

THE PRESIDENT'S NEW VISION OF SPACE

FIELD HEARING

BEFORE THE

SUBCOMMITTEE ON SCIENCE, TECHNOLOGY,
AND SPACE

OF THE

COMMITTEE ON COMMERCE,
SCIENCE, AND TRANSPORTATION
UNITED STATES SENATE

ONE HUNDRED EIGHTH CONGRESS

SECOND SESSION

FEBRUARY 18, 2004

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ONE HUNDRED EIGHTH CONGRESS

SECOND SESSION

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CONTENTS

	Page
Hearing held on February 18, 2004	1
Statement of Senator Brownback	1
Prepared statement	2
WITNESSES	
Chafer, Charles M., President, Team Encounter, LLC	34
Prepared statement	37
Cornyn, Hon. John, U.S. Senator from Texas	3
DeLay, Hon. Tom, Congressman from Texas	4
Lorsch, Robert H., President, The RHL Group, Inc.	39
Prepared statement	42
Mitchell, William F., President, Altair Development Corporation and Chief Executive Officer, NEO Safety International	79
Prepared statement	81
Readdy, William, Associate Administrator for Space Flight, National Aero- nautics and Space Administration; accompanied by Dr. Mary Kicza, Asso- ciate Administrator for Biological and Physical Research; Retired U.S. Navy Rear Admiral Craig Steidle, Associate Administrator for Exploration Sys- tems; and General Jeff Howell, Administrator of the Johnson Space Flight Center	8
Prepared statement	10
Stadd, Courtney A., President, Capitol Solutions	86
Prepared statement	89

THE PRESIDENT'S NEW VISION OF SPACE

WEDNESDAY, FEBRUARY 18, 2004

U.S. SENATE,
SUBCOMMITTEE ON SCIENCE, TECHNOLOGY, AND SPACE,
COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION,
Nassau Bay, TX.

The Committee met, pursuant to notice, at 9:30 a.m. in Council Chambers, Nassau Bay City Hall, Hon. Sam Brownback, Chairman of the Committee, presiding.

OPENING STATEMENT OF HON. SAM BROWNBACK, U.S. SENATOR FROM KANSAS:

Senator BROWNBACK. I call the hearing to order; I thank you all for being out this morning. My name is Sam Brownback and I chair the Senate Subcommittee for Science, Space, and Technology. This is a field hearing of the U.S. Senate and the Subcommittee regarding space exploration and going to the Moon and beyond. I particularly wanted to have this hearing in Houston, given its connection, its guidance and the work that's going to be involved to get this exciting mission going.

I'm delighted to be joined by two Texans, both of whom will be giving an opening statement, who are enormously supportive of the space program and guiding it. Their vision has helped to get us to this point and is going to carry it on forward. We'll be having witnesses, and I understand both of them have further schedules as well. So, they may have to depart sometime before the full hearing is over.

On January 14, President Bush gave one of the most important speeches a president can give. He set our Nation once again on a course to the future. This future will see American men and women return to the Moon for extended periods of time and journey to the planet of Mars. This initiative is definitely a big boost to NASA, and its dedicated men and women, but it's much more than that. It is for the next generation of Americans. President Bush wants a new generation of Americans to have an unlimited future, a future in which space exploration will play a key role.

My generation was inspired by Americans walking on the Moon and flying in space. We were inspired to study science and engineering and we put those talents to great use in building America's economy to the envy of the world. The new generation of young Americans watches countless movies and television shows featuring humans working and living on other worlds, President Bush has challenged them to make these visions real, and they will.

President Bush's space initiative will involve new NASA programs that will be much more than just government work. It will unite our vast private sector's talents and resources to lead the way to space, generating great new wealth and capability. In the next few months, the private sector will be flying ordinary Americans to space for the first time.

In a few months, completely privately-financed rockets will blast new, low-cost satellites into orbit. These satellites will contribute a new dimension to our pressing national security problems and we'll hear some of their ideas today. America is not alone in understanding the promise of space exploration; the first in a series of European missions to the Moon is currently underway (more will soon follow from India, Japan and China). These nations have all announced their intent to place humans on other worlds, beginning with the Moon. Some of these nations are allies but they are all our economic competitors. They know that their space exploration will stimulate their new generations to develop both technical and ultimately economically powerful new capacities.

It has been almost 30 years since Americans last walked on another world, 30 years. Much has changed; new technologies and ideas have emerged. Some have criticized the exploration effort as unaffordable and extravagant, but this is manifestly untrue. Most of the Government resources needed for human exploration of the Moon and Mars will come from reorienting our priorities within NASA. More significantly, though, other resources will come from American entrepreneurs who will reap the rewards of their space investments.

I'm proud to chair the Senate Subcommittee on Science, Technology, and Space and I'm proud to be here in Houston today where America's past journeys to other worlds were led and where our future journeys will be led as well.

Your work will continue to inspire new generations. It's America's destiny to lead the world in science, technology, space, and economic development, as well as to lead humanity to other worlds. It's an exciting and bold mission.

I'm delighted to be joined by my colleague in the Senate, John Cornyn and I have to say, "Thank you, Texas," for sending us such a great Senator. I have already gotten to know him well in the period of time he's been in the Senate and although he's new, he is not operating as somebody new. He is doing a fabulous job. You should be very pleased with your new Senator.

[The prepared statement of Senator Brownback follows:]

PREPARED STATEMENT OF HON. SAM BROWNBACK, U.S. SENATOR FROM KANSAS

On January 14, President Bush gave one of the most important speeches a President can give. He set our Nation once again on a course to the future. This future will see American men and women return to the moon for extended periods and journey to the planet Mars.

This initiative is a big boost to NASA and its dedicated men and women to be sure. But it is much more than that. It is for our next generation of Americans. President Bush wants a new generation of Americans to have an unlimited future—a future in which space exploration will play a key role. My engineering. And we put those talents to great use in building America's economy to the envy of the world. Our new generation of young Americans watches countless movies and television shows featuring humans working and living on other worlds. Now President Bush has challenged them to make these visions real. And they will!

President Bush's space initiative will involve new NASA programs. But it will be much more than just Government work. It will ignite our vast private sector's talent and resources to lead the way in space—generating great new wealth and capability. In a few months this private sector will fly ordinary Americans in space for the first time. In a few months wholly privately-financed rockets will blast new low cost satellites into orbit. These satellites will contribute a new dimension to our pressing national security problems. We will hear some of these ideas today.

America is not alone in understanding the promise of space exploration. Even now the first in a series of European missions to the moon is underway. More will soon follow from India, Japan and China. These nations have all announced their intent to place humans on other worlds beginning with the moon. Some of these nations are allies. But they are all our economic competitors. They know that their space exploration will stimulate their new generations to develop technical and ultimately economically powerful new capabilities.

It has been almost 30 years since Americans last walked on another world. Much has changed. New technologies abound. New ideas have emerged. Some have criticized the exploration effort as unaffordable and extravagant. This is manifestly untrue. Most of the Government resources needed for human exploration of the Moon and Mars will come from re-orienting our priorities within NASA. More significantly though, other resources will come from the American entrepreneurs who will reap the rewards of their space investments.

I am proud to chair the Senate Subcommittee on Science, Technology, and Space. I'm proud to be here today in Houston—where America's past journeys to other worlds were led and where our future journeys will begin. Your work will continue to inspire our new generations. It is America's destiny to lead—to lead the world in science, technology and space, to lead in economic development and to lead humanity to other worlds.

Senator BROWNBACK. John, thank you for joining me this morning.

**STATEMENT OF HON. JOHN CORNYN,
U.S. SENATOR FROM TEXAS**

Senator CORNYN. Good, I'm glad to have you here.

And Senator Brownback, I'd like to welcome you and NASA Associate Administrator Readdy, on behalf of myself and Senator Kay Bailey Hutchison, who I know regrets she's not able to be here today, and I thank you for the opportunity to say a few words this morning.

Of course, it's always an honor to be with my friend and the Johnson Space Center's best friend in the House of Representatives, the Majority Leader of the House of Representatives Tom DeLay. Tom, always good to be with you.

As a Senator representing Texas, I'm immensely proud of the dedicated men and women working at the Johnson Space Center, which has been the home of America's manned space flight for more than 40 years. In Houston working at NASA is more than a job, it's a way of life dedicated to expanding our body of knowledge and the way of life through human space exploration.

On January 14, as Senator Brownback has already noted, the President unveiled a vision for our space program that is worthy of our great Nation, daring, innovative and revolutionary. The United States was settled by pioneers who were determined and undaunted by any obstacle—NASA and the private companies supporting our space program are the modern manifestation of this pioneering spirit. NASA, and especially the men and women who work at the Johnson Space Center, face new and exciting challenges.

In the near term we must return the space shuttle to flight, consistent with updated safety precautions, since the shuttle is a crit-

ical link in the President's plans for the future. The shuttle will transport the remaining components to complete the international space station. The space station will serve as a research center to increase our understanding of long-term exposure to space and as a springboard to the Moon and eventually to Mars. The President clearly recognized what many in this room know to be true—the country, NASA and the Johnson Space Center need a new vision.

His new vision will reinvigorate the space program and capture the public's imagination. There has been much discussion recently about the economy, other countries competing for jobs in this country, whether it's manufacturing, computer programming and business support functions. Some advocate trade barriers and other protectionist measures. Instead, I believe we must continue to strive for excellence to make sure the United States will always be the world's technological leader.

As a re-energized NASA and contract community can play a critical role in the larger American economy to maintain our position as technological leaders, a daring and challenging space program will attract the best and brightest by encouraging more American students to study engineering, computer programming and the sciences. NASA can serve as the intellectual catalyst for development of a new generation of technology, much like previous NASA innovations have led to the development of things that we take for granted today like global positioning systems and CAT scan equipment.

Mr. Chairman, I want to express my appreciation for the opportunity to be with you here today and, again, welcome you. In addition, I can assure you that Senator Hutchison and I, on behalf of the Senate and Congressman DeLay, Majority Leader DeLay, will do everything we can to work with you to accomplish this important vision. Thanks again for being here.

Senator BROWNBACK. Thank you, Senator Cornyn. I appreciate that, and I talked with Senator Hutchison when we were setting this hearing up and she wanted to be here, but could not because of other commitments. She's on the Commerce Committee and is a strong supporter of the space program and NASA.

You have no better supporter in all of Washington than Tom DeLay. I remember Tom talking about a permanent mission, permanent establishment and colonies on the Moon when most people kind of thought of that as a pretty wild idea, Tom. At the time I remember myself thinking twice or more about that, yet, knowing your ability. You've been right on a lot of these things early on and you're right on this one, too.

And so, I'm delighted to have Tom DeLay here as the House Majority Leader, but also, and more importantly, as a key and strong supporter of the NASA program and space exploration.

**STATEMENT OF HON. TOM DELAY,
CONGRESSMAN FROM TEXAS**

Mr. DELAY. Thank you, Mr. Chairman.

I am really thrilled that you're here. Your timing is absolutely perfect. This is the right time to be here to discuss the future of space and I'm glad to be here with my colleague and my Senator John Cornyn and I'm glad to—and I know Kay Bailey Hutchison

is paying attention to this issue as well as to this hearing. John Cornyn has done an incredible job already in a very short period of time, as if he was a veteran. He hit the ground running when he—when he entered the Senate and has distinguished himself in a very short period of time. So, it's great to be with you, Senator.

I am really honored to be here today to speak to this body and the Subcommittee on the President's bold vision for NASA. Not only for the privilege of testifying before the upper body but also the privilege of welcoming the Subcommittee to my own backyard and because, Senators, the men and women you will meet during your stay here, the space community of the Bay Area-Houston, many of whom are my own constituents, are among the finest minds, the finest public servants and the finest people I have ever known. These are the people who won the space race, who put a man on the Moon, who designed and operate the International Space Station and who fly the only reusable launch vehicle, the space shuttle. They're the people who took mankind into space and, Mr. Chairman, they're the people who will take us there again.

The success of NASA's Mars rovers, the Spirit and Opportunity, has captured the imagination of our Nation and of our world. Since the Spirit rover landed on the surface of Mars earlier this year, NASA's website has received almost 6 billion hits. In less than 2 months, NASA has experienced more Internet traffic than any Federal Government website has ever had in a whole year. So, lest we have doubts, mankind's fascination with space and the red planet, in particular, is alive and is well.

And as such, the timing is perfect. After more than two decades of brilliant ingenuity on the space station and the space shuttle, for the President's plan to reinvigorate human space flight program, first to return us to the Moon and, ultimately, to send a manned mission to Mars. Having lived in this area most of my life and having represented many in the Johnson Space Center community for years, the President's speech last month is exactly what I believe NASA has needed for a long time and that's a new vision.

The vision is bold and dramatic, thrilling, really, when you think about the risks and the rewards involved, but it's also realistic and it's practical. The pivot toward the Moon and Mars can't be made overnight and the President's vision accounts for the necessary transfer of time, energy and resources into the new project. The new vision lays out a multi-track program to focus research, planning and exploration on new goals.

The first step, returning the space shuttle to flight as soon as possible, with eye toward completing assembly on the International Space Station can begin soon. The shuttle and the station are vital components of NASA and vital components of the President's vision. They represent the springboard that will vault us into this new era of exploration.

And as the space station is completed, NASA will focus its station research on bioastronautics, the impact of space travel on the human body. Questions about prolonged human exposure to radiation and microgravity are pivotal to human survival on the Moon and during the long trip to Mars. And these questions can't be answered without the laboratories of the space station and when they

are answered, the benefits will be reaped here on Earth as much as they are in outer space.

The Senator from Texas has already talked about all the benefits that we reap from the space program and the shuttle, like the programmable pacemaker, the MRI, the portable X-ray machine and the automatic insulin pump before them. Solutions to problems of prolonged space travel will answer medical questions that face doctors and patients back here on terra firma. Exploration, by its very nature, deals in new territory.

Just as seafarers long ago developed sextants and astrolabes, which, ultimately, served humanity for centuries, so, too, has NASA developed technologies that seem limited in scope but which now are integral parts of modern life. In addition to medical breakthroughs, NASA's work over the years has introduced the world to touchtone telephony, cellular phones and the unquantifiable communications and national security benefits of satellite technology. The list goes on and on.

And I'm not insensitive to the concerns many have about this ambitious new vision in light of the current fiscal situation, but I believe money spent responsibly on focused, goal-oriented space exploration like the President has outlined is an investment of inestimable value.

Technological innovations, like those we can expect to reap from such exploration, will lead to greater economic strength and military security here at home; and to my mind, space exploration, like nautical exploration centuries ago, is inseparable from economic strength and military security. NASA has the experience and the expertise to do this, Mr. Chairman. And if you ask them, I'd bet most of the folks here at the Johnson Space Center have been waiting for a long time to take on the challenge that President Bush has issued.

I firmly hope those of us in Congress will give them the support they need to get the job done. It will be tough convincing our colleagues how vitally important this mission is. In addition to its direct benefits to our collective knowledge, advances in security, healthcare and communication technology, America's mission to Mars will inspire a generation of children to become scientists and engineers and, more fundamentally, to dare to dream.

Thanks to the President we have an opportunity to do great things, Mr. Chairman; and I look forward to working with you and the Senate to educate and convince our colleagues both in the House and the Senate of our need to seize this opportunity. Thank you, Mr. Chairman. Thank you for being in the Bay Area/Houston area.

Senator BROWNBACK. Thank you, Tom. I appreciate it and your testimony.

Mr. Readdy, we want to bring you up to be the first panel. Mr. William Readdy, Associate Administrator for Space Flight National Aeronautics Space Administration out of Washington. As I noted to you earlier, both Senator Cornyn and Majority Leader DeLay may have to leave at some time during the hearing with other commitments, but I'm very appreciative to both the gentlemen for being here for the hearing.

Mr. DELAY. I appreciate that, Mr. Chairman. I might say I've already heard Mr. Readdy.

Senator BROWNBAC. Thanks for joining us. I appreciate it.

And I understand the Johnson Space Center director is here, General Howell.

General HOWELL. Yes, sir.

Senator BROWNBAC. Sir, thank you very much for allowing us to hold this hearing here.

General HOWELL. We're delighted you're here, sir. On behalf of our 10,000 employees and the wonderful people here who support us, we just want to welcome you, say we're delighted you're here and we're very excited about carrying out the President's vision in the days ahead.

Senator BROWNBAC. Thank you. I've been looking forward to this hearing for a while because I wanted to find out from the people here what they were viewing and looking at. Just one additional comment as we're getting y'all settled—and Tom DeLay mentioned this—regarding the inspiration for the next generation. To me, this is the incredible and tangible value of what this mission's about and I mean both terms, incredible and intangible value.

One short vignette. I was a White House fellow about 12 years ago and one of the guys I was a fellow with went through the naval academy. The reason he went through the Naval Academy was because he saw these astronauts flying and going to the Moon when he was a much younger man, and said to his dad: "I want to be an astronaut."

His dad said "Well, if you want to be an astronaut, you've got to go to the Naval Academy. Most of these guys are Naval Academy."

Now, General Howell, I recognize that probably doesn't apply to you. Which academy did you go to?

General HOWELL. I'm a graduate of the University of Texas, sir.

Senator BROWNBAC. Oh, OK.

General HOWELL. I did not qualify to be an astronaut.

Senator BROWNBAC. That would be the "Longhorn Academy."

The reason I say this is because he went to the Naval Academy to be an astronaut. He ended up being the captain of an aircraft carrier for us, which is the largest asset that we have in the U.S. military and he's in charge of it. He wouldn't have been there but for the dream of space. And how many millions of children around the world are inspired because we're going there? To me, that's the thing that I so want us to do—to inspire that 12-year-old boy in Minneapolis, Kansas, that's looking at this and saying "I want to go there, I'm going to study science and engineering and I'm going to go to the academy. I'm going to push myself because we're going there." This is an incredible value.

So, I'm delighted that you're all here. Mr. Readdy, I just had you down as testifying. I'm happy to have the whole group or you may want to introduce your team and then divvy it up any way you'd like.

But thank you for coming here and the floor is yours.

**STATEMENT OF WILLIAM READDY, ASSOCIATE
ADMINISTRATOR FOR SPACE FLIGHT, NATIONAL
AERONAUTICS AND SPACE ADMINISTRATION; ACCOMPANIED
BY DR. MARY KICZA, ASSOCIATE ADMINISTRATOR FOR
BIOLOGICAL AND PHYSICAL RESEARCH; RETIRED U.S. NAVY
REAR ADMIRAL CRAIG STEIDLE, ASSOCIATE ADMINISTRATOR
FOR EXPLORATION SYSTEMS; AND GENERAL JEFF HOWELL,
ADMINISTRATOR OF THE JOHNSON SPACE FLIGHT CENTER**

Mr. READDY. Mr. Chairman, thank you.

I think if you were to conduct your straw poll here today, the excitement in this room and certainly here at the Johnson Space Flight Center and all of NASA is palpable. I had a chance to do my own straw poll at home with my kids, Sean, Peter and Maureen and they are that next generation of explorers. I think there are stories like that throughout this room. This is an exciting and bold new vision for space exploration that is guaranteed to excite the next generation.

With me today, I have Mary Kicza. She's in charge of biological and physical research, Associate Administrator at NASA; General Howell, the director of the Johnson Space Flight Center; and Admiral Craig Steidle, who is newly on board to head up our exploration initiative.

Senator BROWNBACK. OK. Head up this exploration initiative?

Mr. READDY. Correct.

Admiral STEIDLE. Certainly. Thank you.

Mr. READDY. I have a written statement for the record; and in the interest of time, I'll just go ahead and summarize it.

Senator BROWNBACK. Your written statement will be placed in the record.

Mr. READDY. Thank you, Mr. Chairman.

The President has presented a bold, new, forward-thinking, practical vision, and a responsible vision in his renewed spirit of discovery. Pursuing that vision on behalf of the American public, NASA will explore answers to fundamental questions of importance to science and society, develop revolutionary technologies and capabilities for the future while maintaining good stewardship of the taxpayer's dollars.

The President's commission on the implementation of U.S. space exploration policy, led by former secretary of defense and secretary of the Air Force Peter Aldridge, began its deliberations last week and will report on the implementation strategies for the vision in the coming months; this policy's a product of months of extensive and careful deliberations. The importance of these deliberations increased with the findings of the Columbia Accident Investigation board released last August.

These deliberations also form the basis for formulating the President's Fiscal Year 2005 budget request for NASA of \$16.2 billion, representing an increase of 5.6 percent over the previous year. The new U.S. space exploration policy's fundamental goal is to advance scientific, national security, and economic interest through a robust space program. In support of this goal NASA will implement a sustained, achievable and affordable human space flight program that calls for the return of the space shuttle to flight as soon as safely feasible, in order to complete the assembly of International Space

Station, a return to the Moon by the year 2020 in preparation for human exploration of Mars and other destinations.

We think this will promote international and commercial participation in these interests and further U.S. scientific, security and economic benefits. NASA will plan and implement an integrated, long-term robotic and human exploration program measured by milestones and executed on the basis of available resources, using our accumulated experience and technology as they become ready.

Space shuttle, our return to flight as soon as practicable. I was down at Galveston the last 2 days for the shuttle summit, where we're refocusing what was formerly the service life extension program with nearer term objectives of return to flight and assembly of International Space Station—to fulfill our international commitments and build a premier research platform in the space that will allow us to pursue our exploration objectives. We will determine in the next year how best to optimize the use of the space shuttle fleet to do that assembly and assure for the remainder of its life that that investment is sound and focused on safety, reliability and maintainability during this period.

International Space Station's goals will be refocused on the human condition and understanding the fundamental biological challenges to enable astronauts to survive for long-duration missions in space. The budget includes \$1.9 billion for ISS assembly; and while we must work diligently to return safely to flight, we must not forget that orbiting the Earth right this minute on board that International Space Station are Mike Foale and Alexander Kaleri.

Tomorrow they'll be conducting the tests on board with their Arlon space suits to facilitate a space walk next week to inspect the space station and ready it for the autonomous transfer vehicle's arrival sometime next year.

Achieving a full-time human presence on board International Space Station offers us a tremendous opportunity to study human survival in a hostile environment in space and to assess how to overcome the technological hurdles of increased duration space flight. The Space Station plays a key role in preparing us for a human journey into the solar system, first to the Moon and then to Mars.

New Space transportation capabilities, Project Constellation is a new crew exploration vehicle and Admiral Craig Steidle will be in charge of that effort; to provide crew transportation for exploration missions beyond lower orbit. \$428 million is budgeted for this project with an initial unpiloted test flight planned as early as 2008.

Also, we intend to undertake lunar exploration and demonstrate abilities that enable to sustain human and robotic exploration of the Moon, Mars, and other destinations within the solar system. The budget provides \$70 million for robotic lunar test beds and increases to \$420 in Fiscal Year 2009.

Exploration to Mars has, I think, over 6 billion web hits thus far of which over 50 million are individual web addresses that include the likes of AOL, which counts as a single address where there are millions of subscribers. The interest in this, as we've looked at the demographics, includes, obviously, the academic, scientific commu-

nity; but, more importantly, fully half are concerned citizens, interested citizens and children that are being inspired by the robotic exploration that's ongoing right now.

Enabling technologies, Project Prometheus—that's a nuclear propulsion power generation—budget provides \$438 million for that and investments in advanced human and robotic technology systems. We also have included incentives for private enterprise. There's \$10 million in this year's budget to purchase launch services from emerging launch vehicle providers.

There's a commitment to obtain commercial services in the order of \$140 million to support International Space Station, as we phaseout the space shuttle. That, plus we intend to honor our commitments elsewhere within NASA and our other important missions and institutional goals. To successfully execute our exploration vision, NASA will refocus its organization, create new offices—Admiral Steidle is doing that as we speak—and realign ongoing programs to further support our exploration agenda.

Craig Steidle is with me today, as is Mary Kicza. I'd like to sum up by stating as the President stated in his speech, we're embarking on a journey not a race. We begin this journey of exploration and discovery knowing that many years of hard work and sustained effort will be required so that we can look forward to achieving concrete results in the near term. The vision makes the needed decisions for long-term U.S. space leadership, provides an exciting step of major milestones for human and robotic missions and invites new ideas and innovations for accomplishing this bold new vision.

It will provide an opportunity for new generations of Americans to explore, innovate, discover and reach our Nation in ways that today are unimaginable. Fortune favors the bold. Thank you, Mr. Chairman.

[The prepared statement of Mr. Readdy follows:]

PREPARED STATEMENT OF WILLIAM READDY, ASSOCIATE ADMINISTRATOR FOR SPACE FLIGHT, NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

Mr. Chairman, thank you for this opportunity to join you in the beautiful state of Texas to discuss the President's vision for U.S. Space Exploration and NASA's plans for implementing this vision. I am accompanied today by two of my NASA colleagues, Dr. Mary Kicza, Associate Administrator for Biological and Physical Research, and Retired U.S. Navy Rear Admiral Craig Steidle, Associate Administrator for Exploration Systems.

On January 14, the President visited NASA Headquarters and announced his Vision for U.S. Space Exploration. In his address, the President presented a vision that is bold and forward-thinking, yet practical and responsible—one that explores answers to longstanding questions of importance to science and society and will develop revolutionary technologies and capabilities for the future, while maintaining good stewardship of taxpayer dollars.

The vision forms the basis of the new U.S. space exploration policy, "A Renewed Spirit of Discovery," a copy of which is appended to this testimony as *Enclosure 1*. This policy is the product of months of extensive and careful deliberation. The importance of these deliberations increased with the findings of the *Columbia* Accident Investigation Board, which emphasized the importance of setting clear, long-term goals for the Nation's human space flight program. Inputs from Members of this Committee and other Members of Congress informed the Administration's deliberations. Many others contributed ideas for the future of the space program. These deliberations were also the basis for formulating the President's FY 2005 Budget request for NASA. A commission will advise NASA on specific issues for implementation of the policy's goals within four months.

Today, I will summarize the President's FY 2005 budget request for NASA, discuss the goals set forth in the new U.S. space exploration policy, walk you through the major implementation elements and their associated budget details, explain the implications of this directive for NASA's organization, and describe what the Nation's future in exploration and discovery will look like in the coming years.

FY 2005 Budget Summary

The President's FY 2005 Budget request for NASA is \$16.244 billion, a 5.6 percent increase over FY 2004, as reflected in *Enclosure 2*. The NASA budget request is designed with four key goals in mind:

Compelling—The budget fully supports the U.S. Vision for Space Exploration, and provides for ongoing NASA mission priorities such as Aeronautics and Earth Science.

Affordable—The budget is fiscally responsible and consistent with the Administration's goal of cutting the Federal deficit in half within the next 5 years. NASA's FY 2005 budget will increase by \$1 billion over 5 years, when compared with the President's FY 2004 plan; that is an increase of approximately 5 percent per year over each of the next 3 years and approximately 1 percent for each of the following 2 years.

Achievable—The budget strategy supporting the vision will *not* require large balloon payments by future Congresses and Administrations. Unlike previous major civil space initiatives, this approach is intentionally flexible, with investments in sustainable exploration approaches to maintain affordability. After FY 2009, the budget projects that the exploration vision can be implemented within a NASA budget that keeps pace with inflation.

Focused—The budget begins the alignment of NASA's program structure with the exploration vision. We now have the needed compass from which to evaluate our programs and make the needed tough decisions.

Vision Goals

The fundamental goal of this new policy is to advance U.S. scientific, security, and economic interests through a robust space exploration program. In support of this goal, NASA will:

- Implement a sustained and affordable human and robotic program to explore the Solar System and beyond;
- Extend human presence across the Solar System, starting with a human return to the Moon by the year 2020, in preparation for human exploration of Mars and other destinations;
- Develop the innovative technologies, knowledge, and infrastructures both to explore and to support decisions about destinations for future human exploration; and
- Promote international and commercial participation in exploration to further U.S. scientific, security, and economic interests.

Implementation Elements and Budget Highlights

To achieve these goals, NASA will plan and implement an integrated, long-term robotic and human exploration program, structured with measurable milestones and executed on the basis of available resources, accumulated experience, and technology readiness. The policy envisions the following major implementation elements:

Space Shuttle—NASA will return the Space Shuttle to flight as soon as practical, based on the recommendations of the Columbia Accident Investigation Board. The budget includes \$4.3 billion for the Space Shuttle, a 9 percent increase above FY 2004. Included in this total is an estimated \$238 million for Return to Flight (RTF) activities in FY 2005. The RTF activities are under evaluation to confirm the estimated cost and associated out year phasing. The focus of the Space Shuttle will be finishing assembly of the International Space Station (ISS). With its job done, the Space Shuttle will be phased out when assembly of the ISS is complete, planned for the end of the decade. NASA will determine over the next year how best to address the issues associated with the safe retirement of the Space Shuttle fleet.

International Space Station—NASA plans to complete assembly of the International Space Station (ISS) by the end of the decade, including those U.S. components that will ensure our capability to conduct research in support of the new U.S. space exploration goals and those planned and provided by foreign partners. The budget provides \$1.9 billion for ISS assembly and operations, a 24 percent increase above FY 2004. This increase forward funds \$100 million in reserves to partially restore planned near-term reserve levels following the \$200 million Congressional cut

to Space Station in FY 2004 and provides \$140 million in new funding for transportation services to the Space Station. We will separate, to the maximum extent practical, crew and cargo transportation for both ISS and exploration missions. NASA will acquire ISS crew transport as required and cargo transportation as soon as practical and affordable. NASA envisions that commercial and/or foreign capabilities will provide these services.

NASA anticipates that any adjustments in existing ISS Partner responsibilities as a result of the new U.S. space exploration policy can be accommodated within the existing ISS agreements. The ISS Multilateral Coordination Board is scheduled to meet today to begin the process of coordination within the Partnership on implications to the ISS resulting from the new policy. The Administration is also prepared to address issues associated with obtaining foreign transportation services to the Space Station, including provisions of the Iran Nonproliferation Act, but until the ISS Partnership adopts a specific implementation strategy, it is premature to identify specific issues.

U.S. research activities aboard the ISS will be focused to support the new exploration goals, with an emphasis on understanding how the space environment affects astronaut health and capabilities, and on developing appropriate countermeasures to mitigate health concerns. ISS will also be vital to develop and demonstrate improved life support systems and medical care. Consistent with this focus, the budget provides \$343 million, a 61 percent increase above FY 2004, for bioastronautics research to understand and mitigate risks to humans on exploration missions. Over the next year, the Biological and Physical Research Enterprise will conduct a thorough review of all research activities to ensure that they are fully aligned with and supportive of the new exploration vision.

New Space Transportation Capabilities—The budget provides \$428 million to begin a new Crew Exploration Vehicle, named Project Constellation, that will provide crew transport for exploration missions beyond low-Earth orbit. The current budget planning is based on formulation concept studies to be conducted in FY 2004, preliminary design activities conducted in FY 2005 and FY 2006, a System Design Review in FY 2005, and a Preliminary Design Review in FY 2006. NASA plans to develop Project Constellation in a step-by-step approach, with an initial unpiloted test flight as early as 2008, followed by tests of progressively more capable designs that provide an operational human-rated capability no later than 2014. Project Constellation may also provide transportation to the Space Station, but its design will be driven by exploration requirements.

NASA does not plan to pursue new Earth-to-orbit transportation capabilities, except where necessary to support unique exploration needs, such as a heavy lift vehicle. The budget discontinues the Space Launch Initiative, although knowledge gained on the Orbital Space Plane will be transferred to Project Constellation.

Lunar Exploration—NASA will undertake lunar exploration and demonstration activities to enable sustained human and robotic exploration of Mars and other destinations in the Solar System. Beginning no later than 2008, NASA plans to launch the first in a series of robotic missions to the Moon to prepare for and support human exploration activities. The budget provides \$70 million for these robotic lunar test beds, increasing to \$420 million by FY 2009. The policy envisions the first human expedition to the lunar surface as early as 2015, but no later than 2020. These robotic and human missions will further science and demonstrate new approaches, technologies, and systems—including the use of space resources—to support sustained human exploration to Mars and other destinations.

Exploration of Mars—The stunning images we have received from Mars are just the beginning of future Mars exploration. NASA will enhance the ongoing search for water and evidence of life on Mars by pursuing technologies in this decade for advanced science missions to Mars in the next decade. Also starting in the next decade, NASA will launch a dedicated series of robotic missions to Mars that will demonstrate greatly enhanced robotic capabilities and enable future human exploration of the Red Planet. The budget provides \$691 million for Mars Exploration, a 16 percent increase over FY 2004, and will double Mars Exploration funding by FY 2009. NASA will conduct human expeditions to Mars and other destinations beyond Earth orbit on the basis of available resources, accumulated experience, and technology readiness.

Other Solar System Exploration—Over the next two decades, NASA will conduct an increasingly capable campaign of robotic exploration across the Solar System. The budget provides \$1.2 billion for Solar System Exploration missions to Jupiter's icy moons, to Saturn and its moon Titan, to asteroids and comets, and to other Solar System bodies. These missions will search for evidence of life, help us to understand the history of the Solar System, and search for resources.

Extrasolar Planets—NASA will launch advanced space telescopes that will search for Earth-like planets and habitable environments around other stars. The budget includes \$1.1 billion for the Astronomical Search for Origins, a 19 percent increase over FY 2004, to support Hubble Space Telescope operations, the recently launched Spitzer Space Telescope, James Webb Space Telescope development, as well as three future observatories. This funding also supports investments to extend the lifetime of the Hubble Space Telescope to the maximum extent possible without a servicing mission.

Enabling Capabilities—NASA will pursue a number of key capabilities to enable sustainable human and robotic exploration across the Solar System. Among the most important of these capabilities is advanced power and propulsion, and the budget provides \$438 million for Project Prometheus to develop these technologies for future robotic and human exploration missions. The budget also includes \$636 million in other Human and Robotic Technology funding to pursue sustainable approaches to Solar System exploration, such as reusable and modular systems, pre-positioned propellants, space resource utilization, automated systems and robotic networks, and in-space assembly. These technologies will be demonstrated on the ground, in orbit, and on the Moon beginning in this decade and extending into the next to help inform future exploration decisions. The budget projects that funding for these Human and Robotic Technology investments will grow to \$1 billion by FY 2009.

The budget also includes innovative opportunities for U.S. industry, academia, and members of the public to help meet the technical challenges inherent in the new space exploration vision. The budget includes \$20 million for the new Centennial Challenges program, which will establish competitions to stimulate innovation in space and aeronautical technologies that can advance the exploration vision and other NASA missions. The budget also provides \$10 million for NASA to purchase launch services for its payloads from emerging launch vehicle providers. And as previously mentioned, the budget includes \$140 million for Space Station transportation services.

Ongoing Priorities—The budget supports the vision for space exploration, while maintaining NASA commitments in other important roles and missions.

NASA continues its commitment to helping understand our changing global climate. The budget makes NASA the largest contributor to the interagency Climate Change Science Program with \$100 million for the Climate Change Research Initiative. The budget includes \$560 million for Earth Science research, a 7 percent increase above FY 2004, to support research on data from 80 sensors on 18 satellites currently in operation. Work also continues on Earth observation missions in development or formulation, including \$141 million (a 36 percent increase from FY 2004) for the National Polar Orbiting Environmental Satellite System Preparatory Project, \$42 million for the Landsat Data Continuity Mission, and \$240 million (a 37 percent increase from FY 2004) for missions in formulation, such as the Orbiting Carbon Observatory, Aquarius and Hydros.

NASA maintains planned Aeronautics Technology investments to improve our Nation's air system. The budget includes: \$188 million, a 4 percent increase above FY 2004, for technology to reduce aircraft accidents and improve the security of our Nation's aviation system against terrorist threats; \$72 million, an 11 percent increase above FY 2004, for technology to reduce aircraft noise and improve the quality of life for residents living near airports; \$209 million for technology to reduce aircraft emissions and improve environmental quality; and \$154 million for technologies to increase air system capacity and reduce delays in the Nation's airports.

NASA will continue to make fundamental advances in our knowledge of the Sun and the Universe. The budget provides \$746 million for Sun-Earth Connection missions, including the Solar Dynamics Observatory and the Solar-Terrestrial Relations Observatory. The budget also provides \$378 million for Structure and Evolution of the Universe missions, including the Chandra X-ray Observatory and three major missions currently under development.

NASA also maintains its role in science, engineering and math education. The budget includes \$10 million for the newly authorized Science and Technology Scholarship program, which will help attract the Nation's best college students to NASA science and engineering careers. The budget also provides \$14 million for the NASA Explorer Schools, which seeks to attract students to mathematics and science during the critical middle school years. The Explorer Schools program is entering its third phase and will be selecting 50 new schools for a total of 150 participating schools.

Management of Human Capital, Facilities and Institution—NASA has earned the distinction of being the only Federal agency to earn top grades for the Human Capital and Budget and Performance Integration initiatives under the President's Management Agenda. Congress recently passed the NASA Workforce Flexibility Act.

NASA is grateful for the hard work of this Committee in shaping this legislation to provide necessary flexibilities to better manage the NASA workforce. These flexibilities will be critical to implementing the exploration vision. The budget includes \$25 million in FY 2005 to begin to address critical workforce skill and aging issues. NASA ratings have also improved in the Competitive Sourcing and E-Government initiatives, resulting in more total improvements than any other agency. Although we received a disclaimed opinion on our recent audit statement, we are determined in pursuing the right path in Financial Management in bringing on a new financial system that will standardize accounting across the Agency and provide the necessary tools for improved program management. NASA remains committed to management excellence and believes it is essential to implementing the new exploration vision.

The budget includes funding for critical institutional capabilities, including \$77 million for the NASA Engineering Safety Center and \$27 million for Independent Verification and Validation. The budget also provides \$307 million, a \$41 million increase versus FY 2004, for facilities maintenance.

Organizing for Exploration

To successfully execute the exploration vision, NASA will re-focus its organization, create new offices, align ongoing programs, experiment with new ways of doing business, and tap the great innovative and creative talents of our Nation.

The President has issued an Executive Order creating a commission of private and public sector experts to advise on these issues. Former Undersecretary of Defense and Secretary of the Air Force, Pete Aldridge, is Chair of the Commission. The President has named eight other commissioners to join Mr. Aldridge. The commission will issue its report within four months of its first meeting, which is scheduled for February 11, 2004.

Immediately following the President's speech, we established an Exploration Systems Enterprise, which will have responsibility for developing the Crew Exploration Vehicle and other exploration systems and technologies. Retired U.S. Navy Rear Admiral Craig Steidle, former manager of the Defense Department's Joint Strike Fighter Program, is heading this new organization. Relevant programs of the Aerospace Technology, Space Science, and Space Flight enterprises are being transferred to the Exploration Systems Enterprise. The Aerospace Technology Enterprise has been renamed the Aeronautics Enterprise to reflect its new focus.

As human explorers prepare to join their robotic counterparts, coordination and integration will increase. The Exploration Systems Enterprise will work closely with the Space Science Enterprise to use the Moon to demonstrate new approaches, technologies, and systems to support sustained human exploration. NASA's Space Science Enterprise will have responsibility for implementing early robotic testbeds on the Moon and Mars and will also demonstrate other key exploration technologies—such as advanced power, propulsion, and communications—in missions to Mars and Jupiter's moons. NASA's Space Science Enterprise will eventually integrate human capabilities into exploration planning for Mars and other destinations.

Many other elements of the NASA organization will be focused to support this new direction. NASA's Biological and Physical Research Enterprise will put much greater emphasis on bioastronautics research to enable the human exploration of other worlds. NASA's Office of the Space Architect will be responsible for integrating the exploration activities of NASA's different Enterprises and for maintaining exploration roadmaps and coordinating high-level requirements.

As we move outward into the Solar System, NASA will look for innovative ideas from the private sector and academia to support activities in Earth orbit and future exploration activities beyond. Many of the technical challenges that NASA will face in the coming years will require innovative solutions. In addition to tapping creative thinking within the NASA organization, we will leverage the ideas and expertise resident in the Nation's universities and industry.

In his speech, the President directed NASA to invite other nations to share in the challenges and opportunities of this new era of exploration and discovery, and he directed us to fulfill our standing international commitments. We are discussing the impact of our vision implementation plans on the ISS with our partners, and as I have already indicated we will complete the assembly of the ISS. The President called our future course of exploration "a journey, not a race," and other nations have reacted positively to the President's guidance. Several have already contacted us about joining in this journey. Building on NASA's long history and extensive and close ties with the space and research agencies of other nations, we will actively seek international partners in executing future exploration activities.

NASA will also invigorate its workforce, focus its facilities, and revitalize its field centers. As exploration activities get underway, NASA anticipates planning, re-

views, and changes to align and improve its infrastructure. In order to achieve the exploration vision, we will be making decisions on how to best implement new programs. While some of these necessary actions will not be easy, they are essential to achieving the goals of the overall effort before us. We urge you to consider the full context of what we will be proposing rather than any isolated, specific action. Such a perspective will allow us to move forward in implementing the vision.

FY 2003 Accomplishments

Much of the NASA's future ability to achieve the new space exploration vision is predicated on NASA's many previous accomplishments. The most visible NASA successes over the past year are the Spirit and Opportunity rovers currently on Mars. Already, the landscapes imaged by these twin rovers and their initial science returns are hinting at fundamental advances in our understanding of early environmental conditions on Mars and whether Mars was once capable of sustaining water and the development of life.

However, Spirit and Opportunity are not the only recent NASA mission successes. NASA successfully launched four new Space Science missions (including the two Mars rovers), three new Earth Science missions, one new NASA communications relay satellite, and completed two Space Station deployment missions. Missions in operation have also achieved a number of notable successes, including the Stardust mission's successful flight through the tail of Comet Wild-2, initial images from the recently launched Spitzer Space Telescope, a ten-to 100-fold improvement in Earth's gravity map from the GRACE satellite, the most accurate maps of Earth temperatures to date from the Aqua satellite, and new insights into space weather and solar activity from Sun-Earth Connection missions.

NASA exceeded or met 83 percent of its annual performance goals for FY 2003. Among these accomplishments were demonstrations of new systems to improve air traffic control and to combat aircraft icing, improvements in battery, telescope sensor, and life support technologies, fundamental advances in understanding states of matter from Space Station research, and the implementation of new remote sensing tools for tracking diseases and wild fires.

The Nation's Future in Exploration and Discovery

As the President stated in his speech, we are embarking on a journey, not a race. We begin this journey of exploration and discovery knowing that many years of hard work and sustained effort will be required, yet we can look forward to achieving concrete results in the near term. The vision makes the needed decisions to secure long-term U.S. space leadership. It provides an exciting set of major milestones with human and robotic missions. It pursues compelling science and cutting-edge technologies. It invites new ideas and innovations for accomplishing this bold, new vision. And it will provide the opportunity for new generations of Americans to explore, innovate, discover and enrich our Nation in ways unimaginable today. The President's challenging vision provides unique opportunities for engaging students across the country, "as only NASA can," to enter careers in science, engineering, technology and math.

We sincerely appreciate the forum the Subcommittee has provided today, and Dr. Kicza, Adm. Steidle and I look forward to responding to your questions.

A RENEWED SPIRIT OF DISCOVERY

The President's Vision for U.S. Space Exploration

A RENEWED
SPIRIT OF DISCOVERY

*The President's Vision for
U.S. Space Exploration*



PRESIDENT GEORGE W. BUSH

JANUARY 2004

Table of Contents

- I. Background
- II. Goal and Objectives
- III. Bringing the Vision to Reality
 - A. Exploration Activities in Low Earth Orbit
 - a. Space Shuttle
 - b. International Space Station
 - B. Space Exploration Beyond Low Earth Orbit
 - a. The Moon
 - b. Mars and Other Destinations
 - C. Space Transportation Capabilities Supporting Exploration
 - D. International and Commercial Participation

Background

From the Apollo landings on the Moon, to robotic surveys of the Sun and the planets, to the compelling images captured by advanced space telescopes, U.S. achievements in space have revolutionized humanity's view of the universe and have inspired Americans and people around the world. These achievements also have led to the development of technologies that have widespread applications to address problems on Earth. As the world enters the second century of powered flight, it is time to articulate a new vision that will define and guide U.S. space exploration activities for the next several decades.

Today, humanity has the potential to seek answers to the most fundamental questions posed about the existence of life beyond Earth. Telescopes have found planets around other stars. Robotic probes have identified potential resources on the Moon, and evidence of water -- a key ingredient for life -- has been found on Mars and the moons of Jupiter.

Direct human experience in space has fundamentally altered our perspective of humanity and our place in the universe. Humans have the ability to respond to the unexpected developments inherent in space travel and possess unique skills that enhance discoveries. Just as Mercury, Gemini, and Apollo challenged a generation of Americans, a renewed U.S. space exploration program with a significant human component can inspire us -- and our youth -- to greater achievements on Earth and in space.

The loss of Space Shuttles *Challenger* and *Columbia* and their crews are a stark reminder of the inherent risks of space flight and the severity of the challenges posed by space exploration. In preparation for future human exploration, we must advance our ability to live and work safely in space and, at the same time, develop the technologies to extend humanity's reach to the Moon, Mars, and beyond. The new technologies required for further space exploration also will improve the Nation's other space activities and may provide applications that could be used to address problems on Earth.

Like the explorers of the past and the pioneers of flight in the last century, we cannot today identify all that we will gain from space exploration; we are confident, nonetheless, that the eventual return will be great. Like their efforts, the success of future U.S. space exploration will unfold over generations.

Goal and Objectives

The fundamental goal of this vision is to advance U.S. scientific, security, and economic interests through a robust space exploration program. In support of this goal, the United States will:

- Implement a sustained and affordable human and robotic program to explore the solar system and beyond;
- Extend human presence across the solar system, starting with a human return to the Moon by the year 2020, in preparation for human exploration of Mars and other destinations;
- Develop the innovative technologies, knowledge, and infrastructures both to explore and to support decisions about the destinations for human exploration; and
- Promote international and commercial participation in exploration to further U.S. scientific, security, and economic interests.

Bringing the Vision to Reality

The Administrator of the National Aeronautics and Space Administration will be responsible for the plans, programs, and activities required to implement this vision, in coordination with other agencies, as deemed appropriate. The Administrator will plan and implement an integrated, long-term robotic and human exploration program structured with measurable milestones and executed on the basis of available resources, accumulated experience, and technology readiness.

To implement this vision, the Administrator will conduct the following activities and take other actions as required:

A. Exploration Activities in Low Earth Orbit

Space Shuttle

- Return the Space Shuttle to flight as soon as practical, based on the recommendations of the Columbia Accident Investigation Board;
- Focus use of the Space Shuttle to complete assembly of the International Space Station; and
- Retire the Space Shuttle as soon as assembly of the International Space Station is completed, planned for the end of this decade;

International Space Station

- Complete assembly of the International Space Station, including the U.S. components that support U.S. space exploration goals and those provided by foreign partners, planned for the end of this decade;

- Focus U.S. research and use of the International Space Station on supporting space exploration goals, with emphasis on understanding how the space environment affects astronaut health and capabilities and developing countermeasures; and
- Conduct International Space Station activities in a manner consistent with U.S. obligations contained in the agreements between the United States and other partners in the International Space Station.

B. Space Exploration Beyond Low Earth Orbit

The Moon

- Undertake lunar exploration activities to enable sustained human and robotic exploration of Mars and more distant destinations in the solar system;
- Starting no later than 2008, initiate a series of robotic missions to the Moon to prepare for and support future human exploration activities;
- Conduct the first extended human expedition to the lunar surface as early as 2015, but no later than the year 2020; and
- Use lunar exploration activities to further science, and to develop and test new approaches, technologies, and systems, including use of lunar and other space resources, to support sustained human space exploration to Mars and other destinations.

Mars and Other Destinations

- Conduct robotic exploration of Mars to search for evidence of life, to understand the history of the solar system, and to prepare for future human exploration;
- Conduct robotic exploration across the solar system for scientific purposes and to support human exploration. In particular, explore Jupiter's moons, asteroids and other bodies to search for evidence of life, to understand the history of the solar system, and to search for resources;
- Conduct advanced telescope searches for Earth-like planets and habitable environments around other stars;
- Develop and demonstrate power generation, propulsion, life support, and other key capabilities required to support more distant, more capable, and/or longer duration human and robotic exploration of Mars and other destinations; and
- Conduct human expeditions to Mars after acquiring adequate knowledge about the planet using robotic missions and after successfully demonstrating sustained human exploration missions to the Moon.

C. Space Transportation Capabilities Supporting Exploration

- Develop a new crew exploration vehicle to provide crew transportation for missions beyond low Earth orbit;

- Conduct the initial test flight before the end of this decade in order to provide an operational capability to support human exploration missions no later than 2014;
- Separate to the maximum practical extent crew from cargo transportation to the International Space Station and for launching exploration missions beyond low Earth orbit;
 - Acquire cargo transportation as soon as practical and affordable to support missions to and from the International Space Station; and
 - Acquire crew transportation to and from the International Space Station, as required, after the Space Shuttle is retired from service.

D. International and Commercial Participation

- Pursue opportunities for international participation to support U.S. space exploration goals; and
- Pursue commercial opportunities for providing transportation and other services supporting the International Space Station and exploration missions beyond low Earth orbit.

National Aeronautics and Space Administration
President's FY 2005 Budget Request

(Budget authority, \$ in millions)		FULL COST						Chapter Number
By Appropriation Account		Est. Conf. Rept.						
By Enterprise		FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	
By Theme								
Exploration, Science & Aeronautics		7,830	7,760	7,869	8,320	8,900	9,091	ESA-SUM 1
Space Science		3,971	4,138	4,404	4,906	5,520	5,561	ESA 1
Solar System Exploration		1,316	1,187	1,202	1,300	1,392	1,438	ESA 2
Mars Exploration		595	691	724	944	1,188	1,268	ESA 3
Lunar Exploration			70	135	280	375	420	ESA 4
Astronomical Search for Origins		899	1,067	1,196	1,212	1,182	927	ESA 5
Structure & Evolution of the Universe		406	378	365	382	425	457	ESA 6
Sun-Earth Connections		755	745	781	788	958	1,051	ESA 7
Earth Science		1,613	1,485	1,390	1,368	1,343	1,474	ESA 8
Earth System Science		1,522	1,409	1,313	1,290	1,266	1,397	ESA 9
Earth Science Applications		91	77	77	77	77	77	ESA 10
Biological & Physical Research		885	1,049	950	938	941	944	ESA 11
Biological Sciences Research		368	492	499	496	500	502	ESA 12
Physical Sciences Research		357	500	220	210	210	210	ESA 13
Research Partnerships & Flight Support		260	257	232	232	231	232	ESA 14
Aeronautics*		1,034	819	957	938	926	942	ESA 15
Aeronautics Technology		1,034	819	957	938	926	942	ESA 16
Education Programs		226	169	169	171	170	170	ESA 17
Education Programs		226	169	169	171	170	170	ESA 18
Exploration Capabilities		7,521	8,456	9,104	9,465	9,070	8,911	EC-SUM 1
Exploration Systems*		1,646	1,752	2,579	2,941	2,809	3,313	EC 1
Human & Robotic Technology		679	1,094	1,318	1,317	1,386	1,450	EC 2
Transportation Systems		967	658	1,261	1,624	1,423	1,863	EC 3
Space Flight		5,875	6,704	6,525	6,524	6,261	5,598	EC 4
International Space Station		1,496	1,963	1,764	1,780	1,779	2,115	EC 5
Space Shuttle		3,945	4,310	4,326	4,314	4,027	3,030	EC 6
Space Flight Support		432	492	435	430	456	453	EC 7
Inspector General		27	28	29	30	31	32	IG 1
TOTAL		15,378	16,244	17,002	17,815	18,001	18,034	
Year to year increase			5.6%	4.7%	4.8%	1.0%	0.2%	

*In FY 2004 Aeronautics and Exploration Systems will become separate Enterprises

NOTE: May not add due to rounding

Senator BROWNBACk. Thank you very much and I agree with that.

Let me first, before we go on to any questions, congratulate you on the two rovers on Mars. What a fascinating treat. They're just great pictures and information, working. It makes me feel safer in my car knowing it landed in airbags so that, you know, I trust my airbag a lot more in that car. It's just really a beautiful vision and very encouraging to a number of people that that's occurring.

Second, I want to congratulate you and the people in the administration as well on a new vision. I've been after the administration for some period of time that we've been less and less stuck in lower space orbit. You are doing good work, but it doesn't keep us on the balls of our feet leaning forward all the time and this one does and this one's going to be a real challenge. It seems to me we've got a number of challenges in getting there, not the least of which is political, really, getting this on through. And those are some of the issues that I want to address and ask you about as well.

We'll start with the Admiral that's going to run the new space launch vehicle—or the new——

Admiral STEIDLE. Yes, sir.

Senator BROWNBACk.—vehicle design of it.

Admiral STEIDLE. Yes.

Senator BROWNBACk. Give me 2 minutes of where your thinking is regarding the design of this project and how it's going to build on the past projects that we've had of designing new space vehicles.

Admiral STEIDLE. Yes, sir. The reason I was asked to come to NASA was, originally, to discuss large integrations of systems that could be tied together to produce a product. I was the director of the Joint Strike Fighter Program and we pulled that program together, harmonized the requirements for that particular program and got it started and kicked off. So, in those original discussions, I found a tremendous amount of enthusiasm that was infectious. Then, I came in one day before Thanksgiving and I haven't left yet.

I am going to apply the lessons learned from the Joint Strike Fighter Program and that is to look at the trade studies and the pieces that have already been done. There's a lot of work on OSP and some other technical maturation programs that are applicable to where we're going in the future. I designed an office in which I have technologists and operators together who will sort through the trade studies and define the requirements. With discipline we'll hold those requirements through the process. I've got an office of technologists who will bring those technologies to fruition through risk mitigation and make sure they integrate in this particular product. I've got a team down here today looking at the work that has already been done on OSP and other particular programs to reap those lessons learned and apply them to this particular vehicle.

The program itself is Prometheus, which is the nuclear propulsion piece, in space propulsion; it's the CEV system.

Senator BROWNBACk. CEV system?

Admiral STEIDLE. Yes, sir. That is the crew exploration vehicle itself.

And then all these technology pieces that come together. So, it's a system of all these pieces being integrated together to perform

this exploration vision that the Nation has. We're also going to apply some new ways of doing acquisitions. Things that we have used over in DOD are very applicable and that's the discipline that's going to be applied in the program. Then we're off and running.

Senator BROWNBAC. Do you have any initial thoughts on a cost of being able to pull together and get this new vehicle? What's your budget for doing that?

Admiral STEIDLE. Certainly.

Senator BROWNBAC. Do you have any ideas on that?

Admiral STEIDLE. Yes, sir. I've looked at what's in the budget right now that goes out to 2009 and there's approximately \$1.5 billion per year. We have a flight in 2008 for a performance demonstration, which is a risk mitigation plan. There's funding to be able to support that and we also have a flight in the year 2011. So, there's \$4.5 billion after that. I've looked at the assumptions in putting that budget together, from my background in other major programs, and it fits.

Senator BROWNBAC. Let me stop you on that point.

Admiral STEIDLE. Sure.

Senator BROWNBAC. You say it fits. A number of people have been challenging the budget number—

Admiral STEIDLE. Yes, sir.

Senator BROWNBAC.—on doing this for \$11 billion reprogrammed internally and 1 billion additional—

Admiral STEIDLE. Yes, sir.

Senator BROWNBAC.—on the vehicle itself. Are you comfortable and confident of that budget number given your past experience with Joint Strike and looking at what you're putting together here?

Admiral STEIDLE. Yes, sir, I am. And that was one of the first questions I had coming in here. What are the underlying assumptions? Where do these figures come from? Has there been an independent assessment of those figures? What do you have in mind? The Nation's vision articulated by the President as, essentially, the initial requirements for what we need to do. I can match that with the assumptions that put that budget together and I felt very confident we can achieve that and that's why I signed on to execute this.

Senator BROWNBAC. The administrator has talked a number of times about how going to the Moon and beyond with this vehicle doesn't require any leaps of faith, in that we don't have this technology, or breaking any laws of physics.

In developing the new vehicle it seems to me that the major issue of new development is going to be the power generating unit, Project Prometheus.

Admiral STEIDLE. Yes, sir.

Senator BROWNBAC. Is that correct in your estimation? And I want you to talk a little bit about Prometheus, if that is a correct assumption, that that is the major technological issue to press forward with.

Admiral STEIDLE. Yes, it is a major technological achievement. The reactor is doable. The engines on the back ends are doable and are actually flying at JPL facilities there right now. It's the transfer of the power between the two. We have that capability and with

the time lines that we have, the year 2015 and beyond to demonstrate that capability in flight, we'll achieve that.

The other part of your question is the need for not having any significant technological breakthroughs and what we are going to apply in the technical maturation program is the application of new technologies, increased manufacturing capabilities, subsystems, upgrading the integration of those particular systems and software into this particular vehicle. So, we think we can apply technologies that are there for manufacturing these particular vehicles differently than it has been done in the past and will not require any inventions.

Senator BROWNBACK. That last statement, expand that.

Admiral STEIDLE. What we did, and I can only go backward and tell you what we did in Joint Strike Fighter, which I think is applicable here. As we went forward with the actual design of the vehicle, we also went forward to industry, what we plan on doing here, asking for new, innovative technologies in areas such as manufacturing, integration of subsystems, lowering the cost of doing business and we got a lot of tech maturation proposals. We initiated quite a few of them that found their way into those particular vehicles; we intend to do that here as well.

We plan to define the requirements of the vehicle and then look across the board at technologies that can reduce the cost, increase the manufacturing capability of it, integrate the subsystems into those particular vehicles and we have several of those technology maturation programs under review already. They were simple things that have already been done in manufacturing, in life support, habitation, integrated subsystems, that have been done and started. We just need to refocus those and that's a big part of this program as well.

There's quite a bit of technology programs that have been brought into our enterprise as well. We're refocusing those and doing program assessment to make sure they steer toward this particular vehicle and the system, in general.

Senator BROWNBACK. Mr. Readdy, that's one of the things that's been striking to me and I'm going to talk about the tough questions because those are the ones that people are raising. We have a budget deficit of \$500 billion. The Congress and the President's getting serious about wanting to get back to a balanced budget. So, then people say "Well, then you can't do these big, new, expensive programs like this going to the Moon and Mars."

You know, and my comment is, A, most of it's reprogrammed money and, B, we ought to be able to show people—we've got enough total money. We just don't have it spent in the right places and we're going to reallocate the funds.

Then other people raise up say "Well, you can't do it for this number in the budget." And they'll cite to prior proposals to go to Mars and enormous budget figures. What is so different about this project than those prior assessments of cost of going to Mars?

Admiral STEIDLE. I think there are several different facets. One is NASA's committed to fulfilling this new exploration vision and we've been willing to make the really tough trades internally to do that. I think in your opening statement you mentioned that NASA is going to receive \$1 billion in the next five-year budget run out,

but \$11 billion will be for reprogramming and reprioritizing among NASA's ongoing missions.

A major portion of that is phasing out the space shuttle. It frees up dollars in later years to go ahead and accelerate our space exploration vision. Also, when you look at the vision that the President spelled out, it puts space shuttle and space station into more context in that it fulfills, I think, the analog of what Gemini did during the lunar program initially in the Sixties. When the President committed us to going to the Moon in this decade, we had 15 minutes of suborbital space flight in this country, Alan Shepherd. We didn't know among the three different competing options for how to get to the Moon; we didn't have a rocket booster that could get us there. The technologies required were not going to be demonstrated during the Mercury era.

What was on the drawing board for Project Apollo were large booster rockets, spacecraft that potentially could go from the surface of the Earth to the surface of the Moon or rendezvous in Earth or lunar orbit. All that was really not defined when the President committed us to do that.

The Gemini program is where we did the technological development and demonstrated the capabilities necessary to actually go to the Moon, land successfully and bring the crews back. It demonstrated rendezvous, space walks, the ability to change orbits and do space navigation, and some maturity and reliability in the life support systems and the power generation systems we would need to go to the Moon. It also demonstrated human endurance and if you go back to that era, the notion that people could survive in space for 2 weeks was still an open question.

So, what this new vision does is it puts space shuttle and space station in a new context where we're using that as kind of the Gemini analog to inform our exploration agenda, to be able to go on the Moon and then further on to Mars at some point.

The other thing is that without a date certain to land within this decade to do the following, it also frees us to be able to work on the technologies that will enable us to do this more capably. And I think it also causes that engine of ingenuity here within the private sector industry, academia and NASA to focus on the problems that we have at hand. So, I think all of those, plus our willingness to reprogram within our own budget, should give people the confidence that we have capability to go off and do it.

Senator BROWNBACK. And one thing I want to throw out here, and I know the Chairman is very interested in this, is you have within NASA a number of add-ons that have been put into your budget from various Members of Congress for good and worthwhile projects. I hope all of them are good and worthwhile projects, but they're not ones that NASA has asked for nor has placed in there. And if we can take those non-essential monies and put them into a very targeted program to the Moon and beyond, we're talking in the hundreds of millions of dollars, I believe, in looking at your budget to be able to do that and that's going to be one of my pushes on the Appropriation Committee. Now, we know where we want to go here. Let's get the money that's non-essential to that mission and make it essential to that mission, so that you take those.

The other thing that's available that we didn't have before is there's on-the-shelf technology that you can use that we aren't going to have to go out and invent. You can pull those things, a number of them; I used the airbag analogy on that. We didn't have to invent that one, we had it developed. You got to get it up to your specifications and needs but we know how this thing works. Instead of discovering and inventing a way, we can pull some of these pieces together.

And I guess, Admiral——

Admiral STEIDLE. Sure.

Senator BROWNBACK.—that's really your task——

Admiral STEIDLE. Yes, sir.

Senator BROWNBACK.—of doing those things.

Admiral STEIDLE. Yes, sir. We're out there right now exploring what technologies are there, refocusing on ones that are necessary, finding the gaps and then looking for programs and projects that have already been done, and there's quite a bit. Then look at those and do a program assessment for the applicability for this particular program.

Senator BROWNBACK. Mr. Readdy, international cooperation on this exploration, what sort of communication have you had from other countries of interest in working with us on this project?

Mr. READDY. Well, when the President came to NASA and presented his bold, new vision, the Administrator had been talking on the phone that very morning with the other heads of the international space agencies to tell them what it included and in the President's remarks he said that this is not a race. It's a journey and all will be included, and we solicit the international participation.

I'd say thus far the reaction has been extremely positive. Last week we had representatives from all the partner countries come in. We went into more detail on what that involves and, in fact, it provides more opportunity for them to participate. As we refocus our efforts on human biology and some of the problems that we need to address directly for exploration, it allows the partners to participate in those and it allows our principal investigators to partner internationally on other disciplines, like materials research and other things. And so, this really provides more opportunity for them.

Also, the notion that we would want to achieve our objectives and research sooner with more crew provides additional opportunities for our international partners. And where we go beyond International Space Station, time will tell; but there's tremendous interest and excitement from our international partners.

Senator BROWNBACK. There has been some challenges regarding the International Space Station, which has been an international project. But then I hear rumors—and I have not looked at these numbers—that other countries haven't come through with the degree of funding that we wanted them to, or that they originally signed on to, in this project or they have not done the things that we had asked.

Is that accurate or inaccurate? Would you answer that question concerning the space station, for us to be able to get that as a model for this project?

Mr. READDY. Well, be happy to get you the details. But I'd say in aggregate the partners have been there for us and have participated very actively. Their hardware has for the most part been delivered. They're making progress on their commitments and certainly in the past year the Russians have demonstrated their integral—

Senator BROWNBAC. They really carried the load, haven't they?

Mr. READDY. They have, in fact.

So, we expect that to continue; but we will need to include them in our discussions of how our participation will change because, clearly, as we phase out the shuttle, there may be more reliance on commercial sector logistics or the European-provided ATV or Russian logistics. All of those are in the trade space.

Senator BROWNBAC. If we phased out the shuttle faster and reprogrammed that money toward this project sooner and relied, then, on other partners or the commercial sector to take care of the International Space Station, can we move up the time-frame of this project?

Mr. READDY. Senator, we looked at that very closely in formulating this vision and choosing the time-frame that we did, and it looks to us as though the completion of International Space Station around the end of the decade is an achievable set of milestones.

We want to make sure that we do it very deliberately, but the shuttle is the only vehicle capable of taking those modules to the International Space Station, the only vehicle capable of conducting the assembly operations that are required. So, the shuttle is needed to complete the International Space Station, that role. And as soon as we've completed the International Partner Core Complete, we'll phase the shuttle out.

Senator BROWNBAC. Dr. Kicza?

Dr. KICZA. Kicza.

Senator BROWNBAC. Kicza, excuse me.

There have been a lot of challenges to whether or not human endurance would survive a mission to Mars and back given the length of time that it will take. Project Prometheus, we're hopeful, cutting the time-frame down, as I understand, I believe a third.

Admiral STEIDLE. Yes, sir.

Senator BROWNBAC. To a third of the current. But you're still talking about an extended stay. Can humans survive and do this with what we know and what we believe the timeframes will be to go to Mars and back?

Dr. KICZA. Yes. Based on what we know today, we do think it's achievable; but there are clearly some countermeasures that we're going to have to put in place. Probably the most significant is radiational and shielding from radiation. A lot of our work on the ground is focused on this right now. In fact, just this last October in cooperation with the Department of Energy we opened a new radiation line at Brookhaven National Laboratory specifically dedicated to NASA's needs to understand the impacts of radiation on biological systems and then to develop the materials to allow us to shield humans on those journeys to the Moon or to Mars or in transit. We do think it's achievable. Yes, there's some work to be done but we have the tools in place to do it.

Senator BROWNBACK. Is radiation the major issue or are there others?

Dr. KICZA. Sure. Probably one of the tallest poles is clearly radiation. Other countermeasures that we need to put in place deal directly with the effects of the microgravity environment on our astronauts. We've seen from our research to date that astronauts clearly suffer from bone loss. They suffer from muscle atrophy in the space environment, problems with sleep, and circadian rhythms are upset as you go through sunrise and sunset many times a day.

So, yes, there are issues that we have to face about the microgravity environment and that's why the International Space Station is so central to our research. It allows us to conduct this research; it allows us to understand where the thresholds are taking place at which point these symptoms are manifesting themselves anywhere from 0G to even close to 1G. We have the capability to understand at what point these impacts are happening so that, then, we can perform the countermeasures. For example, artificial gravity, what are the systems we need to put in place to counter-effect the weightless environment?

And that's what the space station is doing for us right now in a laboratory environment where we can conduct those experiments.

Senator BROWNBACK. General Howell, any time you reprogram money, particularly \$11 billion, you get a lot of people enquiring about where they are in this reprogrammed system. I'm guessing you're getting a lot of questions like that here. I hope people are reacting positively to the phasing out of the space shuttle. It's been a great vehicle. It has done a lot of work, but we have had tragedy and it's time to move on.

I hope people are reacting that way in the scientific community as well. Are there things that we should be communicating or what can you tell me about how people are handling the transition?

General HOWELL. Senator, we're very excited about the vision. Of course, first things first, as you know the Johnson Space Center has been a focal point for human space exploration for over 40 years and right now we have literally thousands of our people involved in the return to flight effort as well as the support of the space station. So, you know, what is critical to this vision is our return to flight and assembly of the station. And that's what we're all about right now here as well as the medical and human, clinical research in space. We do all that here, too.

So, our people are fully employed now and in the near future.

At the same time we have been, you know, joined at the hip with the shuttle program. That's so important to us, because people are concerned about what lies ahead in the future. However, I'm doing everything I can to assure them that the same people who were needed to develop, assemble and fly the shuttle are the same people who are going to be needed to do the crew exploration vehicle and all of that. These wonderful, talented, committed people are going to be needed for whatever NASA does in human space exploration. So, this should be a time of great excitement for all of our people and I'm trying to get that message across to them, because we're going to be right in the middle of all of this. It's just going to be a great time for this area, I believe.

Senator BROWNBACK. General, we get the question a lot and it's raised often. I don't know of anybody in a better position to answer it than you. Why humans? These rovers are doing great. We can do this for a lot less expense. The safety issue is a concern and each life is precious to us so that, I mean, the safety issue is a very real thing. Why not just do all of this by robots, to the Moon and Mars and on?

General HOWELL. Sir, the President said it much better than I can. I think we are compelled, as a nation, to go beyond, to explore. I think as a human race we've always had to go to the other side of the hill, go across the ocean. Now it's out in space. We have to take inherent risk in exploration, but I think it's part of humanity, and as a great Nation, we must do great things and lead the way in this. It's just something that we have to do. I guess that's the best explanation I can give you, sir.

Senator BROWNBACK. I've argued with people if we don't and others do, what does that do to the psyche of a nation?

General HOWELL. I personally think that would be the beginning of the end for this Nation as a great nation. You know, as a leader of the world, it's imperative that we lead the world in space exploration. That's my personal opinion.

Senator BROWNBACK. And if we fail to do it, I just feel it sends such a shutter through the system that we're too fearful to risk that we won't do it. And plus, to me, it'd be a disaster for those who have gone before them and put their lives on the line, some of which have been lost, to not carry on.

Mr. READDY. Sir?

Senator BROWNBACK. Mr. Readdy?

Mr. READDY. If I can add, just like freedom isn't free, often space exploration has expended a very awful toll, most recently last year, but the fact of the matter is the way we honor their legacy is not to quit; it's to press on. It's to fulfill the dreams that they had and the dreams of generations to come.

Exploration is part of the human psyche. It's the same thing that drives the curiosity of your 2-year-old to learn to explore. It's what causes us to relate to the robots and their exploration, however slight. With 6 billion hits on the Internet, certainly people are excited about this, but what those rovers will be able to do in 90 to 120 days a human in a space suit could accomplish in an afternoon, in a single space walk.

And so, there's a notion also of productivity. But we are explorers by nature.

Senator BROWNBACK. Well, thank you very much. I look forward to working with you and the Chairman and we're working on the authorization legislation language. One of the things that we'll talk about with the next panel is the use of incentives to the private sector to get that capital involved and in some cases may be prize money, note that the X factor I mentioned in my opening testimony is attracting. I don't know how many millions people are spending to get a \$10 million prize but they're spending a lot of money to do that. And I hope we can use that as well here to try to stimulate private sector activity and to get that capital motivated and moving forward. We may put more of that in the authorizing language as

well, Mr. Readdy, and I've talked to the administrator about that, too.

Mr. READDY. And, in fact, I think we have a centennial prize already as part of a—

Admiral STEIDLE. Yes, you'll see it. There's a budget line called Centennial Challenge, which is exactly what you described, sir. It is prize money for innovative technologies to have application to what we want to do and it's in there and it's in my office, the point is to stimulate some innovative thinking on private sector to participate.

Senator BROWNBAC. Just have such a fabulous private sector and I—to me in designing this one versus going to the Moon the first time around, which really had to be a government project when we went to the Moon the first time. I hope to really marry into these guys that have a lot of technology and capital. I want to marry into their capital and get this thing moving further and faster.

Admiral STEIDLE. Yes, sir.

Senator BROWNBAC. With that, we will go to the next panel. I want to thank and congratulate you. I've held a number of hearings on space, most of which have been tough because, well, we've had a difficult time. But it's now time to move on and look forward and this is an exciting moment. And I look forward to seeing that person on the Moon working and on Mars walking in the near future.

God speed. Thank you very much.

Mr. READDY. Thank you, Mr. Chairman.

Senator BROWNBAC. Our second panel, the private sector panel, engage in the private sector with this mission and they all consist of Charles Chafer, President of Human Encounter out of Houston; Mr. Bob Lorsch. He's President of the RHL Group, which is an advertising group and has been interested in advertising and its resources and usefulness in space. Some very interesting prospects and proposals there; Mr. W. F. Mitchell, President of Altair Development Corporation of League City, Texas; and Mr. Courtney Stadd, President of Capital Solutions out of Bethesda, Maryland. I look forward to the presentations from these individuals regarding engagement of the private sector capital on the space exploration work.

Let's see. Mr.—is it Chafer or Schaeffer?

Mr. CHAFER. Chafer.

Senator BROWNBAC. Chafer. We've got you down first on the program. So, please feel free—I will include all of your written statements in the record. So, if you'd care to just summarize that would be wonderful. If you want to present it that would be good, too, and then we'll have questions and answers afterwards. Thank you for joining us.

**STATEMENT OF CHARLES M. CHAFER, PRESIDENT,
TEAM ENCOUNTER, LLC**

Mr. CHAFER. Thank you, Mr. Chairman. And thank you for your leadership in providing the private sector's view here today. I will summarize my testimony. From my youth on a Kansas farm to my mid-youth launching rockets here in Houston, Texas or Matagorda

Island, I've spent a long time thinking that commercial activities in space are critical and that the President has recently committed us to move humanity throughout the solar system where I think that there's an important critical role for the private sector in that. And I had four observations that I wanted to share with you today on that subject. I think it's all good news.

The first is that, as I said, I think the private capital is required in order to achieve the President's goals; but, fortunately, I also think that it's available. It's required because if you listen to Chairman Aldridge at the first meeting of the President's commission, there was a lot of discussion about sustainability and about, "Well, maybe we can't do business as usual anymore," in terms of how we go about meeting those goals. I think that's true simply for the point that if we can achieve sustainability through private sector dollars, that means every dollar that comes in commercially to relevant space technology is a dollar the taxpayer doesn't have to come up with. It's not a hundred percent tradeoff by any means but there is a way to do it cooperatively.

I think, also, second, the private capital is available for space projects. Certainly in my career we've spent and raised tens, tens and tens of millions of dollars toward commercial ventures. We've heard today about Elon Musk and Paul Allen. These are guys that have substantial capital that are currently funding commercial space transportation opportunities. And certainly with Team Encounter and our flight schedule for next year, we've been able to tap into money here in real estate and energy and software development. So, I think there's money that's required. Fortunately, there's money that's available.

Second point I wanted to make is that I think today there are some encouraging signs that, perhaps, Federal space agencies are more open to private capital infusions than perhaps they've been in the past. I'll cite two examples that I'm personally familiar with and try to draw analogies to the President's program. I mentioned that we'll be flying our Team Encounter flight one in the fourth quarter of next year for public participation, for corporate sponsors and for cutting-edge technology. We'll be flying advanced solar sail propulsion technology that we're teamed with the NASA Langley Research Center on.

We were recently awarded a contract by NASA to fly one of their space instruments, that's under test and development, on our commercial mission. It's a little bit of a paradigm shift in that the private sector wasn't looking to NASA to fly stuff, NASA was looking to us to fly stuff and that was really for a couple of reasons. One is I think it was best value for the government and certainly it was a valuable partner for us to have in the form of NASA.

Secondly, I think it was important that we're risk-sharing with NASA. If we don't succeed, we don't get paid; and I think that's an important component of private sector risk capital can come in and take some of those risks, not all of them by any means, again. But it's an important way to leverage the genius that I think our country has in private sector funding.

The third point about working with NASA is we're learning to work together; which hasn't been easy. There's a lot of flexibility that we have to show as a private company. There's an enormous

amount of flexibility that NASA's had to show in working with us to fly this instrument on our commercial mission. So, I think that's good news at NASA. I think that can be drawn out to other missions as we look to going to the Moon and Mars. There are plenty of opportunities to work together with NASA.

A second thing that I wanted to mention, though, was that we ought to look at all Federal agencies. The National Oceanic and Atmospheric Administration recently released a request for information where they said: "We need to learn about solar storms, but we're willing to do that with our next generation spacecraft by issuing a data purchase contract to a private company that goes out to L1, a long way out, and puts a spacecraft there and brings the data back to us."

Again, a bit of a paradigm shift and I think an important sign that maybe things are a little bit more friendly in terms of private sector and government cooperation. So, my second point is that we're beginning to see some encouraging signs and we ought to really work on those.

The third point that I wanted to make was how can we do this? And I think government policy should encourage private sector access, should encourage the certainty that the private sector will be there and third and most importantly, I guess from the government's point of view, the government ought to be allowed to engage in certain risk management techniques that, perhaps, they don't do now.

On the first point in terms of access, I believe that all Federal agencies should seek co-investment opportunities in the development of space technologies and applications, as they say here in Texas, from the get go. Just don't think of it as an afterthought but as you're building Project Prometheus, as you're looking at people on the Moon and on Mars, from the very beginning how can we encourage the private sector to co-invest with us? I think that would be an important sign about access.

In terms of certainty, I think that private sector participation needs to be institutionalized within Federal agencies. I'm careful to say not bureaucratized within Federal agencies, but the ebb and flow of commercial ability to work with space agencies is one of the clearest ways that private sectors will not come in. They need some certainty.

Ultimately all policy is people, I believe; and we were very fortunate to be able to work with Dr. Ed Weiler and a gentleman down here at the end of the table, named Courtney Stadd, who was the Chief of Staff at NASA when we approached them with our innovative private sector approach. They served as honest brokers on both sides of the table. Probably pulled all of their hair out in the process but we're absolutely critical to the process of being able to marry my investors, who are skeptical about investing, and the government managers who are going: "Who are these guys from Texas and why should we talk to them?"

So, I think it would be useful if we find a way to institutionalize. We can't institutionalize Courtney because he's left; but if we can create a position in the Federal space program world that says "This is where you come to talk to us about commercial space activity," I think that would be very important.

My final recommendation on government policy, I put my government hat on. Commercial ventures are by their nature viewed as perhaps a little bit more risky than the way the government does things. That, again, I think is the great genius of America; but there are risk management techniques available to the government. Simply ensuring government activities and payloads or requiring the private sector to do that is a way to give those managers who are thinking about working with the private sector a little more certainty.

My final point, Mr. Chairman, is that I believe that if we accomplish these goals we'll do a lot of things; we'll be more competitive. There'll be less Federal dollars required, but the most important thing is that we'll inspire the folks that you were talking about. Certainly I'm an example of being inspired by the Apollo program. Also, I can tell you we get resumes every day of the week from kids. "How can I be a part of your exciting commercial space station? I want to sign up."

You know, I can't hire them all but I believe that if we expanded the private sector commitment to space, you'd see an awful lot of people looking for jobs there and maybe not in other arenas that aren't quite so productive toward the goals that we all share here today.

Thank you very much.

[The prepared statement of Mr. Chafer follows:]

PREPARED STATEMENT OF CHARLES M. CHAFER, PRESIDENT, TEAM ENCOUNTER, LLC

Mr. Chairman and Members of the Committee, thank you for holding this important Senate hearing in Houston and for giving commercial space entrepreneurs the opportunity to offer their valuable perspective on how the private sector and NASA may cooperate most effectively to assist in the realization of the President's new space policy.

As a boy spending summers on my grandparents' farm in Republic County, Kansas, during the Apollo era, I can recall looking at moonrise over their fields and wondering how I could make a contribution to what seemed to be that most important human endeavor—the exploration of space.

Years later, as a young man, I was blessed with that very opportunity by being fortunate enough to land a position with David Hannah, Jr., and former Mercury and Apollo astronaut Deke Slayton at Houston, Texas-based Space Services, Inc. of America (SSI). In 1982, SSI became the first ever private company to conduct a launch into outer space—*Conestoga 1*.

Today, I've devoted my career seeking to expand private-sector space activities—because success in this arena holds the key to humanity's long-term prosperity. We simply must extend our presence throughout the solar system.

May I make four observations that best describe the potential for further private-sector/NASA cooperation.

First, private sector capital is essential and is available to fulfill the emerging opportunities of new space age. At the first meeting of the President's Commission on Implementation of United States Space Exploration Policy, there was much discussion devoted to "sustainability" and to the notion that "business as usual" would not result in the early achievement of these bold new space initiatives.

Simply put, significant private investment is a key element to help the President's initiative achieve sustainability. In an era of tight Federal budgets, every private dollar invested in relevant space technology development is a dollar not required of the taxpayers.

Fortunately, significant private investment capital is indeed available to support space technology development and application in areas of relevance to the new space initiative. The great genius of this country lies in the ability to mobilize capital quickly and efficiently in pursuit of real opportunities. For example, recently we have seen significant investments by successful Internet entrepreneurs, including Paul Allen of Microsoft and Elon Musk, founder of PayPal, Inc., in new modes of space transportation. Team Encounter, LLC, has been able to attract significant

capital from some of Houston's leading energy, software, and real-estate developers. Generally speaking, I believe that investment capital can and will flow into space activities under the right set of circumstances.

My second observation is that there are now encouraging signs within various Federal agencies that private investment may be welcome. Two examples illustrate vividly this emerging reality.

Recently Team Encounter was awarded a contract from NASA's New Millennium Program to fly its Inertial Stellar Compass aboard our Flight One Mission late next year. This contract is important to commercial investors for several reasons. NASA has chosen to fly one of its experiments, as a secondary payload, on a mission that is primarily commercial in nature. We represented a "best value" proposition for NASA, and NASA represented important additional revenue and enhanced stature for us. We are risk sharing with NASA in that only upon the success of the mission are we able to collect the second half of the contract value. Finally, both NASA and Team Encounter are learning how to work together in an "imperfect" environment. By that I mean that each side has had to exhibit flexibility and accommodation in order to reach an acceptable mission profile.

A second recent example extends beyond NASA to another Federal agency with a significant space portfolio, the National Oceanic and Atmospheric Administration (NOAA). Last year NOAA published a Request for Information (RFI-NESDIS-OSD-002) seeking to understand the viability of a "data purchase" approach to providing next-generation solar-wind data from a commercially operated spacecraft. This request also contemplates a risk-and reward-sharing approach to the achievement of U.S. Government space needs and, as such, is further evidence that creative people in the government and the private sector might well be able to work together to achieve common goals.

The above examples, and others, underline the potential for a paradigm shift to take place in government/private-sector interaction in the development and application of space technologies. This should be encouraged further as we embark upon great new space agendas.

Third, governmental policy should focus on methods and systems that best can offer access and certainty to the private sector while offering new risk management tools to governmental managers. I have three suggestions.

First, all Federal agencies—not just NASA—should examine their space efforts for co-investment opportunities. New space program initiatives should be designed from the outset to encourage private-sector co-investment whenever possible.

Second, federal commitment to commercial co-investment in space should be institutionalized, not bureaucratized. Ebb-and-flow interest in space commerce does not create a positive investment climate. Each Federal agency with a space portfolio should have a commercial-space advocate. This is paramount. All policy is ultimately embodied in the people charged with its implementation.

At NASA, Team Encounter was extremely fortunate to be able to work with Dr. Ed Weiler and his capable staff including Charles Gay and others and former Chief of Staff Courtney Stadd, whose long-term commitment to including the private sector in space is well known, as evidenced by his appearance on today's panel. Without their commitment to overcome any barrier and willingness to honestly broker very real concerns on both the government's and industry's side of the table, I would not be able today to speak to NASA's new interest in private-sector approaches.

Third, risk management techniques—for example, insurance coverage for Federal payloads—should be permitted as a means to assist agencies to accept conventional commercial-risk parameters as they work with existing and emerging private-sector space companies.

My final observation is that a continuous, strong national commitment to the inclusion of private investment in space applications and exploration will inspire a new generation of engineers and entrepreneurs; permit the U.S. to accomplish major new space goals in a budget-constrained environment; and help to maintain our leadership in an increasingly competitive global space industry.

Please allow me to elaborate on the first point. Our own Team Encounter missions—involving a unique blend of cutting-edge technology development, corporate sponsorship and media participation, and direct public participation via the internet—continually attract a steady stream of resumes, inquiries, and "how can I help?" requests from young people from every state and across the planet. Space missions can be fun, exciting, and meaningful to young people as they contemplate their career choices.

By embracing a new generation of entrepreneurial space companies, NASA can help to ensure its own future through the development of talented, enthusiastic engineers and managers. Perhaps this increased inspiration to a new generation will

be the most important legacy of increased government/private sector cooperation in space.

Senator BROWNBACK. Thank you.

The human soul is meant to be inspired and to yearn and it's given an opportunity here. In fact, I have a young man from Topeka—I don't know if Alex is still here. Alex, you still here? Stand up.

This is a talented young Kansan who is interning down here with the NASA program who's dreamed of doing this all his life and his mother has dedicated her life to getting him to his dream. And so, you have two people involved in that and done a great job. It's a classic example.

Thanks, Alex.

ALEX. Thank you.

Senator BROWNBACK. The gentleman who was the one that put the most meat on the bones about talking to me about advertising and the ability to raise funds through advertising with space programs is next to testify. Bob Lorsch, President of RHL Group, has done a brilliant advertising work terra firma. He wants to take this on a broader scale.

Bob, welcome.

**STATEMENT OF ROBERT H. LORSCH, PRESIDENT,
THE RHL GROUP, INC.**

Mr. LORSCH. Thank you, sir. And good morning, Mr. Chairman.

I'm here today to discuss this opportunity, which I think is incredibly important and potentially very, very lucrative for our country's space program. For more than 30 years, I have specialized in advertising and sales promotion for some of the biggest companies in the world, including Beatrice Foods, Johnson & Johnson, Microsoft, Procter Gamble, all three major television networks and numerous other international and domestic corporations. I've been involved in private sector philanthropy and cause-related marketing for a variety of major charitable organizations, including the California Science Center, which is the second largest science institution next to the Smithsonian in the United States and the gateway of which is the Robert H. Lorsch Family Pavilion. Talking about a place for young minds to go and learn about what we're here today to talk about.

I've received a "C" flag from the White House during the Reagan Administration for private sector initiatives and I've raised more than ten, probably tens of millions of dollars through cause-related marketing programs for organizations that are both charitable and private sector educational organizations along the lines of the program I'm here to discuss today.

In 1981, President Reagan challenged government to work with the private sector, to create programs designed to return a portion of the financial burden of government to business and industry. I contacted the White House through his press secretary, Jim Brady, at that time with an idea for NASA space advertising program of noncommercial, and I want to emphasize noncommercial and tasteful sponsorship, supportive messages, not billboards and logos, to fly inside the space shuttle to generate revenue for the space program.

The proposal suggested that for \$1 million a sponsor could place this noncommercial message on the inside of the wall of the shuttle and at various points during the mission, when astronauts were either being interviewed on camera or there were camera pans of different experiments in the space shuttle, those plaques would be displayed worldwide. The sponsorship benefits would include lift-off and launch parties, pictures with donates and astronauts, perhaps a visit by an astronaut on a sponsored mission to a company's corporate headquarters and the right to promote the company's involvement in the space program; much like that of an Olympics advertiser could promote their involvement with their Olympic program in a responsible, supportive way.

Secretary Brady referred my program to a gentleman by the name of Admiral Robert Garrick, who was Deputy Counselor to the President. Working with Admiral Garrick and another gentleman by the name of Fred Fielding, Counsel to the President, the program made its way to Ed Meese, Chief of Staff at that time and was, ultimately, forwarded on to NASA.

The gentleman at NASA who received the program is a gentleman by the name of James Fanseen, who was Assistant Administrator of NASA. Mr. Fanseen greatly supported this program and worked over years to help me get it off the ground. However, it had no success. It was rejected primarily because there was no way for NASA to receive the money since monies raised for a government agency, such as NASA, would have to go into the treasury and there was no mechanism to get them back out to the agency, which is really an important aspect of what this committee should address, if you're going to entertain private sector initiatives and commercialism of space.

Additionally, there was a significant belief that the shuttle belonged to the American people and no organization of any kind, other than the American people, had any right to make it commercial. Officials in NASA, Congress and the senate encouraged me to continue to stay with this program. In fact, 20 years later, I was approached to participate in NASA's Dream Time Venture, which I rejected, and despite all good intentions, did not materialize the way most would have liked it to go.

In 1984, I presented a revised and updated approach to the 1981 presentation. This presentation was made now with much more support from the administrator's office of NASA and the White House and it was presented to Mr. Fanseen; Jesse Moore, who was at that time Acting Assistant Administrator for space flight, NASA's general counsel and others. Among the aspect of this plan was an outline of how and when sponsorship plaques could be broadcasted. It included an example of noncommercial messages. Incentives were more detailed. Included VIP tours at major space centers and the most significant thing a replica plaque would fly with the sponsor plaque. So, one plaque could actually hang in a corporate office and, more importantly, the other plaque could hang in the Smithsonian Institute as a tribute to the space mission that paved the way for the future.

However, despite all the encouragement, the program was, again, rejected for similar reasons in 1984 and then in 1989.

I was told, additionally, that retaining the services of any vendor in the private sector would need to be subject to open competition and the Armed Services Procurement Act, ignoring any of the intellectual property rights, common-law copyrights or registrations which I might have accrued over the years of submitting these various concepts.

Since the first shuttle flight, there have been 113 missions. If this program had been implemented the space program could have earned more than \$5 billion. That would have represented more than enough money to cover the entire budget in 1982 when I started or nearly 35 percent of last year's NASA budget, a staggering number.

Additionally, the message of support, which will now never be seen, would remind the public about the importance of the space program in our daily lives without taking away the public's ownership in any manner whatsoever. In addition, I might say that NASA has gone out of their way with the NASA Public Affairs Television Network, the Dream Time Venture and a variety of other programs, most of which are available on the website, to spend hundreds of millions of dollars to get the message out that these advertising sponsors could have gotten out on a win-win-plus-revenue basis versus an expense.

Last month President Bush announced a plan for this Nation to have manned missions to go back to the Moon and Mars. NASA estimates these programs will require expenditures of at least \$170 billion. Hundreds of millions of dollars more will be needed to convert NASA's ground-based and space-based video facilities to HDTV standards over the next decade and with an underfunded NASA, stuck where it was in 1979 at eight-tenths of a percent of the Federal budget, the challenge seems insurmountable.

My written submission includes copies of my 1981 and 1984 presentations along with a revised presentation in 2004. Working with NASA, this program can become a reality starting now. It can generate dollars, enough dollars for ground and space-based facility upgrades with billions more in the works from sponsors within the next 3 years.

In fact, in 1999 NASA, despite all the contradiction of my program, posted its own commercial space transportation study, a portion of which is included in my written submission. In Section 3.10.3.7 of NASA's own document it says, and I quote: "the use of launch vehicles as an advertising medium is a newly evolving market with the potential to obtain substantial revenues." However, nothing's been done. Since that period of time, billions could have been generated to the space program with the support of plaque messages that I spoke about earlier.

It discusses opportunities for advertising in space, including orbiting billboards. It discusses an agreement with Columbia Pictures on an ad for "The Last Action Hero," which was placed on the side of the Conestoga comet launch vehicle for \$500,000 while the Soviets are generating millions of dollars from American companies such as Pepsi. Why don't those monies stay in our space program?

This Subcommittee needs to create a mechanism to get money from the private sector into NASA. I've never given up on my

dream to get NASA space advertising off the ground. I've shared my proposals, ideas and presentations with congressional leaders, representatives of NASA, JPL and a lot of astronauts, including Eugene Cernan, Harrison Schmidt, Buzz Aldrin, T.K. Mattingly, James Lovell, Bill Shepherd, former NASA administrator Dan Goldin, all of which over the years, I'm proud to say, have become friends.

Last October, I presented my program to Representative Dana Rohrabacher from the Congressional Space and Aeronautics Committee Chairman, who told me he wholeheartedly supports efforts and encourages that the Congress will work with the senate in order to figure out ways to get these money through the treasury into NASA and initiate programs like this.

I just hate to see NASA waste another 23 years and lose another \$5 billion or more. We need to work as a team to get private sector sponsorships of the space program off the ground so we can deliver on Ronald Reagan's challenge and fulfill President Bush's mission to take our Nation back into space.

And I might add just on the testimony of NASA this morning, which was very impressive in their comment that over 6 billion people have gone to the website. Now, if NASA, to illustrate how simple this is, would offer a photograph screen saver for \$1 to those people and 10 percent of those people took advantage of that \$1, the 5 percent that the Congress and the Senate negotiated for to get into next year's NASA budget would have been handed to NASA at no incremental cost in the last 90 days and at no cost to taxpayers.

There is a tremendous opportunity here and it's almost irresponsible for this Committee and Congress to ignore at this time with the deficit situation, the way we're trying to go toward balanced budget and the interest of getting back to Mars.

Thank you for allowing me to speak here today.

[The prepared statement of Mr. Lorsch follows:]

PREPARED STATEMENT OF ROBERT H. LORSCH, CHIEF EXECUTIVE OFFICER,
THE RHL GROUP, INC.

Good morning members of The Subcommittee. My name is Robert H. Lorsch and I am CEO of The RHL Group, Inc. I am pleased to be here today to discuss this very important opportunity. For more than 30 years I have specialized in marketing communications and my clients have included all three major television networks, Johnson & Johnson, Beatrice Foods, Sears, McDonald's, Northrop Grumman, Procter & Gamble and Microsoft amongst others.

I have also been involved as a philanthropist promoting science education as a Director and Trustee of the California Science Center, whose gateway is the Robert H. Lorsch Family Pavilion. I have received the "C" Flag Private Sector Initiative award from the White House for my work in Earthquake Preparedness. As a businessman and philanthropist I have raised in excess of ten million dollars for a variety of charitable organizations, through direct contributions and numerous national advertiser cause-related marketing programs, similar to the concepts contained herein. My biography is included as a part of my written submission.

In 1981, then President Ronald Reagan challenged government to work with the private sector to create programs designed to return a portion of the financial burden of government to business and industry.

I contacted his press secretary, Jim Brady, with an idea for a NASA space advertising program of non-commercial sponsorship messages to be placed inside the space shuttle.

The 1981 proposal suggested that for one million dollars, sponsors or advertisers could place a message in a shuttle flight. The message carried on a "Plaque" would

be a non commercial supportive message of NASA missions to be placed on an inside wall of the space shuttle, which would be seen during broadcasts from the mission. As incentives, each individual, company, foundation, or other organization would receive benefits such as:

- A launch and landing party and dinner with NASA officials and available members of Congress;
- Pictures of donors with astronauts and other dignitaries;
- Official letters of appreciation;
- The right to promote the companies sponsorship of NASA much like a major Olympics sponsor;

Secretary Brady referred my program to Admiral Robert Garrick then Deputy Counselor to the President at the White House. Working with Admiral Garrick's office in conjunction with then Counsel to the President Fred Fielding, I refined my plan when Chief of Staff Ed Meese directed it be reviewed by NASA.

At that point the program made its way to the desk of James Fanseen, then Assistant Administrator for NASA.

Mr. Fanseen greatly supported this program and worked over years to help me "get it off the ground" with no success. It was rejected primarily because there was no way for NASA to see any money, since monies raised for a government agency would first go to the United States Treasury and could not be directly allocated to the space agency. Additionally there was a belief that the shuttle belonged to the American people and no one had a right to commercialize it.

Numerous officials in NASA, Congress and the Senate encouraged me then and now to stay with a space advertising program. I was approached 20 years later to participate in NASA's Dreamtime venture, which I rejected and despite all good intentions did not meet its planned objectives for tapping the commercial potential of the space program.

In 1984, I presented a revised and updated approach to the 1981 presentation. This presentation made with the support of the administrator's office and the White House was formally presented to Mr. Fanseen, Jesse Moore, Acting Assistant Administrator for Space Flight, NASA's General Counsel and others.

Among the new aspects of this plan was an outline of how and when sponsorship plaques could be broadcast. It included an example of a non-commercial message. Incentives were more detailed. VIP tours at the major space centers were added. The Smithsonian Air and Space Museum was suggested as a place where sponsorship plaques might hang permanently.

However despite all the encouragement, the program was again rejected for similar reasons in 1984 and again after going back again in 1989. Additionally I was told retaining the services of my agency would need to be subject to open competition & the Armed Services Procurement Act ignoring any intellectual property rights (common law or otherwise) which I had accrued over the years through my numerous writings & presentations.

Since the first Shuttle flight there have been 113 missions. If my program had been implemented, the space program could have earned more than five billion dollars, not counting Space Station opportunities. This would have been enough money to have funded NASA's entire budget in 1982 or nearly thirty five percent of it in 2003.

Additionally the messages of support (which now will never be seen) would have reminded the public about the importance of the space program in our daily lives without taking away the public's ownership in any manner what so ever.

Last month President Bush announced a plan for this Nation to have manned missions to go back to the Moon and Mars starting in 2014. NASA estimates these programs will require expenditures of at least \$170 billion. Hundreds of millions of dollars more will be needed to convert all of NASA's ground-based and space-based video facilities to the HDTV standard over the next decade. With an under funded NASA stuck where it was in 1979 at eight tenths of one percent of the Federal budget this financial challenge seems insurmountable. However, there is a way upwards.

My written submission includes copies of my 1981 and 1984 presentations, along with a revised 2004 presentation. Working with NASA, this program can become a reality starting now. And by 2008 that reality can generate at least 100 million dollars for the ground and space based facility upgrades with billions more in the works from sponsors in support of NASA efforts to send America back to the Moon and then to Mars.

In fact in 1999 NASA posted its own "Commercial Space Transportation Study" on the web. In section 3.10.3.7 of NASA's own document it says "*The use of launch*

vehicles as an advertising medium is a newly evolving market with the potential to obtain substantial revenues". It discusses the opportunities for advertising in space including orbiting billboards. Excerpts of which are also included in my written submission. It is clear that times have changed and NASA now recognizes the value of the intellectual properties I presented through their own demonstrated efforts to find ways to initiate a space advertising program.

NASA points to an agreement with Columbia Pictures to place an ad for "The Last Action Hero" on the side of the Conestoga Comet launch vehicle for five hundred thousand dollars while the Soviet space program has already been supported by advertising from American companies such as Pepsi. Why didn't those monies stay here?

I ask this Subcommittee to create a mechanism to get money from the private sector into NASA to enable the next generation of spacecraft to get off the ground.

I have never given up on my dream to get Space Advertising off the ground. I have continued to share my proposals, ideas and presentations with congressional leaders, representatives of NASA, JPL, and astronauts including Eugene Cernan, Harrison Schmitt, Buzz Aldrin, T.K. Mattingly, James Lovell, Bill Shepherd, and former NASA Administrator Dan Goldin.

Last October, I presented my program to Representative Dana Rohrabacher, Congressional Space & Aeronautics Chairman who recently told me, "I wholeheartedly support your efforts to help the U.S. space program and am pleased that the Senate committee is taking such a proactive interest in your ideas."

Let's not waste another 23 years and lose another five billion dollars or more. Let's work as a team to get private sector sponsorships of the space program off the ground so we can deliver on Ronald Reagan's Challenge and fulfill President Bush's mission to take our Nation back into space.

I look forward to responding to any comments or questions you may have.

BIOGRAPHY OF ROBERT H. LORSCH

Los Angeles businessman, entrepreneur and philanthropist Robert H. "Bob" Lorsch's professional career spans over 35 years, mainly in advertising and sales promotion.

For more than 20 years, Bob Lorsch served as President of Lorsch Creative Network (LCN), a full-service advertising and sales promotion agency specializing in merchandising, point-of-sale, games, contests, sweepstakes and interactive marketing for corporate clients. LCN blended advertising, sales promotion, marketing campaigns and interactive telepromotions for "blue chip" national and international clients, including the ABC, CBS and NBC television networks, Marvel Entertainment, Caesars World, Inc., The Seven-Up Company, Campbell's Soup, Procter & Gamble, Beatrice Foods, Johnson & Johnson, Taco Bell, American Isuzu Motors, Northrop Grumman, McDonald's Corporation and MCA/Universal, among many others. Lorsch also partnered with Pacific Bell Information Services to build a voice mailbox system that is now part of the popular WinFax product offerings. In late 1994, Lorsch co-founded a prepaid long distance calling card company SmarTalk TeleServices, Inc., which started in late 1994 with five thousand dollars in capital and five people in a room above his garage. After going public in 1996, the company became one of the largest providers of prepaid telecommunications products and services in the world. Lorsch served as CEO until February 1998, following which the company was ultimately sold to AT&T in 1999.

Today, Lorsch continues to pursue entrepreneurial business opportunities in the private sector through his investment and development firm, The RHL Group, Inc. One of his companies, www.yourdiscountdepot.com is an E-commerce enterprise that operates an online store and auction site as well as markets offers from a network of strategic partners.

Another of Lorsch's projects is Natural Products for Pets, Inc., which launched in October 2001 and is the exclusive manufacturer and distributor of Dancing Paws, a popular pet nutrient system that promotes optimum health and longevity. Offered at major retail specialty stores and the Internet at www.dancingpaws.com, the Dancing Paws line is produced at human dietary supplement plants requiring FDA approval. In fall 2002, the company introduced its newest product, "Breath-A-Licious," a dental treat for dogs that has met with huge success.

Additionally The RHL Group is proud to have been an early stage investor in the Series A, B and C rounds of CancerVax www.cancervax.com a Biotechnology Company that completed its public offering in October 2003 (NASDAQ CNVX).

Whatever his role, Lorsch faces each endeavor with unparalleled enthusiastic energy. One of his personal mantras is: "To be average scares the hell out of me."

These words are inscribed on a sign that has hung on his office door for more than 20 years. In the book, *Barbarians Led by Bill Gates*, Lorsch is described as “a marketing mastermind” and “a magician who believed anything was possible and simply wouldn’t take no for an answer.”

One of Lorsch’s marketing innovations involved his efforts in 1980 to sell advertising on the Space Shuttle to benefit NASA research programs. This caught the attention of White House and NASA officials, who encouraged him to get involved with the Museum of Science and Industry in Los Angeles as well as other science museums across the country. In February 1998, Vice President Albert Gore recognized Lorsch’s support of science and technology in his dedication of the new California Science Center, which features the Robert H. Lorsch Family Pavilion as the gateway to the Center. Lorsch also serves on the California Science Center Foundation’s Board of Trustees.

Lorsch has received numerous awards and proclamations for his public spirit, including the prestigious “C” Flag Private Sector Initiative award from the White House during the Reagan administration for his work in raising millions for financing state and local earthquake preparedness education. His efforts for this cause, which include serving on numerous earthquake preparedness committees, have also earned him awards from the City and County of Los Angeles, the State of California and the Federal Emergency Management Agency (FEMA).

On June 5, 2002, Lorsch was again recognized by the City of Los Angeles when the Los Angeles City Council adopted a resolution commending the entrepreneur/philanthropist for his outstanding charitable work and business acumen, and further honored him by creating “Bob Lorsch Day.”

Further, on June 12, 2002, Lorsch was appointed by the California Gambling Control Commission to serve on its 10-member Gaming Policy Advisory Committee. And on September 11, 2002, he received a state appointment from Governor Gray Davis to serve on the nine-member California Science Center Board of Directors for a four-year term.

In contributing a tremendous amount of time and energy toward giving back to the community—a lesson he learned in his youth—Lorsch also encourages clients, business associates and friends to give a portion of their profits back to the community. His efforts have led to raising millions of dollars for a variety of charitable organizations, along which are numerous cause-related marketing programs he created for national advertisers that have helped raise millions for organizations such as the Special Olympics and others.

Among his many current charitable endeavors, Lorsch is a major supporter of the John Wayne Cancer Institute, D.A.R.E. America, the Elizabeth Glaser Pediatric AIDS Foundation, the Thailians Mental Health Center at Cedars-Sinai Medical Center, The Los Angeles Police Historical Society, the Starlight Children’s Foundation, the Sheriff’s Youth Foundation, the VPI Skeeter Foundation, and the Muscular Dystrophy Association, for which he serves as both a National Vice President and President of the Los Angeles Chapter.

Over the last 18 months, Lorsch has been involved in helping the Wildlife WayStation. www.wildlifewaystation.org. The WayStation is an internationally acclaimed non-profit wildlife refuge in Southern California’s Angeles National Forest and the largest rescue facility of its kind in North America. Currently home to 600 animal residents, The WayStation has saved over 76,000 animals over the past 28 years from certain death, with funding for its operations provided from the private sector without taxpayer support. In his role as volunteer and “Best Friend,” Lorsch has committed his time and resources helping to bring The WayStation into compliance by resolving issues with County, State and Federal regulators. This year he led a series of legal and political actions—including filing a successful court motion on behalf of the chimp residents—while at the same time building The WayStation’s base of financial supporters. Lorsch has served the wildlife sanctuary as its “Best Friend” during the most difficult period in its history, and in November 2003, was named Chairman of its Board of Directors.

Over the past five consecutive years, Lorsch has received six humanitarian awards from the following charitable organizations: the anti-drug, anti-violence organization D.A.R.E. America honored him in 1998 with its coveted Future of America Award at a dinner where he was named D.A.R.E.’s “Man of the Year.” Lorsch was instrumental in raising over \$2 million for this organization at the dinner, which represents the most successful fund raising event held by D.A.R.E. and is among the most successful money-raising events honoring an individual in the Los Angeles area. The Muscular Dystrophy Association honored Lorsch in 1999 with its esteemed Humanitarian of the Year award; the Southern California Chapter of the Asthma & Allergy Foundation of America named him Humanitarian of the Year 2000; A Family Celebration presented him with the Humanitarian of the Year

award at its 2001 gala, where he was joined onstage by fellow honorees President Bill Clinton, President Gerald and Mrs. Betty Ford, and Sylvester Stallone; and Starlight Children's Foundation honored him in April 2002 with the Golden Wish Award at its 19th annual gala hosted by Jamie Lee Curtis. Most recently, in October 2003, Lorsch was honored by the Wildlife WayStation with its "Paws of Fame" Humanitarian Award in recognition of his philanthropy and unselfish dedication to the world-renowned animal sanctuary. The presentation was made at *the Ninth Annual Safari Brunch* held at the Playboy Mansion and was the organization's most successful benefit in history.

Lorsch has been an arbitrator for the American Arbitration Association and a member of the James Brady Presidential Foundation and, also, the Fulbright Commission. He has been highlighted in national and international newspapers, magazines and broadcast media, and has been a featured speaker on telecommunications at forums nationwide, including at MIT. Lorsch is 53 years old and is a resident of Los Angeles for more than 33 years. He has one son, Jordan, who is 19 years old.

SOME SITES THAT YOU MAY BE INTERESTED IN

www.yourdiscountdepot.com

www.dancingpaws.com

www.lorschland.com

www.wildlifewaystation.org

FEBRUARY 17, 2004 PRESENTATION TO SENATOR BROWNBCK



February 17, 2004

The Honorable Sam Brownback
 Senator, Kansas
 316 Hart Senate Office Building
 Washington DC 20510

Dear Senator Brownback,

In 1981 my company, then called The Bob Lorsch Company, Inc. and now called The RHL Group, presented NASA with an unprecedented opportunity prior to the Space Shuttle Columbia's maiden voyage – to create a self-funded public awareness program that would generate considerable revenue to help fund NASA's programs.

At the request of Mr. Fred Fielding, Counsel to the White House during the Reagan Administration, and Mr. James Farnsen, then Assistant Administrator for NASA, I spent years working through various offices of NASA and the offices of the White House as well as consulting with numerous members of Congress, to develop my program. Despite these efforts, and despite significant support from the Reagan Administration and Congressional support in both the House and the Senate, this program never got off the ground. For your reference, a copy of the original copyrighted proposal for Advertising In Space is attached.

At that time, and despite many exploratory efforts to commercialize its programs that have continued through today, NASA has still not chosen to take advantage of this opportunity. Since that time NASA has flown numerous Shuttle missions, each of which could have generated as much as \$50,000,000 in revenue or billions of dollars, had this Advertising in Space program been implemented.

These revenues could have funded educational grants, advanced communications technology, medical technology, improved Earth observation and weather forecasting techniques, and numerous other scientific research projects that could have significantly benefited and enriched the lives of the American people.

Today, NASA is involved in completing the construction of the International Space Station (ISS). At the same time, NASA is looking for alternative ways of funding its programs, as it faces unprecedented levels of proposed budget cuts. As a result, I believe that the time is now right to revisit the original 1981 concept and extend it to the many opportunities before NASA today.

The main thrust of this proposal is for The RHL Group to take on the role of creating public awareness about NASA and function as the fundraising representative for NASA. We will approach businesses, individuals, foundations and other organizations, to make them aware of how they can merchandise their Company's product or service through involvement with NASA space flights.

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February 17, 2004
Page 2

These presentations would be made using state-of-the-art entertainment industry technologies. In concert with NASA's objectives, we will create a program to show participating organizations how they can become a part of history through their involvement with NASA and the purchase of plaques on the ISS and Space Shuttle Missions that go back and forth from the ISS.

The plaques would be positioned in the ISS, and on the Shuttle, so that they would be seen on broadcast television. The logos and trademarks of participating corporate sponsors will be commemorated as part of the multimedia documentation of NASA's efforts in the next millennium. So in fact, participating sponsors will become part of the Historical Record of humanity's emergence as a space-faring civilization.

BACKGROUND

With the International Space Station (ISS) program underway, a new era in space exploration has begun; an era linking the Earth with a permanent human presence in space. The ISS will serve as a focal point for international cooperation. The RHL Group shares the anticipation and excitement that surrounds this project, both at NASA and throughout the world. We believe that NASA is utilizing America's greatest natural resource -- the knowledge and ingenuity of our people -- to expand Humanity's reach beyond previous limits. Now it's time to use that knowledge and ingenuity again, this time to make the American people and the world in general aware of what's on the horizon for them because of NASA's accomplishments.

It is obviously unnecessary for The RHL Group to expound on the value of space exploration to NASA. However, it is essential to the future of space exploration that the world appreciates and understands its value. This is why so much energy is put into public affairs.

Public awareness of the existing and potential benefits of space exploration has always been overshadowed by the enormity of the achievement of any given mission and the emphasis that is placed on the method of accomplishment. Indeed, this focus is understandable. In the early stages of the space program, the American public, as well as the world, was amazed and genuinely excited by the accomplishments of NASA. However, as the years have passed and space missions have become more routine in the public mind, we believe that there has been a steady decline in public interest in NASA. In a world with so many problems and offering so many media diversions, NASA's efforts, potential, and accomplishments are now taken for granted.

In addition, economic pressures have taken their toll on NASA's budget. Cuts in the budget obviously have had a detrimental effect on NASA's plans. NASA's curtailed funding also has had a detrimental effect on the American people, who could now be benefiting from advanced communication technology, medical technology, improved Earth observation and weather forecasting techniques, and other scientific research developments.

NASA has traditionally relied on the media for exposure, which has limited the results of NASA's public affairs efforts. There are numerous examples of exciting space accomplishments receiving tremendous media coverage for a few days at most, with little or no follow-up when the media's attention invariably moves elsewhere. This is generally followed by rapid decline in public interest for the important accomplishment in space.

February 17, 2004
Page 3

NASA's ability to achieve its long-term goals would be significantly enhanced by greater public awareness. Unfortunately, given NASA's charter and the realities of declining budgets and resources, a focused effort to achieve a greater level of awareness has been difficult, if not impossible to achieve.

OUR PROPOSAL

The RHL Group has than 30 years developing creative, and effective, advertising and promotion programs. We are proposing to apply our expertise in generating public attention, involvement and recognition to a program that would enhance NASA's current and future plans for space exploration. This program would not only give NASA a unique way to get the American people involved in its space program and create the public awareness that NASA desires, it would also generate significant revenue for the agency.

It is important that NASA establish a stronger link with the American public. Given the fact that the government establishes budget priorities based on public interests, welfare, or demands, it's apparent that the public needs to be stimulated with regard to space exploration. Effective public relations, like advertising, does not diminish interest, it stimulates the government, the media, the public and the world at large to take effective action.

We recognize that NASA's charter and responsibility is to focus its energy on maintaining a space transportation infrastructure, the successful construction of the ISS, and the program of planetary exploration. The RHL Group proposes to let NASA continue to focus on those critical efforts while we implement a public relations program in a manner that will maximize the perceived significance of these activities and events.

One of NASA's objectives is to communicate that it is an organization whose missions serve and benefit all the people in the world. Another objective is to promote the successful commercialization of routine space operations. The RHL Group program will accomplish both by encouraging the participation of private industry, as well as individuals, foundations, unions, state governments and even international organizations in NASA's efforts. We believe that millions of dollars in additional revenue can be generated. National and international support and recognition will reach new highs. Media coverage worldwide will increase. The media interest in the implementation of our program will spark immediate global attention.

What we are suggesting is that we create an opportunity today for the American people to actively participate in the support of NASA objectives.

PROGRAM ELEMENTS

1. CONTRIBUTOR SOLICITATION

The RHL Group, Inc. (formerly The Bob Lorsch Company), proposes to take on the role as public awareness and fundraising representative for NASA. Our manner and method of communication and presentation will be of the highest caliber.

February 17, 2004
Page 4

We will approach organizations and individuals, with a specific letter of agreement from NASA, and make these organizations aware of how significant the space program can be to them. We will work to help these contributors become interested in not only supporting or recognizing NASA's purpose, we also will demonstrate to them the direct advantages of financial "investment." We will use the construction of the ISS as the focal point of our efforts.

In our opinion, contributing to NASA is akin to being associated with a winner. The "Contributors" and NASA will be in a Win-Win relationship. Many companies have already allocated millions of dollars to space related activities as NASA contractors, research participants, etc. Surely, these companies and many other organizations would be interested in spending money to be identified with a very visible and successful space program promotional campaign.

The RHL Group is aware of many companies and unions that are potential candidates for participation in this program. As participants, they can communicate their employees' and members' support for NASA and, at the same time, represent NASA to their constituencies by communicating back to them what NASA wants heard. State and foreign governments can be persuaded to take on the responsibility of making their citizens aware of the benefits that will directly affect them. This accomplishes a major objective: involve the world with NASA.

The RHL Group anticipates that our proposed program could generate hundreds of millions of dollars in much needed revenue for NASA during the remaining deployment phases of construction of the ISS. The achievement of this goal will be a significant accomplishment and the long-term results in terms of public relations for all concerned will be phenomenal.

To bring this to reality, The RHL Group will promote national and international support for NASA's programs, in particular the International Space Station, by soliciting Contributors willing to invest *one, three or five million dollars each* to receive the benefits of an association with NASA.

We understand that, as an administrative agency operating solely on funds provided by the government, NASA does not have independent authority to raise much needed revenue for its programs. However, we have been advised that NASA may accept revenue that is either contingent upon the performance of service, or, is totally unconditional. Any contribution received under our program would fit into one of these categories. For example, some contributions would be given to support specific research experiments to be conducted on the ISS; however, these contributions would be given as unconditional in that NASA would make the ultimate decision as to where the actual revenues would be applied.

In recognition and appreciation of each Contributor and their investment in the future of space exploration, we propose that NASA honor the Contributors in the following manner which honors would include but not be limited to packages similar to the following:

- Three commemorative replica tile "plaques" would be created for each contributor. One tile would be mounted in the ISS. The other two tiles would be placed inside of the Space Shuttle, with one of the tiles returned to the Contributor for the Contributor to proudly display a personalized individual or corporate memento that has flown in space. The last tile/plaque will reside in The Smithsonian as described below.

February 17, 2004
Page 5

- The plaques would be strategically positioned so that the names or logos of the Contributors would be seen as part of televised feeds from the ISS and Space Shuttle. This would create enormous public relations and advertising value for the Contributor.
- Prior to any launch ISS Contributors would be invited to attend a pre-launch cocktail party and dinner with NASA officials, Congressional Representatives and other key officials.
- Contributors would be presented with Congressional public service plaques to honor their participation in this program.
- Contributors would receive VIP privileges at any NASA launch and landing.
- Contributors would be invited to attend a special post-landing celebration dinner attended by the astronauts, NASA officials and other dignitaries.
- At this dinner, each Contributor would be presented with the tile/plaque, bearing their name or logo, which flew aboard the ISS.
- Contributors will be photographed, both still and video, with astronauts, NASA officials and other dignitaries.
- Each Contributor would receive an official letter of appreciation, signed by the President, the head of NASA and others.
- One of each Contributor's three plaques would also be displayed at any future exhibit in the Smithsonian that includes the Space Shuttle, the ISS, and other programs insuring that Sponsors are a permanent part of history.

2. NASA MEDIA SERVICES

A second objective of our program also would be to assist NASA in providing enhanced media services. NASA has amassed a vast archive of film, photos and video images, as well as audio that can be further utilized as a revenue source while not interfering with free access enjoyed by the public.

Over the years, NASA has created many promotional and educational films. What has been missing is the incentive for organizations to show them. The exposure that NASA could receive through this program could potentially expand worldwide recognition of NASA dramatically.

In addition, the NASA Select Cable Television Channel is currently operated at considerable expense to NASA, as much as tens of millions of dollars per year, and yet generates no revenue. The RHL Group proposes to take over management of NASA Select as part of our overall public awareness program. Because we have many significant contacts within the film and entertainment industry, we believe we can significantly improve the production quality, appeal, and revenue generating potential of NASA Select.

February 17, 2004
Page 6

In addition, we will be able to use NASA Select to produce targeted documentaries that will be of tremendous value to NASA and the Contributors in consideration of their support of the space program. These documentaries could be produced as compelling documentaries that would provide each Contributor with an incentive to show them to employees, clients, members, associations, Chambers of Commerce, as well as private citizens and friends. Contributors will use these documentaries to show what they are giving back to the world, which will enhance their own marketing and public relations efforts. Just as important, these documentaries will also increase public awareness of the ISS and other NASA space program elements, which will help enable people to understand the benefits that space exploration brings to them. We believe that there will be significant excitement generated by these documentaries, which could well result in national and international network exposure.

We also are aware that NASA is interested in switching all ground based and space based video facilities to the HDTV standard in the next decade. The total cost of this effort is expected to be in the hundreds of millions of dollars. We would make this transition part of our program, and be able to promote and solicit specific contributions underwrite the cost of transition to HDTV.

One of our key elements to increase awareness of the ISS, and NASA in general, would be the production of a series of short segments that would chronicle the construction of the ISS, an undertaking of great historical significance. These segments could be produced and distributed worldwide daily during the 5-year on-orbit construction of the ISS. This type of program was used very successfully during America's Bicentennial Celebration, when a promotional campaign featuring a series of "Bicentennial Minutes", highlighting key Bicentennial events and historical facts, were syndicated worldwide. Our "ISS moments" would create great interest and awareness in the NASA program.

The RHL Group would work closely with NASA to accomplish these program goals. With NASA's permission, we would photograph and videotape all targeted events related to the ISS, the Space Shuttle, and other programs as required. We would want to capture all mission related events including pre-launch, launch, tracking, launch control, operations, checkout, astronauts, mission control, briefings, crew activities, hardware operations, approach, landing, crew egress and all the other moments that define a Space Mission. The more we are able to show about NASA, the more we will be able to accomplish the goals of generating revenue and increasing positive public awareness.

3. COST

In order to run this program, The RHL Group is requesting a one time recoupable advance of Five million dollars to cover the initial cost of operating this program plus any third party extraordinary expenses as would be approved in advance by NASA. In addition we are requesting a three-year minimum performance agreement from which The RHL Group would receive the standard Seventeen point six five percent advertising/marketing commissions on monies raised from any and all sponsorship revenues, advertising sales and or merchandise sales (the "Revenues") directly related to this effort, less the recoupable advance. The minimum performance would call for The RHL Group to generate Revenues contracted for, earned or received by NASA of not less than one hundred million dollars in the first three year period from the time immediately following the signing of the agreement in which case the agreement would automatically be renewed for another seven years.

February 17, 2004
Page 7

PROPOSAL SUMMARY

What we are presenting to NASA is a proposal that will be the most significant government public relations campaign in the history of the United States, and, in fact, the world. We are presenting a plan that generates an enormous influx of revenue, goodwill, national and international support and recognition for the great purpose of the space program, which is Service to Mankind.

What is necessary to implement this action is the willingness of the individuals in authority NASA to make decisions, take action and make choices that could be as bold and innovative as to those taken daily in the space program.

The United States is leading the effort to create the first permanent international human presence in space. It is an appropriate time to also launch The RHL Group's program to generate the type of global support that catapults the United States to a leadership position of responsibility in terms of enhancing world unity.

Very truly yours,



Robert H. Lorsch
Chairman/CEO
The RHL Group, Inc.

Enclosure

RHL/bv

1984 COPYRIGHTED PRESENTATION TO NASA

The Lorsch Group
6255 Sunset Boulevard, Suite 2200
Los Angeles, CA 90028
Telephone 213-856-0006

July 3, 1984

Mr. Jesse W. Moore
Acting Associate Administrator
for Space Flight
NASA Headquarters
Code M
Washington, D.C. 10546

Dear Mr. Moore:

The following presentation represents a unique, revenue-generating opportunity for NASA.

The programming described herein is to develop a Public Affairs Advertising Program which revolves around the space shuttle.

This program is designed to generate billions of dollars in additional revenues for the space program, ultimately allowing NASA to fund expanded programs.

Thank you for the opportunity of making this presentation. We are looking forward to it representing the beginning of a long-term, mutually advantageous relationship between NASA and our firm.

Sincerely,

Robert H. Lorsch
President

RHL/mp

OVERALL CREATIVE OBJECTIVES

- . To adapt the concept of "commercialism in space" to the development of additional programming that will generate significant commercial dollars toward the space program, without dramatically impacting scientific research and development.
- . To create a revenue generating opportunity over and above existing revenue services for the shuttle program.
- . To create programming that will enable individuals worldwide to feel they are part of this nation's accomplishments in space.
- . To create a program whereby business and industry worldwide will support the space program whole-heartedly, thereby increasing enthusiasm and awareness in millions of employees throughout their organizations.
- . To develop programming whereby business and industry will become more aware of the commercial opportunities inherent in shuttle programming, thereby expanding potential revenue from private industry through additional scientific research and development projects.
- . To develop programming which will utilize the full potential of marketing communications to generate worldwide participation in the space program, as well as significant additional revenues for NASA.

- . To participate in the process of helping create programs that allow business and industry to share in the cost burden of government.
- . To do all of the above within a reasonable set of time and procedural guidelines at no cost to NASA.

RATIONALE

In today's high cost media marketplace, more and more corporate advertisers are looking for media opportunities that can expand their advertising, sales promotion and public relations dollars.

At more than \$500,000 for a 30 second television spot on certain network programming with no long-term residual benefits, corporations are looking for unique, cost-effective programming opportunities that bring together advertising, merchandising and public relations.

Public Affairs Advertising in Space is that kind of program.

Public Affairs Advertising in Space is a program which will enable business, industry and individuals world-wide to be part of this nation's space program.

It would make possible the linking of business, industry and individuals in an effort to promote the importance and awareness of space research and exploration.

Public Affairs advertising takes advantage of the resources of individuals, business and industry, by allowing them to participate financially in the successful future of this nation's space program.

Public Affairs advertising is a supportive statement of expression as to the world-wide importance of this nation's space program.

Public Affairs advertising is a unique opportunity for NASA inasmuch as it sets up a global link of business, industry and individuals working to generate needed funding and education regarding the space program, while promoting the importance of space research and exploration.

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OVERVIEW

Government establishes budget priorities based on public interest, welfare or demands. Whenever business, industry and individuals are interested and involved in a particular event, it helps make things happen.

The success of this nation's space program is largely contingent upon funding. Public Affairs Advertising in Space is a concept that can generate millions of dollars in badly needed revenues to help take advantage of the fullest potentials of the space program.

A NASA objective that has been communicated to me in many conversations is that NASA is a space agency whose missions serve and benefit all the people of the world. Involving private industry in the space shuttle program falls within the parameter of that objective.

This proposal takes the above referenced objective and expands it by making it possible for individuals and organizations who may not have realized or have need for scientific and/or development programs in the shuttle, to still be an integral part of this nation's space program; and, in particular, shuttle programming.

Everyone likes to be on a winning team. One of the most successful examples of monies being raised to support winning and worldwide communication is the 1984 Summer Olympic Games which are about to begin in Los Angeles.

The shuttle program has the opportunity of raising millions of dollars of much needed additional revenue along the concept of the way the Olympics are brought to the people of the world.

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NASA is a winning organization and everyone likes to be associated with winners. The opportunity of being involved in a marketing communications program with NASA is a winning opportunity for everyone.

Many corporations have already allocated millions of dollars to NASA for valuable experimental time on the space shuttle. These companies, and many other organizations world-wide, would be interested in spending additional dollars to be identified with the shuttle program.

Many organizations spend millions of dollars annually on pet projects of that organization's founders and/or Board of Directors. These projects range from solving hunger problems to medical research, and so forth.

The shuttle offers unique opportunities to help deal with many of those problems and turn them into opportunities. These corporations would be receptive to being involved in marketing communications programs with NASA, where they could direct revenues toward experimentation that would help fulfill some of their companies' humanitarian objectives.

If NASA were to accept these types of "sponsorships," it would not only be a win for the space program, a win for sponsoring organizations or individuals, but a win for mankind in general.

Individuals, business and industry, states, communities, foreign countries and charities can benefit from the visibility that would occur through a space shuttle Public Affairs marketing communications program.

The private sector can use a Public Affairs Space Advertising Program to publicize contributions they've made to mankind as

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well as to express their appreciation for the risk and contributions that NASA and the space program have given to them.

Furthermore, a Space Shuttle Public Affairs Advertising Program offers NASA the opportunity to take advantage of a "fund-raising vehicle" in the form of "space." NASA could selectively donate sponsorships to worthwhile public service organizations, telethons, or service groups. These contributions would demonstrate NASA's commitment to a better world by giving assistance to those organizations.

Public Affairs Advertising in Space is a self-liquidating way for NASA to communicate to the American taxpayer, private business and industry and individuals world-wide, the benefits of the space program. Public Affairs advertising gets people more involved in the space program at no cost to NASA. Public Affairs advertising helps to reduce any existing Public Affairs expenses that NASA is currently expending.

Public Affairs advertising is an opportunity for NASA to demonstrate its participation in helping to conserve valuable taxpayer dollars and cooperate by sharing some of the expense of government with business and industry.

From a practical standpoint, Public Affairs Advertising in Space does the following:

- . Increases revenues for the space program.
- . Creates public and international support, recognition and educational awareness of the space program.
- . Reinforces public acceptance and support of congress in funding the space program.

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- . Creates private sector awareness of shuttle activities, ultimately benefitting commercial usage of the shuttle.
- . Restores valuable programs that may have not been done due to lack of funding.
- . Increases the amount of media coverage and media awareness in general of the space program, NASA and particular missions.
- . Enables the space program and mankind in general to take more advantage of existing resources, enabling programs that benefit mankind to be funded.

PUBLIC AFFAIRS ADVERTISING - HOW IT WORKS

The following portion of this presentation represents recommendations as to what a sponsor would receive in consideration of a one million dollar sponsorship toward Public Affairs advertising on the space shuttle.

Although the points that follow represent recommendations as to what we might offer an advertiser any modifications to the programming as described herein must retain the original integrity of the program, insuring the sponsors get value for their participation.

Advertisers purchase a sponsorship plaque (the size of which is yet to be determined), which will carry a supportive, non-commercial message and will be displayed in and around different areas on the particular space shuttle mission they are sponsoring.

Plaques will be placed in those areas throughout the shuttle, where television cameras will already be broadcasting events. Sponsor messages would then be telecast (for a minimum of 60 seconds over an entire mission in conjunction with events that people will be interested in watching. This insures people will see the messages.

By placing plaques in different areas of the shuttle, where television cameras will already be broadcasting events, it will keep the advertiser's interest up in terms of sponsoring one or more missions, inasmuch as their company's message will be interested in watching.

If plaques were simply broadcast like commercial messages, the program would be exciting for one or two missions, and then if.

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someone were watching televised activities from the space shuttle, they might stop watching and take a break when plaques were shown. By integrating plaques with events, this will not be a problem.

Major national and international corporations, states, fundraising groups, countries and individuals would be approached to purchase one or more (up to 50) sponsorship plaques to be placed inside the shuttle on a particular mission.

At present, sponsors purchase signage strategically placed at all types of promotional events, as well as non-commercial fundraising events. When a camera passes the signs they are readily identifiable.

NASA would zoom in for a certain number of seconds on a plaque, or group of plaques, at a time when the plaques could be shown in conjunction with a particular event without interfering with the event or extensively using astronauts' costly time.

It's possible that certain sponsors might pay more money per plaque, depending on the location of their plaque in relation to an undertaking.

For example, if there were extensive coverage of a particular space walk and the plaque were mounted near equipment significantly involved in that event, a sponsor might spend more than the one million dollars referenced above to have his message on that plaque.

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The plaques are to be totally non-commercial in nature and are to carry only supportive messages such as:

"The Lorsch Group, its employees and friends around the world, support the benefit that NASA is giving to mankind."

(Logo)

The program should include a pre-launch cocktail party, luncheon or dinner, for up to six representatives of a particular sponsor per mission, as well as appropriate administration, NASA and congressional representatives in attendance. The attendance of the mission astronauts would also be desirable, but not necessary.

At the luncheon, photos would be taken of a company's plaques prior to loading on the shuttle. Film of the plaques being installed on a particular mission would also be taken.

Special V.I.P. seating privileges and hospitality areas should be provided at a sponsor shuttle launch for up to 30 individuals from a sponsoring corporation. Guests might include executives employees and key customers, depending upon the sponsor's wishes.

V.I.P. privileges at the shuttle landing should be extended as per launch privileges outlined above.

Sponsors would be entitled to V.I.P. tour privileges at major space centers for one year from the date of that sponsor's launch. These might include tours of the Houston Space Center, Edwards Airforce Base, the Smithsonian Air and Space Museum and NASA headquarters. Tours would be arranged only after an appointment in advance had been made, subject to NASA's convenience.

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Plaques returning from a mission would be installed in the Smithsonian Air and Space Museum for a period of one year from the launch, where tens of thousands of individuals could be aware of the companies that are helping to make the space program more viable.

An engraved scroll listing all sponsors of shuttle plaques would hang permanently in the Smithsonian Air and Space Museum listing sponsor name and logo. The plaques would be returned to sponsoring corporations after the mission after hanging in the Smithsonian Museum one year.

A post-landing celebration dinner with astronauts, administrative officials, NASA officials and congressional representatives would be held for sponsors of a particular mission. This could be done as one dinner covering several missions rather than one dinner for each mission.

At the dinner, still pictures would be taken with corporate executives and astronauts and other dignitaries.

Each sponsor would receive an official letter of appreciation from the White House and NASA administrative officials.

Sponsors will be furnished print and motion picture film from their missions for use by their public relations departments to inform and educate customers, their local communities and others as to their involvement in this program.

These materials would include pre-launch, in-flight, and post-launch coverage as best possible of that particular sponsor's mission. All usage of these films would first be approved in writing by NASA.

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Sponsors would be allowed to use an official logo as part of their ongoing advertising and public relations activities. This will verify their involvement in the space program and contribution to a better world and mankind in general. NASA will have the right to review and approve any such materials prior to publication.

The sponsor package outlined above offers appropriate consideration to any major national or international corporation, individual, group of individuals, community, state, country or public service organization, to justify a one or more million dollar plaques(s).

In the event, for technical reasons, a sponsor does not receive a major percentage of the benefits called for in a final sponsorship agreement for a particular mission, the sponsor's plaque would be replaced on future missions at no cost to the sponsor.

RELATIONSHIP OVERVIEW

The Lorsch Group is a marketing communications firm that creates special projects programming for a variety of national and international clientele. As such, we feel qualified to develop a Public Affairs Advertising Program for the space shuttle.

The Lorsch Group would be responsible for all sales of shuttle sponsorship plaques to potential clients world-wide on the basis of an exclusive representation agreement with NASA, along the lines of the following.

From time to time The Lorsch Group may contract with other advertising and/or marketing communications firms (subject to NASA approval) in order to effectively offer this Public Affairs Sponsorship Advertising Program to any and all qualifying sponsors world-wide.

The Lorsch Group would handle sales of Public Affairs advertising at their own expense.

The Lorsch Group would receive the standard media advertising agency commission of 17.65% on any Public Affairs advertising sold.

Any clients purchasing a Public Affairs advertising sponsorship must be approved by NASA prior to entering into any sponsorship agreement. Any message on a sponsor plaque must be approved by NASA prior to it being placed on a mission.

Any approvals from NASA involved in the Public Affairs Advertising in Space program shall not be unreasonably withheld.

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The Lorsch Group would work on a best efforts basis to sell any and all available sponsorships on a particular mission, pursuant to NASA's advising The Lorsch Group of how many potential sponsorship areas are available on a particular mission.

NASA agrees to fulfill all required terms and conditions in the (to be developed) sponsorship agreement between NASA, The Lorsch Group and any approved sponsor. In the event certain details having to do with organization, coordination, fulfillment, creation or manufacture of any of the materials called for in a sponsorship agreement can not be provided by NASA, and NASA must retain outside marketing services organizations to furnish these items, The Lorsch Group shall have an option to bid for providing those services to NASA.

It is our point of view that as many as 50 plaques could be sold for each mission once this program develops. It is entirely possible that over 50 missions, based on as few as an average of 20 plaques per mission, that NASA could generate as much as one billion dollars.

Based on 50 plaques per mission on 50 missions, NASA could realize as much as two billion, four hundred ninety-five million dollars in net revenue. To accommodate the presentation of as many as 50 plaques, they could be clustered in groups of four or more when being displayed.

The above referenced calculations are based on a cost per plaque of one million dollars, less standard media advertising commissions. In the event certain sponsorships sell for more than one million dollars, these numbers would go up accordingly.

The Lorsch Group would have an exclusive relationship with NASA as their representative for selling Public Affairs advertising

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inasmuch as the concept of Public Affairs advertising in the space shuttle was developed by The Lorsch Group over a three year period.

NASA would be involved in supporting The Lorsch Group's marketing and sales activities by furnishing written substantiation of the validity of any relationship between NASA and The Lorsch Group to sponsors. Furthermore, NASA would cooperate with The Lorsch Group with regards to promoting their involvement with The Lorsch Group via public relations, usage rights of appropriate copyright materials (such as logos, photographs, and so forth) and cooperating with regard to furnishing support and printed material for presentations as required, provided, however, all news releases, presentations and materials are first approved by NASA, which approvals shall not be unreasonably withheld.

As part of this program, we would develop an official patch or emblem to offer sponsors for their employees and customers. This would reinforce a connection or involvement with the particular organization's sponsorship. This type of programming will help to expand awareness and interest in particular missions.

NASA and The Lorsch Group should immediately enter into a preliminary "deal point memorandum" so that potential advertisers can be approached. If any sales are made prior to a formalized agreement between NASA and the Lorsch Group, sponsors could pay pay sponsorship fees to a special escrow account whereby funds would be disbursed to NASA and The Lorsch Group in percentage increments at different stages (to be determined) in the course of a mission.

Following the development of a final defined sponsorship package between NASA and The Lorsch Group, NASA and The Lorsch Group would enter into a formalized, exclusive representation agreement.

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Public Affairs advertising in the space shuttle is the beginning of a potential revenue stream for the space program that can ultimately generate many billions of dollars for NASA and the space program.

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CONCLUSION

Public Affairs Advertising in Space represents a unique opportunity for NASA, sponsors and mankind in general, inasmuch as it helps the space program continue at full strength, ultimately making the world a better place to live in.

Public Affairs Advertising in Space can generate billions of dollars of badly needed revenues for NASA.

A Public Affairs Advertising Program for NASA would dramatically stimulate individual and private sector awareness of the importance of the space program to the world. This awareness would ultimately reinforce funding potentials through congress for the space program.

Questions have been raised about the propriety of putting "advertising" in space. Public Affairs Advertising in Space is not "advertising." It is non-commercial, supportive Public Affairs signage, dedicated to expressing a particular individual's or organization's support of a happening or event that has occurred as a result of space exploration. It is not a forum whereby a major company may send their latest slogan into outer space.

The public will be more than receptive to a non-commercial program that helps relieve taxpayer burden for additional funding so that NASA can take advantage of its fullest potentials.

Furthermore, who would argue with the private sector for picking up the cost of a program that makes all our lives simpler and more productive, reinforcing our capabilities in science, medicine and technology in general, making the world a better place to live.

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Inasmuch as shuttle missions are watched world-wide, the concept of Public Affairs Advertising in Space offers sponsors the opportunity to have their company's name, logo and message transmitted to hundreds of millions of individuals world-wide.

In many cases, individuals that a sponsor might reach may represent whole new resources for that particular sponsoring company. Furthermore, the value of the association of a particular sponsor and NASA reinforces this program's potential for being a multi-billion dollar success.

Media interest in this program is tremendous, inasmuch as it is a dramatic representation of how the private sector can help benefit mankind.

We look forward to placing sponsorship plaques in shuttle missions at the earliest possible convenience, inasmuch as each launch that occurs without plaques represents a loss of millions of dollars in revenue.

Space exploration is by its very nature, an example of how mankind again achieves the impossible dream and creates a better universe.

This program is nothing more than allowing millions of individuals the opportunity to share in the excitement and thrill of reaching out and being part of making another impossible dream become a reality.

Respectfully submitted,

Robert H. Lorsch
The Lorsch Group

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1981 COPYRIGHTED PRESENTATION TO NASA

The Bob Lorsch Company

3255 Wilshire Boulevard, Suite 1634
 Los Angeles, California 90010
 Telephone 213 • 386-2041

PROPOSAL FOR: NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
 NASA HEADQUARTERS
 WASHINGTON, D.C. 20546

With the Space Shuttle program beginning in April, 1981, when the Columbia is launched, a new era in space exploration begins; an era linking earth and space with a total transportation system. The anticipation and excitement at NASA as the event draws closer to reality is shared by The Bob Lorsch Company. We recognize and acknowledge the creative genius of the people that have contributed to the Shuttle program.

As a major advertising company, creativity brings results for us too. In this proposal we are presenting you with a creative concept from our area of expertise. . . public attention, involvement and recognition, in a program to enhance both current and future plans for space exploration.

By linking with The Bob Lorsch Company in this public relations program, NASA would truly demonstrate to the American people that it wants their support by giving them the opportunity to be involved. Instead of adding to the millions of tax dollars already spent in the gigantic campaign of NASA's Public Affairs Office, it would be generating revenue that would offset taxpayer burden and create the results that NASA desires.

Public awareness of the existing and potential benefits of space exploration are overshadowed by the enormity of the achievement that is placed on the method of accomplishment, and indeed, this focus is understandable.

It appears as though the American public has been so overwhelmed by the accomplishments of NASA, that we are in an assumption mode, one that has the majority of people taking NASA's efforts, potential and accomplishments, for granted.

One example would be the rapid decline in public interest of the important discoveries of Voyager; demonstrated by the fact that one day Voyager receives tremendous media coverage and the next week the public at large forgets. To rely so heavily on the media for exposure, limits the results of NASA's public affairs efforts.

It is obvious that NASA is utilizing our greatest natural resource -- the knowledge and ingenuity of our people to expand beyond previous limits. Now it's time to use it again, to make the American people and the world in general aware of what's on the horizon because of our accomplishments, not, depending upon them.

NASA Proposal
Page 2

It's obviously unnecessary for The Bob Lorsch Company to expound on the value of space exploration to NASA. However, for NASA to make sure that the world knows the value is essential to the future of the space program. This is why so much energy is put into public affairs.

There is no doubt that eventually most of the results desired by NASA will be obtained. Unfortunately, the urgency to obtain these results, relative to the significance of life itself, is overlooked because of limited awareness.

Awareness of, leads to knowledge or the learning process which grows into linking to emotional preference and commitment. Once commitment is established the active stage of participation and conviction comes into play. This is the mutually benefiting relationship NASA must establish with the American people.

What our company can do is assist NASA to make the world aware of what it wants. . . NOW!

The strain on our economy has taken its toll on NASA's budget. Cuts in the budget obviously have had a detrimental effect on NASA's plans and the American people who could now be benefiting from advanced communication systems, solar research, medical achievements, weather forecasting and other scientific research developments. Developments that could have already saved or prolonged lives.

In that the government establishes budget priorities based on public interests, welfare, or demands, it's apparent that the public needs to be stimulated.

Effective public relations, like advertising, does not diminish interest, it stimulates the government, the media, the world to take effective action.

We recognize NASA's responsibility at this time to focus its energy solely on this tremendous endeavor; the successful mission of the Columbia.

Without interfering with this effort, The Bob Lorsch Company can implement its public relations program that will maximize the significance of this event and actually perpetuate its effect to all future space exploration.

One of NASA's objectives is to communicate that it is a space agency whose missions serve and benefit all the people in the world, and another objective is to involve private industry in the Space Shuttle in order to expedite research and generate revenue for NASA. Indeed, the survival of NASA's programs is dependent upon a return on investment from public usage and support of the Shuttle.

NASA Proposal
Page 3

Our program will accomplish both, but will not be limited to private industry. And, the involvement and revenue will be generated well ahead of the time originally anticipated. It will begin immediately.

It potentially could include individuals, foundation, unions, state governments and international participation. Millions of dollars in additional revenue will be generated. National and international support and recognition will reach new highs. Media coverage worldwide will increase. The media interest in the implementation of our program will spark immediate global attention.

We are not suggesting that NASA should receive unlimited financial assistance or employ hundreds of thousands more as in the days of Apollo. What we are suggesting though, should create a specific direction for the American people to actively participate in the support of NASA objectives. One of the results of this could be increased employment, another, is definitely increased financial assistance.

The main thrust of our proposal will be to approach organizations, with a specific letter of agreement from NASA, to make them aware of how significant the space program can be to them. . .to get them interested not only in the sense of support or recognition of your purpose, but also, of the direct advantages of financial "investment."

The Bob Lorsch Company, a professional organization, will represent the United States and NASA as such. Our manner, and method of communication and presentation will be of the highest caliber.

In our opinion, contributing to NASA is like being associated with a winner. The "Contributors" and NASA will be in a Win-Win relationship. Add to this the value of scientific research developments aided by the increase in revenues and the American people join to create a Win-Win-Win relationship.

Many companies have already allocated millions of dollars to NASA to reserve research time on the Space Shuttle. Surely, these companies and many other organizations would be interested in spending money to be identified with the space program.

To bring this to reality, The Bob Lorsch Company will promote national and international support of NASA's programs. In particular the Space Shuttle, by soliciting Contributors willing to invest \$1,000,000 each to receive the benefits of the association.

There are many companies and unions that can communicate their employees' and members' support of NASA and at the same time represent NASA by communicating to them what NASA wants heard. State and foreign governments will

NASA Proposal
Page 4

take the responsibility to make their citizens aware of the benefits that will directly effect them. This accomplishes a major objective; involve the world with NASA.

Generating much needed revenue for NASA in excess of \$50,000,000 prior to the launching of the Columbia is going to be a significant achievement. However, the long term results in terms of public relations for all concerned will be phenomenal.

As an administrative agency operating solely on funds provided by the government, NASA does not have independent authority to raise much needed revenue for its programs. However, we have been advised by your agency that NASA may accept revenue that is contingent upon the performance of service, or, totally unconditional. Any contribution received under our program would fit into one of these categories.

For example, some would be given in support of specific research experiments to be conducted utilizing the Space Shuttle, however, they would be given as unconditional in that NASA would make the ultimate decision as to where the actual receipts would be applied.

Another possibility is for NASA to provide a service. The services that The Bob Lorsch Company, as Contributor representative, will require under the terms of this program are:

- Video tape all possible operations aboard the Columbia.
 - Assemble and provide The Bob Lorsch Company with all raw video and audio transmissions from the Columbia.
- 1) This coverage should include all operations (launch, on-orbit and landing) from pre-launch to post-landing.
 - Shoot on both still and motion picture film all mission events.
 - Assemble and provide The Bob Lorsch Company with all still and motion photography.
 - 2) This coverage should be of all mission events including pre-launch, launch, tracking, launch control, operations, checkout, astronauts, mission control, briefings, crew activities, hardware operations, approach, landing, crew egress and VIP's.

NASA Proposal
Page 5

NASA should provide any other service or data that, if viewed, would be beneficial to the public and NASA.

In recognition and appreciation of each Contributor and their \$1,000,000 investment in the future of space exploration, we propose that NASA along with The Bob Lorsch Company honor the Contributors in the following manner:

- . Pre-launch cocktail party and dinner with NASA officials, Congressional Representatives, etc.
- . Presentation of public service plaques.
- . Transport public service plaques on the Columbia mission.
- . Film each plaque aboard the Columbia.
- . VIP privileges at launching.
- . VIP privileges at landing.
- . Post-landing celebration dinner and presentation of plaques that were transported with astronauts, NASA officials and other dignitaries.
- . Present each Contributor with one heat-resistant tile from the Columbia.
- . Still and motion pictures with astronauts, NASA officials and other dignitaries.
- . Official letters of appreciation.
- . Allow Columbia astronauts interviews.
- . Display duplicates of the public service plaques at any future exhibit that includes the Columbia.
- . Encourage Presidential involvement.

Additionally, The Bob Lorsch Company could produce a documentary that could be of tremendous value to NASA and the Contributors in consideration of their support of the space program.

NASA Proposal
Page 6

The documentary could be produced in a manner that would provide each user with an incentive to show it to its universe of employees, clients, members, associations, chambers of commerce, citizens, and friends. This would give each Contributor the opportunity to show what they are giving back to the world thus, enhancing their public relations efforts.

NASA has had many promotional and educational films available for years; what has been missing is the incentive for organizations to show them. The exposure that NASA could get through this program could potentially expand worldwide recognition of NASA dramatically.

These documentaries will be in demand because they will move viewers through amazement and into anticipation of what space exploration really means to them. The demand could result in national and international network exposure.

What we're presenting to you is a proposal that will be the most significant government public relations campaign in the history of the United States, and, in fact, the world. A plan that generates an enormous influx of revenue, goodwill, national and international support and recognition for the great purpose of the space program, Service to Mankind..

What is necessary to implement this action is the willingness of the individuals in authority at the National Aeronautics and Space Administration to make decisions, take action and make choices that could be as bold and innovative as many taken to date in the space program.

With the United States on the verge of launching the first true aerospace vehicle it is appropriate to also launch this program as the first vehicle to generate the type of global support that catapults the United States to a position above the space race superiority struggle, a position of responsibility in terms of world unity.

Of all the things we have learned from the exploration of space, one of the most important is the perception of the essential unity of our world.

Senator BROWNBACK. Thanks for that last example, too. I had not thought through that but if you're going to get 6 billion hits on a website——

Mr. LORSCH. 600 million people at a dollar, two screen savers. I mean, that's \$1.2 billion. That's nearly twice the amount of money that NASA just wrestled to get its budget increased in the next 12 months.

Senator BROWNBACK. Thank you very much.

Mr. LORSCH. You're welcome, sir.

Senator BROWNBACK. Look to act on that.

Mr. W.F. Mitchell, President of Altair Development Corporation. Go ahead.

STATEMENT OF WILLIAM F. MITCHELL, PRESIDENT, ALTAIR DEVELOPMENT CORPORATION AND CHIEF EXECUTIVE OFFICER, NEO SAFETY INTERNATIONAL

Mr. MITCHELL. Thank you, Mr. Chairman.

At the end of this program, after everyone's through testifying, our company will have a movie that you're welcome to watch; it's a public outreach movie. There are some important statements in the movie from Peter Diamandis, who's one of our consultants. He's, as you know, founded the X Prize and the Zero-G Corporation, which I'm a stockholder in.

I was inspired to study space when I was flying for Auburn University as a college student back in the 1970s, when we were landing on the Moon, which I've been studying it ever since, and once proposed a private lunar development for NASA to consider.

And much has been said here today about the future of our children and in the movie that you will see and what I'm going to talk about today, the future of our children is paramount in my presentation. And so that I won't forget anything, Mr. Chairman, I'll read it if you don't mind.

I applaud the new space policy. The new direction and vision for the Nation is long overdue. Having a clear picture of where to go and what to accomplish is the first step in any challenging new endeavor. I believe the President's bold vision is a worthy and honorable undertaking that our great nation has the talent and the resources to make a reality. However, the critics abound. Even some staunch GOP supporters are having difficulty supporting the policy given the current large military budgets needed to fight a worldwide war on terror and the precarious status of many of our social programs due to large budget deficits. The bottom line, as critics say, is that we simply cannot afford this expensive vision solely to satisfy our need to explore and fulfill our scientific curiosity.

But I believe that the critics can be quieted and a broad-based support gained by acknowledging a far more serious reason for our Nation to be in space. The Nation must develop space to mitigate the threats of impacts by asteroids and comets. Only now are we beginning to become fully aware of the true life-and-death danger posed by these impact threats.

There is currently a large number of concerned scientists around the world, international experts, that are studying the danger of these impacts from near-earth objects. The attached space defense manifesto is a result of a logical analysis of that body of work. Most

experts agree that it is not a question of if but rather when the impact of an asteroid or comet will cause a serious global disaster. The worse case scenario even predicts the destruction of all life on earth.

The when is statistically just as likely to be now as it is a thousand years from now. Therefore, we have an urgent and compelling reason to act to protect ourselves, our children, their children from this danger of neo impact.

Neo Safety International is a privately funded corporation that was formed to facilitate and expedite the rapid development of a space-based defensive system to protect the planet from near-earth impacts. The business plan of the corporation is in the early feasibility stage. However, some of the preliminary aspects of the plan are: perform fast-track reconnaissance missions to several asteroids to learn their exact physical, chemical and mineral makeup; capture one or more relatively small asteroids and convert the raw elements into rocket fuel, structural materials and shielding devices needed to build a larger material processing space craft; use the asteroid to derive interceptor and material processing spacecraft to intercept progressing larger asteroids and convert them into incrementally larger interceptors and space bases; use this building block method to build a reasonable number of space bases and equip them with a fleet of neo interceptors; strategically locate these bases at positions within the inner solar system to reasonably assure ourselves that we are capable of intercepting any and all threats from comets and asteroids.

The first material processing base should be built at the Moon's L1 Lagrange location and it should also facilitate the development of a lunar base. The base should also be used to stage the President's proposed Mars mission. The development of this space defense system will be very difficult. Nevertheless, developing this system is doable and absolutely necessary.

Some of the key ingredients needed to successfully create the new infrastructure are to use Apollo space shuttle era, off-the-shelf technology for the early missions and develop new technologies as they are needed; acquire a large percentage of the total mass needed to fuel and build these bases by mining the asteroids themselves. Only a relatively small mass will be launched from earth, *i.e.*, food, computers, space suits, et cetera; finance the early missions by selling the science discovered on the asteroids to NASA and other interested parties.

Command and control of all the interceptors will be by an international military coalition. Individual interceptors will be sold and/or leased to U.S. military and the militaries of other nations working to protect the planet. The bases will be a traditional real estate-type development with sales and leases to various militaries, NASA, other space agencies and industrial companies, commercial entities, universities, research institutions, medical facilities and even individuals.

Many of the President's goals for NASA and the exploration of space can be enhanced and enabled by developing resources from asteroids. Byproducts of the defense system will be availability of almost limitless quantities of radiation shielding material, large supplies of low cost water and propellant available in near-earth

orbits, a vast array of metals, glasses and other building materials will be for sale. Other yet unknown finds will help service the new space industry.

The project will be financed using techniques common to the real estate and defense industry. Ownership of private property, minerals and natural resources will be an essential ingredient for success. Neo Safety International will assume the development and financial risk. Our corporation will sell and lease facilities to the U.S. military, NASA and as anchor tenants. An international military and space agency coalition will be co-anchors. Other target customers are industrial enterprises and commercial entities. A few of the ways that Congress can help in starting this project are enact enabling legislation where needed, provide tax incentives to owners, investors and lenders, direct NASA and the DOD to prioritize and cooperate to create this defensive system, help create a mutually assured protection, MAP, philosophy with other nations, and ensure that private property rights and intellectual property right laws are extended into the solar system.

Exploring space for exploration's sake is no longer our primary motivation. We now have a moral imperative. We must develop space to ensure our survival and the survival of all those who will follow. I also believe that the act of developing this defensive system will spark a new space industrial revolution that will pay for itself in the creation of new wealth in sizes unimaginable in today's terms.

Thank you, Mr. Chairman.

[The prepared statement of Mr. Mitchell follows:]

PREPARED STATEMENT OF WILLIAM F. MITCHELL, PRESIDENT, ALTAIR DEVELOPMENT CORPORATION AND CHIEF EXECUTIVE OFFICER, NEO SAFETY INTERNATIONAL

Mr. Chairman and members of the Committee:

Thank you for this invitation to share my views on the President's new space policy and to introduce NEO Safety International's efforts to help achieve the President's space goals.

I applaud the new space policy. This new direction and vision for the Nation is long overdue. Having a clear picture of where to go and what to accomplish is the first step in any challenging new endeavor. I believe the President's bold vision is a worthy and honorable undertaking and that our great nation has the talent and the resources to make it a reality.

However, critics of the space policy abound. Even some staunch GOP supporters are having difficulty supporting the policy given the current large military budgets needed to fight a world wide war on terror and the precarious status of many of the nations social programs caused by large budget deficits. The bottom line is critics say the Nation simply cannot afford this expensive vision solely to satisfy our need to explore and fulfill our scientific curiosity.

I believe the critics can be quieted and broad based support gained by acknowledging a far more serious reason for our Nation to be in space.

The nation must develop space to mitigate the threat of impacts by asteroids and comets.

Only now are we becoming fully aware of the true life and death danger posed by these impact threats. There is currently a large number of concerned scientist and international experts studying the danger of impacts from Near Earth Objects (NEO's). The attached Space Defense Manifesto is the result of a logical analysis of that body of work.

Most experts agree that it is not a question of "If", but rather "When", the impact of an asteroid or comet will cause a serious global disaster. The worst case scenario even predicts destruction of all life on earth!

The “When” is statistically just as likely to be NOW as it is a thousand years from now. Therefore, we have an *urgent and compelling reason* to act to protect ourselves, our children and their children from this danger of NEO impacts.

NEO SAFETY INTERNATIONAL is a privately funded corporation that was formed to facilitate and expedite the rapid development of a space based defensive system to protect the planet from NEO impacts. The business plan of the corporation is in the early feasibility phase. However, some of the preliminary aspects of the plan are;

- Perform fast track reconnaissance missions to several asteroids to learn their exact physical, chemical and mineral makeup.
- Capture one or more relatively small asteroids and convert the raw elements into rocket fuel, structural materials and shielding devices needed to build a larger material processing spacecraft.
- Use the asteroid derived interceptor and material processing spacecraft to intercept progressively larger asteroids and convert them into incrementally larger interceptors and space bases.
- Use this building block method to build a reasonable number of space bases equipped with a fleet of NEO interceptors.
- Strategically locate these bases at positions within the inner solar system to reasonably assure ourselves that we are capable of intercepting any and all threats from comets and asteroids.
- The first material processing base should be built at the Moon’s L1 Lagrange location and it should also facilitate the development of a lunar base. This base should also be used to stage the President’s proposed Mars missions.

The development of the space defense system will be very difficult and challenging. Nevertheless, developing this system is doable and is absolutely necessary. Some of the key ingredients needed to successfully create the new infrastructure are;

- Use Apollo/Space Shuttle era “off the shelf” technology for all initial missions. New technologies will be developed as needed.
- Acquire a large percentage of the total mass needed for fuel and building materials from the mining and processing of the asteroids themselves. Only a relatively small mass will come from the Earth, *i.e.*, food, computers, spacesuits etc.
- Finance the early missions by selling the science discovered on the asteroids to NASA and other interested parties.
- Command and control of all the interceptors will be by an international military coalition.
- Individual interceptors will be sold and or leased to the U.S. Military and the militaries of other nations working to protect the planet.
- The bases will be a traditional real estate type development with sales and leases to the various militaries, NASA, other space agencies, industrial companies, commercial entities, universities, research institutions, medical facilities and individuals.

Many of the President’s goals for NASA and the exploration of space can be enhanced by developing resources from asteroids. Byproducts of the defense system will be:

- Availability of affordable and limitless quantities of radiation shielding materials
- Large supplies of low cost water and propellants available in near earth orbits
- A vast array of metals, glasses and other building materials will be “for sale”
- Other yet unknown “finds” will help service the new space industry

The project will be financed as a traditional real estate development. Ownership of private property, minerals and natural resources will be an essential ingredient for success. NEO Safety International will assume the development and financial risk. Our corporation will sell and lease facilities to the U.S. Military and NASA as anchor customers and tenants. An International Military and Space Agencies Coalition will be co-anchors. Other target customers are industrial enterprises, commercial entities, universities, research institutions, medical facilities, financial/service companies and individuals.

A few ways that Congress can help in starting this project are:

- Enact enabling legislation where needed
- Provide Tax incentives to owners, investors and lenders
- Direct NASA and the DOD to prioritize and cooperate to create this defensive system
- Help create a Mutually Assured Protection (MAP) philosophy with other nations
- Insure that private property rights and intellectual property rights laws are extended into the solar system

Our motivation to master space needs to no longer be based on exploration for exploration's sake. We now have a moral imperative. We must develop space to insure our survival and the lives of all who will follow. I also believe that the act of developing this defensive system will also spark a new space industrial revolution that will pay for itself in the creation of new wealth in sizes unimaginable in today's terms.

Thank you Mr. Chairman and member of the Committee.

ATTACHMENT

The Space Defense Manifesto

By

William F. Mitchell

Monday September 15, 2003

Whereas there are thousands of asteroids and comets in the Earth Sun System and many of them are not yet charted to determine if they pose a hazard to Earth,

And whereas some of the very large and extremely dangerous asteroids already come uncomfortable close to our planet,

And since the planet has been impacted in the prehistoric past by large extinction level events and is still being hit in modern times on a regular basis by smaller but still very dangerous objects,

And since most experts agree that it is not a question of "IF" but only "WHEN" another big asteroid or comet will hit the planet that will cause **MASSIVE DESTRUCTION OF LIFE ON EARTH**,

And since the "WHEN" a big asteroid or comet will appear with **LITTLE OR NO WARNING** and then collide with the planet is **JUST AS LIKELY TO BE TODAY** as it is a thousand years from now,

And since **WE ARE COMPLETELY UNPREPARED** to deal with impact threats and because **WE HAVE NO PROVEN ABILITY** to respond in short or long term time frames to keep large impactors from hitting the planet, **WE HAVE A VERY APPARENT, COMPELLING AND URGENT DUTY TO ACT NOW!**

We must not wait until a killer asteroid is discovered to take preventive action. The time frames from detection to prevention will be too short for guaranteed success and in fact, last minute hit or miss efforts to avert a disaster will probably result in failure.

The failure to prevent a large comet or asteroid from hitting the earth carries the risk of **CERTAIN DEATH AND THE CATASTROPHIC LOSS OF ALL LIFE ON THE PLANET**, therefore

**WE MUST ACT WITHOUT DELAY
TO DEVELOP AND DEMONSTRATE OUR CAPABILITIES
TO TIMELY DETECT, INTERCEPT, DIVERT OR OTHERWISE
CONTROL
IMPACT THREATS TO OUR PLANET!**

The mission to develop and demonstrate our capabilities should be the highest priorities we have ever had for the human race. If we do not act on this moral obligation to ourselves, our children and life in general, it will be the greatest dereliction of duty in the history of mankind!

It will be the saddest of all days when we acknowledge to ourselves and our children that we are going to die only because we did not act soon enough or did not invest the relatively small amount of funds needed to prevent the planet from being destroyed by a comet or asteroid.

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The Space Defense Manifesto

By
William F. Mitchell
Page 2

NOW THEREFORE THE QUESTION SHOULD BE ANSWERED AS TO WHAT ENTITY SHOULD ACCEPT THE RESPONSIBILITY FOR THIS MISSION?

It is not the U. S. Military alone. The Military can only pay minor attention to the impactor problem because it is currently fighting a highly justified global war against terror requiring billions of budget busting dollars.

It is not NASA alone. NASA is keenly aware of the problem, but NASA must solve serious Shuttle and Space Station problems that make it politically impossible to quickly change priorities and make the impactor problem its number one mission.

Although there is great international knowledge and concern for the impactor problem, there is no known serious commitment by any other nation, entity or group of individuals to spend the billions of dollars needed to fund an action plan that will protect the planet.

Therefore, Altair Development Corporation is proposing to form and manage a privately funded New Corporation whose unique and only mission is to develop facilities and infrastructure needed to support the United States Military, NASA, and other international parties in concerted efforts to provide strategic defense capabilities against NEO impactor threats.

Senator BROWNBACK. Thank you, Mr. Mitchell. I appreciate that. It was a very exact thought.

Mr. Courtney Stadd, President of Capital Solutions. Thanks for joining us this morning.

**STATEMENT OF COURTNEY A. STADD, PRESIDENT,
CAPITOL SOLUTIONS**

Mr. STADD. Yes, sir. Good morning, Mr. Chairman. Thank you. And I also want to thank you for the leadership that you've brought in terms of supporting the President's vision for NASA, particularly the leadership you've shown supporting the role of the private sector. It means an awful lot to us in the industry and also I want to express appreciation for the fact that you're holding a field hearing. I think, personally, it's so important for leaders such as yourself, with very busy schedules. And I know it's disruptive and I know sometimes the transaction costs can be high. But actually leave Washington to come down to meet with people, such as the people here at Johnson Space Center, who are the people who actually make things happen, along with the contractors. And I must add—although I'm going to concentrate mostly on the entrepreneurs, the new starts in my testimony—there's no shortage of innovators and big contractors as well that populate the neighborhood here who work hand in hand with the agency as well.

And I'm looking over at General Warden. He and I worked in the White House many years ago and it's also a tribute to you, sir, that you've brought on my old colleague to this terrific staff that supports the Committee.

Senator BROWNBACK. Thank you. I've got to answer regarding that, because I'm glad to have General Warden on the staff and he had been around when we tried this once before and didn't get it done; he was brought on to get this done. So, we've got experience and I'm delighted to have the expertise of the General and Baker, too.

Mr. STADD. You've chosen well.

In interest of time, I'll make six points, Mr. Chairman. First, the fledgling but very determined commercial sector is eager to provide innovative solutions for space station transportation for logistics and transportation support. Accordingly, I'm very pleased to see the \$140 million that NASA has set aside for the space station crew and cargo services to purchase space station transportation services. And NASA should be strongly supported in its efforts to direct the bulk of these funds to U.S. commercial suppliers.

The alternative to commercial competition is that NASA and its space station partners will devote critical resources to providing unmanned logistics support that could be done by the private sector and that would be a loss for everyone.

The American entrepreneur firms are also eager to respond to the small payload demonstration program that is intending to use emerging launch suppliers to fly unflown NASA instruments to other small payloads. These are very, very important new initiatives.

Another exciting initiative that was referred to me by former colleagues at NASA on the first panel is the Centennial Challenges Program. That is requesting, I believe, 20 million annual prizes. It

is my understanding that in order for this program to be established, it will require this committee to provide the same type of authorization to NASA that the defense advanced research projects agency has as well and, in fact, is using for its own more modest prize efforts as we meet here today.

So, I would ask the Committee and the staff to, please, focus specifically on how the agency executes this program because done right it could represent no less than a paradigm shift in how the agency deals with the private sector.

Third point, it is a purely nonscientific observation, but I would say that the current cycle of entrepreneurs and like my colleague, Charlie Chafer, I've lived through several cycles over the past 30 years although very much in the startup stage that's been driven by, frankly, more sophisticated players and capital that have learned from the trials and tribulations of their predecessors. A case in point, quite frankly, is Charlie Chafer's Team Encounter engineering team that worked with some unsung heroes in bureaucratic trenches at NASA to make his effort and his company's effort come to fruition.

Another case in point is an entrepreneur that I'm working closely with and that is Robert Bigelow, who's founder of Bigelow Aerospace, a 5-year-old Nevada-based space company, developing expandable or better known as inflatable space module technology that is based from the Trancept Project, which was started right down this street at the Johnson Space Center several years ago. We had to, frankly, terminate that program based on budget, not technical merit, a few years back.

But the idea behind these modules is to build radically low-cost modules that could be placed in one with orbit and ultimately, perhaps, even be habitates in other planetary surfaces in years to come.

Mr. Bigelow has never taken one dollar of Federal contract money. He's spent 30 years in the construction/real estate business and any of you who have worked in that business know it's a very, very competitive field; but he's a gentleman, also, who was inspired in his teen years to invest in space and now that he's in a position to invest a good part of his personal wealth, he's doing just that. And it's his hope that he'll actually have these commercial modules initially in place by the end of the decade.

I do know that he would want me to put on the record the support that he's received from the Johnson Space Center, particularly the director General Howell, who personally went out to visit Bigelow Aerospace facilities. We have a Space Act agreement with the agency and there has been a sharing of technical expertise with the center that has just been going tremendously. In addition, I believe this reflects the presumption now at NASA headquarters to support more and more of these commercial type of efforts.

Potential uses of these modules could range from biotechnology to Earth observation and space tourism. By the way, in pursuing this capability in low-Earth orbit, it is imperative that the United States Government/private sector develop vehicles capable of bringing people and cargo to lower orbit. I'll get back to that in a second.

Elon Musk, quite familiar to this agency, is another gentleman who came from a different sector, in his case the Internet, who's

bringing considerable wealth investing his Space X Corporation to develop a very low-cost vehicle; and it is a credit to the Department of Defense that they're willing to put a payload on the very first Falcon rocket scheduled to launch this spring. And it is precisely these types of rockets that, I think, NASA should be supportive in its efforts to put experimental payloads and help these new companies achieve credibility.

These two entrepreneurs are just two examples of an increasingly diverse community of space entrepreneurship but I also want to express my excitement for other companies, such as Zero-G Corporation, and the space adventurers that are seeking to expose the marketplace to the experience of weightlessness. And, although, the growth of space tourism, Mr. Chairman, merely is now part of NASA's new mission, it will be of immense benefit, frankly, to the agency, to the government in the sense of strengthening and diversifying the aerospace industrial space by bringing the excitement of space travel to the wider public, including those young people you referred to in the hearing.

And I'd like to comment to the Committee, if I may, that a review of HR3752 introduced by Congressman Dana Rohrabacher and recently passed on the House Science Committee that calls for a balanced regulatory framework for space tourism.

Fourth point is that I wish I was in a position to tell the Committee how it and the agency could support and encourage each of these entrepreneurs, but each entrepreneurial project, in many ways, has its own unique needs; and, therefore, must be dealt with on a case-by-case basis. The critical issue is that NASA officials who are responsible for dealing with these entities must be given the freedom and the support to deal with new, sometimes risky companies in a flexible and creative fashion. And, again, I emphasize it is so important for the Committee, with your leadership, sir, the other members of the staff, to remain actively engaged in this process over the long term and provide the even moral support for officials who, when you're dealing with the risky world of entrepreneurship, occasionally we will experience problems and failures; but to provide the support that allows them to continue to go on.

And, Mr. Chairman, I'd be remiss if I didn't mention the burdensome role of the export control laws. I know I'd probably fill the hearing room with studies and commission reports on how outdated many of the export control laws are. So, I would urge the Committee to review our space-related export control laws to identify those, in fact, that have become obsolete and sometimes hurt more than they help our security and business interest.

In the wake of the President's announcement, I also believe that there may, in fact, be investors who might explore negotiating with the agency an exclusive marketing and brokering arrangement for the U.S. portion of the space station for a specific period of time. Again, a concept like this would be feasible only if there is genuine interest by the United States Government to such a proposal. If NASA and its prime contractor base move on to implement the exploration strategy beyond lower Earth orbit, perhaps now is a great, opportune time to explore innovative ideas in how the commercial sector might want to utilize the space station capabilities to its fullest extent.

And the gentleman to my right, Mr. Lorsch, certainly has provided an example of the type of innovation that happens when you allow creative individuals like himself the license to pursue that type of opportunity; but whether or not this specific opportunity goes anywhere, my point is that today's challenges can become win-win opportunities if the government is seriously open to new approaches for the private sector.

And, finally, sir, the President's direction to NASA has opened new opportunities by which government and industry can learn from one another, thus, maximize the chances of this new vision actually become reality, while giving birth to a robust, diverse and competitive U.S. and industrial base with major benefits for a nation in the future of humanity. And I must say that for those colleagues of yours who are skeptical, I would really urge them to go review the Commission that was chartered by Congress 2 years ago—

Senator BROWNBACK. Right.

Mr. STADD.—the future of this huge industrial sector, involving a former colleague, of course, Congressman—

Senator BROWNBACK. Bob Walker.

Mr. STADD.—Bob Walker, who was the Chairman, who laid out in very stark terms the state of our industrial base and aerospace today and it's not a very good situation. And I think one of the benefits of this new vision is that it can help vitalize that base because as that report makes clear, as we sit here today, Tokyo, Paris, Berlin, other capitals of the world, India, China, of course, are being very aggressive, very active in pushing their respective industrial base as well. And, frankly, a key concern for the commercial sector is whether the U.S. Government will ultimately follow through with a promise of a new policy.

Thank you, again, for the opportunity to be here; and I look forward to answering whatever questions you may have, sir.

[The prepared statement of Mr. Stadd follows:]

PREPARED STATEMENT OF COURTNEY A. STADD, PRESIDENT, CAPITOL SOLUTIONS

Mr. Chairman, and members of the Committee, I greatly appreciate the opportunity to participate in this hearing regarding the President's newly announced space policy and especially to discuss the prospects for private sector interest in space-related activities, including launch vehicle development and the International Space Station.

I would like to begin my statement with an excerpt from an essay drafted by one of my space clients, Robert Bigelow, about whom I have more to say later in my testimony. If you go to his company's website at www.bigelow-aerospace.com and click on "space commerce" you can access the full text. I think its sentiments are highly relevant to today's hearing.

"Two hundred years after the Lewis and Clark expedition America continues to explore new frontiers. The manned space program of the late twentieth century has opened the door to almost limitless possibilities. Yet, despite the brave efforts and sacrifice of astronauts, both American and Russian, the U.S. and other nations have failed to capitalize on the hard earned achievements of the national space programs. As was the case 200 years ago, exploring the frontier was relatively simple when compared with the difficulties of surviving and profiting in a new and hostile environment.

Unlike past space endeavors, settling and developing space cannot be accomplished by government programs and personnel. The U.S. Government could fund and order Lewis and Clark to explore the West, but it could not pay or force pioneers to settle the region. Governments do have an important role to play in creating an environment conducive to space development, but it is the

pioneering entrepreneurs, not the soldiers or bureaucrats, who can take and colonize a new frontier.”

A little over a year ago, we mourned the tragic loss of the Space Shuttle *Columbia* and its heroic crew. The investigation that followed blamed not only technical and communication problems within NASA, but called out the absence of a compelling strategic vision for our Nation’s civil space program. January 14th marked a major milestone in the Nation’s civil space adventure when the President committed the Nation to a new bearing point and a renewed strategic direction in space. His vision now takes humankind beyond the confines of the low earth orbit we have occupied for decades, and draws our attention out into the distant universe, and the next logical destinations for humanity, including the Moon, Mars and beyond.

The President’s new space policy is a tribute to both the *Columbia* astronauts and future generations of American pioneers. I am the father of two teenagers and I can tell you that they and their friends’ imaginations were really fired up by the combination of the President’s speech and the extraordinary technical achievements of the Mars rovers—Spirit and Opportunity. The prospect that members of their generation might one day actually walk on another planetary surface even managed to cause some of them, however briefly, to think outside themselves and focus on a higher calling. No small miracle in itself!

The President’s plan responds to what many in the space community have been calling for in recent years: A bold new vision for NASA that lays out measured, pragmatic, evolutionary steps as the path for achievement of the goals he broadly outlined. Achievement of those goals will require a number of ambitious capabilities to be developed and demonstrated. We in private industry are greatly encouraged by NASA’s recognition that it will be looking to the commercial sector for critical products and services in pursuing this exciting new road map. And make no mistake: there is ample room for significant contributions by entrepreneurs, private sector investors and commercial companies who see the benefits of supplying products, services and technology for space-related markets.

Change, of course, often serves as a catalyst for innovation and new out-of-the-box ideas in the way we do things. By their very nature, entrepreneurs view “change” as a chance to translate challenge into profitable opportunities. This is why, frankly, so many American space entrepreneurs are embracing the period of potential change set in motion by the President’s policy announcement.

I have spent nearly thirty years of active involvement in the U.S. civil and commercial space communities—working in both the public and private sectors. With that said, I have also learned that it is nearly impossible to craft a national policy that satisfies all the various and sundry stakeholders. There will always be “rice bowls” who resist change when new priorities are set, such as those who may have a vested interest in preserving certain NASA programs that will be terminated or redirected as a result of the new vision. There will also be those that are frustrated by what they may view as an overly deliberate, evolutionary approach to realizing the President’s goals. From this particular stakeholder’s vantage point, however, I think the President and NASA have offered a compelling and exciting vision that is both pragmatic and executable, costing less than one percent of the annual Federal budget. At the same time, it offers a range of exciting opportunities for private industry whose resources can help leverage and expand the investment of taxpayer dollars in the space program.

Before proceeding to discuss specific potential private sector interest in supporting the civil space program in areas such as launch vehicle development and the Space Station, allow me to underscore that the interdisciplinary nature of the new space exploration vision will require innovative technologies and breakthroughs in areas with huge potential impact on our economic competitiveness. These include major industrial sectors such as communications, robotics, materials, computing and automation, biotechnology and life sciences, power and propulsion, and networking.

As the Congressionally-charted “Commission on the Future of the U.S. Aerospace Industry” (November 2002) made clear, our domestic aerospace infrastructure is severely undermined by a shortage of engineers and scientists, as well as foreign subsidized competition. The Commission’s Executive Summary lays it out in stark terms: “The industry is confronted with a graying workforce in science, engineering and manufacturing . . . New entrants to the industry have dropped precipitously to historical lows as the number of layoffs in the industry mount . . . We note with interest how other countries that aspire for a great global role are directing intense attention and resources to foster an indigenous aerospace industry. This is in contrast to the attitude present here in the United States. We stand dangerously close to squandering the advantage bequeathed to us by prior generations of aerospace leaders. We must reverse this trend and march steadily towards rebuilding the in-

dusty.” Scientists and engineers initially attracted to work on space exploration programs will likely also go on to build the next generation Global Positioning System (GPS) satellites, missile defense systems, and laser communications satellites.

I would respectfully suggest, Mr. Chairman, that your colleagues in Congress, should debate the merits of this new exploration vision in the broader context of providing this Nation a much overdue opportunity to revitalize our aerospace sector and return the U.S. to a leadership position in an area that has such important national economic and security implications.

With the primary focus of the Space Shuttle on completing the assembly of the Space Station, the commercial sector is eager to provide innovative solutions for Space Station transportation, logistics and research support. There are several start-up companies, such as Constellation Services, Inc., and Kistler Aerospace that are offering to provide such services. This category of company includes those who are using private sector capital in seeking NASA as an “anchor tenant” in pursuit of both government and commercial market business opportunities. Accordingly, I am very pleased to see that NASA has included \$140 million for a new project, ISS Crew and Cargo Services, to purchase Space Station transportation services. Although I understand that foreign suppliers may provide some of these services, NASA should be supported in its efforts to direct the bulk of these funds to U.S. commercial suppliers to develop services to meet Space Station cargo transport needs.

It is important for NASA to ensure that it offers truly competitive opportunities for industry, including start-up ventures; rather than utilizing the procurement process to prejudge the outcome for preferred suppliers of products and services. It is equally important for this Committee and its counterparts in the House to give NASA the resources and even moral support it will need to sometimes take the risk on new entrants and engage alternative commercial suppliers of space goods and services. In that regard, American entrepreneurial firms are eager to respond to the \$10 million Small Payload Demonstration Program that is intended to use emerging launch suppliers to fly unflown NASA instruments or other small payloads; while also assisting these new firms to establish their credibility as providers of new commercial vehicles to meet future NASA needs. The alternative to commercial competition is that NASA and its International Space Station partners will continue to devote critical attention to providing unmanned logistics support that could be done by the private sector. That would be a loss for everyone.

From a commercial standpoint, Mr. Chairman, an exciting new initiative in the NASA budget is the Centennial Challenges Program. This initiative was partly inspired by the success of the X-Prize Foundation, which is offering \$10 million for the first team that launches a vehicle capable of carrying three people (or one person and ballast weight for two others) on a suborbital trajectory to 100-kilometers or 62-miles and repeats the flight within two weeks. I understand that approximately 27 entrants representing seven countries are competing for the prize. It is fair to say that a \$10 million prize has caused tens of millions of dollars to be invested by the private sector in pursuit of a wide variety of innovative launch vehicle concepts. For me, this is a dramatic illustration of how much dynamic energy and creativity is available in the commercial space sector.

The Centennial Challenges Program invests \$20 million in a series of annual prizes for revolutionary, breakthrough accomplishments from innovators not usually affiliated with the space program. It is my understanding that in order for the Centennial Challenge program to “take off” it will require that this Committee authorize NASA to have similar prize-making authority that the Defense Advanced Research Projects Agency (DARPA) currently enjoys. Examples of potential candidate programs include nano-materials, very low cost robotic space missions and spacecraft power systems. It is well known that during the Apollo program breakthrough innovations often came from unexpected sources; therefore we need to create “on ramps” for creative individuals and small entrepreneurial teams. The key to this program’s success, however, is to ensure minimal bureaucratic intrusion and efforts by “rice bowls” to vector the resources into programs that perpetuate the status quo versus truly advancing unorthodox inventions and ideas. Accordingly, I would urge this Committee to pay special attention to how the Agency executes this potentially exciting program. Done right it could represent no less than a paradigm shift in how the Agency works with the private sector.

Over the past three decades, I have personally witnessed several cycles in which private capital—either in the form of institutional or high net worth individuals—have tried to develop various space launch and payload concepts for commercial and/or government markets. Every cycle has been characterized by its share of firms poorly managed (in that sense, the commercial space business is no different than other business sectors) or those who fall into the trap of mistaking technical possi-

bility for market opportunity, or those who are essentially using taxpayer money to sell to the government under the guise of “commercialization”. It is my purely non-scientific observation that the current cycle, although very much in the start-up stage, is being driven by more sophisticated players and capital who have learned from the trials and tribulations of their predecessors. There are multiple signs that capital formation is interested in space activities and even defense and space services, and that capital markets are becoming healthy again.

Although I do not profess to be an expert on the capital markets, the Nation’s pension funds, banks, and insurance companies appear to have re-energized their private equity and debt investments into venture and other forms of capital management in the past two years. Venture firms are showing signs of stability as well as a penchant for many of the nano-technology, life sciences, power sources, power technologies and other fundamental technical areas required for support of new space exploration missions.

Last quarter, the venture capital industry invested \$4.9 billion into new ventures, a level of investment activity that is the highest in the past eighteen months. This level of investing is expected to continue based on the increase in the availability of capital and deal flow for the foreseeable future, approximately \$20 billion a year. Even more significant is the steady amounts of capital being raised by venture capital firms and other private sector institutions for investments into new high tech opportunities.

In terms of high net worth individuals who are investing their personal wealth into commercial space-related projects, I am associated with Robert Bigelow, President and founder, Bigelow Aerospace, a five-year-old Nevada-based space company that is developing expandable space module technology based on the Transhab project which was managed down the street at the Johnson Space Center until it was terminated for budget reasons a few years ago. Mr. Bigelow has never taken one dollar of government contract money. He brings to his space venture over three decades of true competitive commercial business experience in the construction, engineering and contracting fields.

Since early 1999, Mr. Bigelow has been aggressively investing his own resources in building his company’s expertise, capabilities, key partnerships and hardware. Bigelow Aerospace has been developing its capabilities within a Space Act Agreement with NASA that allows for a sharing of knowledge and expertise between the two parties involving no exchange of funds. When I informed Mr. Bigelow that I would be making a statement to this Committee, he requested that I underscore his praise for the Johnson Space Center Director, Jefferson Howell, under whose leadership Bigelow Aerospace has benefited greatly from the cooperation it has received from JSC. Such cooperation also appears to reflect the overall policy support for commercial space initiatives, such as Bigelow Aerospace, that is coming from NASA Headquarters.

BA is pursuing its expandable space module technology based on the belief that such modules might drastically reduce the costs of living and working in the low earth orbit (LEO) environment. Potential uses include biotechnology research, earth observation, space tourism and other applications that we are pursuing on a proprietary basis. Such modules could, of course, eventually be utilized as habitats on other planetary surfaces. In pursuing this capability in low earth orbit, it is imperative that the U.S. develop space vehicles capable of bringing people and cargo to and from LEO. The current grounding of the Space Shuttle fleet has revealed the unfortunate reliance of the U.S. on the only alternate human carrier, the Russian Soyuz spacecraft, which makes it a single point of failure. Further, it is a fundamental rule of business to avoid negotiating in a situation where the other party has the upper hand in terms of being the sole supplier of a critical service. In this instance, the Russians hold some key “Aces”. It is therefore in the self-interest of the U.S. to encourage private sector cargo and human rated launch initiatives. As noted earlier, NASA plays a critical role in encouraging the emergence of private sector alternatives.

Elon Musk, who is familiar to this Committee, is another example of an entrepreneur who comes from a non-space industry sector (in his case, the Internet) who has founded SpaceX to develop a new family of low cost Falcon launch vehicles that are currently priced to cost less than half the price of similar launch vehicles due to competitive pricing and through the use of reusable first stage rocket engines. It is to the credit of the Department of Defense that it has placed a payload on board the company’s first launch—currently scheduled for late spring of this year. SpaceX’s Falcon rockets are precisely the type of vehicles that NASA should consider for some of its own experimental payloads. Based on my own informal discussions with Mr. Musk, he is similar to Mr. Bigelow in that they both have immersed themselves in the arcane science and engineering associated with their respective

space businesses, are aggressively recruiting the best and brightest technical minds and are investing their own significant wealth in bringing to the aerospace marketplace business strategies that have served them well in their previous commercial businesses.

These two space entrepreneurs are but two examples of the small but growing community of individuals and companies that are pursuing space-related opportunities. I am also excited by the potential of companies, such as Zero-G Corporation and Space Adventures, that are seeking to expose the marketplace to the experience of weightlessness. (As someone who has experienced zero-g on NASA's KC-135 I can testify that the experience is sufficiently exhilarating that I would relish the chance to experience it on a sustained basis in space.) The successful growth of space tourism while clearly not a part of NASA's new mission, would be of enormous benefit to NASA in strengthening and diversifying the aerospace industrial base while bringing the excitement of space travel to the wider public. I would like to commend to the Committee that it review H.R. 3752, introduced by Congressman Dana Rohrabacher, and recently passed by the House Science Committee, that calls for a balanced regulatory framework for space tourism. These entrepreneurs are demonstrating that the private sector can potentially augment the government's efforts to open the space frontier for the full expression of the human enterprise.

I wish that I were in a position to tell the Committee specifically how they and the Agency could support and encourage the work of these entrepreneurs. The reality is that each entrepreneurial project will have its own unique needs, and therefore they must be dealt with on a case-by-case basis. For example, Bigelow Aerospace could potentially benefit from NASA launching one of its sub-scale demonstrator modules, whereas I'm sure SpaceX would jump at an opportunity to receive a contract for a NASA launch. The critical issue is that the NASA officials who are responsible for dealing with these entities must be given the freedom and support to deal with new entrepreneurial companies in a flexible and creative fashion. Moreover, this Committee too can play a critical role in providing the resources and relevant Agency oversight to ensure that NASA is fulfilling its commitment to leverage private sector opportunities to the greatest extent possible. Again, I cannot emphasize how important it is for this Committee, its Members and staff to remain engaged in this process over the long term.

Additionally, I would be remiss if I failed to mention the burden that current export control laws place on new entrepreneurs. No doubt, I could fill this hearing room with various academic studies and Commission reports that document the negative competitive effects of the current export licensing regime on the U.S. aerospace sector. The emerging space companies often depend upon the low-cost alternatives that foreign aerospace organizations can provide. One of the key recommendations from the "Commission on the Future of the U.S. Aerospace Industry" was that "U.S. export control regulations must be substantially overhauled. . . ." I feel strongly that the time has come for this Committee and Congress to conduct a comprehensive review of our space-related export control laws in order to identify rules that have become obsolete and hurt more than they help both American security and business interests.

Mr. Chairman, I would like to raise another possible way the commercial sector might assist our government in leveraging its highly constrained resources. In the wake of the President's announcement, I really think that there may be investors who might explore negotiating with NASA an exclusive marketing and brokering arrangement for the U.S. portion of the Space Station for a specific period of time. Again, a concept like this would be feasible only if there is genuine interest by the government in such a proposal. Such an initiative is based on the view that NASA has demonstrated engineering brilliance in construction and deployment of the Space Station. But as NASA and its prime contractor base move on to implement the exploration strategy, perhaps now is an opportune time to explore innovative ideas for how the American commercial sector might be able to utilize the Space Station capability to its fullest extent. Specifically, the potential may exist to establish a structure whereby the Agency would receive royalties based on the profits generated by a private sector ISS initiative. These royalties might well help partially reimburse the government for the tax-payer's investment in ISS, and perhaps over the long term could fund improvements to the Station and/or be leveraged to support the President's vision of exploration beyond LEO. Whether or not this specific initiative goes anywhere, my point is that today's challenges can become win-win opportunities if the government is seriously open to new approaches with the private sector.

In addition to private sector sources of capital, there is an increasing interest on the part of state and local government organizations to partner with NASA to assist in financing new services. For example, several state-based commercial spaceports

have used their own resources to leverage infrastructure investments for both private and public sector uses. Speaking of innovative public-private partnerships in space, it is worth noting that private investors recently financed a Norwegian satellite data center that supports and is an integral part of U.S. defense and space activities. A private placement was raised, which enabled both U.S. and Norwegian governments to access a critical service, without seeking new appropriated dollars from the Congress. Under the financing mechanism, which raised over \$40 million dollars, the government is estimated to be saving up to \$2.5 million per year for the first few years, and as much as \$7 million for the remaining 20 years.

Such third party and state supported financings are making inroads into many sectors of government involvement, especially in defense and energy, which depend heavily on outsourced services and private financing. There is no reason why such a model could not be utilized in the space arena.

Finally, Mr. Chairman, I must admit that when I first started in the commercial space sector my colleagues and I had fervently hoped that we would be much further ahead in the development of commercial space markets than we are today. In retrospect, I believe that we neglected a fundamental rule of the marketplace: Markets usually change over extended periods of time as customers and providers become slowly educated and acclimated to the advantages of new products and services. A case-in-point was the slow evolution of the marketplace before Global Position System (GPS) applications reached "critical mass" with a global commercial customer base. A technology that began commercially as a more efficient means of conducting land surveys now brings Information Technology-based productivity to an astonishing array of global infrastructures—from telephones to trucking and aviation to power lines.

The President's direction to NASA has opened new opportunities by which government and industry can learn from one another and thus maximize the chances that the new vision actually becomes reality while giving birth to a robust, diverse and competitive U.S. space industrial base with major benefits for our Nation and the future of humanity. America's space entrepreneurs, who reside in both small and large companies, are poised once again to bring the promise of space to fruition. Frankly, a major challenge is whether the U.S. Government will ultimately follow-through on the promise of the new policy.

Thank you again for the opportunity to be here today and I look forward to any questions you may have.

COURTNEY A. STADD: PROFILE

Mr. Stadd is President, Capitol Solutions, a management consulting firm located in the Washington, DC, area. In July 2003, after nearly three years, he resigned his position as Chief of Staff and White House Liaison for the National Aeronautics and Space Administration. He led President Bush's NASA transition team and worked with the NASA Administrator to cast the agency's strategic direction. Mr. Stadd had chief responsibility for developing and executing turn-around plans, budgets and staffing that addressed the major financial and management challenges facing NASA's high-profile \$15 billion research and development activities.

For the past 26 years, Mr. Stadd has worked in both the private and public arenas with a primary focus on identifying and removing barriers to market-driven opportunities in aerospace-related technology areas. In the previous Reagan and Bush Administrations, he has held senior space-related program management and policy positions in the U.S. Department of Commerce, the U.S. Department of Transportation and the White House National Space Council.

In the private sector, he was affiliated with the establishment of several satellite and space transportation ventures, such as Colorado-based DigitalGlobe, an industry leader in providing high-resolution commercial satellite imagery. Over the past twenty-five years, in both official and private capacities, he has been invited by various U.S. Congressional committees to testify on a range of high technology-related public policy matters.

He has been the recipient of numerous industry and government awards including the 2002 U.S. Space Foundation certificate of honor for his contributions to advancing "the greater cause of the exploration and development of space." In 2001, Mr. Stadd was awarded NASA's highest honor—The Distinguished Service Medal for "his extraordinary vision, leadership, and dedication to . . . advancing technology into industry."

Senator BROWNBACK. All right. I think that's a good way to put it. This isn't just about an expenditure of money on a mission. It

can be about vitalizing and energizing a whole industrial sector; and to me, one of the keys here is that I want to see that private capital coming in and the reward coming back with that growth and opportunity with it.

Well put. Thanks.

I have to call up a story. I had a chance to visit Dennis Tito, who had paid Russia, what, \$20 million to do space tourism and he, like so many of us, wanted to go to space. As a young man, he was an aerospace engineer or something of that nature. He worked at Jet Propulsion Laboratory, then left and made a lot of money, but still wanted to go to space. So, he paid for the ride. I believe there's a huge sector of the population willing to pay pretty substantial fees to experience weightlessness and see the world from that perspective. He gave me a really interesting little vignette, though. He was saying that when he was up there it was really an incredible experience to him and he said he noted at one point in time that he now understands all those pictures of angels that he saw as a child, which didn't make any sense to him because he thinks as an aerospace guy, he said, the wings are too small on all the pictures of these angels. He said in weightlessness you just need little wings; I understand.

It was an interesting vignette that he gave.

Mr. Chafer, I hope you'll provide to us specifics on what we need to do to put in any authorizing language to make sure the private sector has access to work in these areas because we really do want to do this mission in a different way; and I think for it to work it has to be done in a different way of going to the Moon and to Mars.

So, I hope you'll provide to us or your group of your specific areas that the authorizing legislation language needs to be different and we'll, hopefully, work with you, excuse me, we will work with you on that.

Mr. CHAFER. Happy to do so, sir.

Senator BROWNBACK. You said that we haven't been open in the past. Is that different now? Is there anything we need to do now to make sure that that is different now?

Mr. CHAFER. It ebbs and flows and I think that the biggest challenge is that it's so personnel dependent that there's adequate authority to do almost anything under the 1958 Space Act, so that you're looking at the only person in the world that's bought a Minuteman Missile from the U.S. Government. We did that from NASA. Launched it off Matagorda Island under Deke Slayton's leadership and created the first privately launched rocket into space when there were no regulations, but 11 separate agencies gave us the approval. We had to go 11 for 11 to do that.

Senator BROWNBACK. Wow.

Mr. CHAFER. So, there's almost always the ability to accomplish things and I use the example of Courtney and Dr. Ed Weiler who wanted to do those things. What I sense today is, as Courtney said, there's more sophistication in the private sector and, therefore, there's a greater willingness in the government sector to look at these alternatives.

My largest concern is that you almost always bump into situations where you may well be competing with each other, the government and the private sector; and we have such scarce resources.

We need to find ways not to compete. That was certainly true back in the early launch vehicle days when the space shuttle was being designed as a way to launch all satellites for everyone and here we were, a group of a few people in Texas wanting to launch rockets.

So, there's great risk that the power of the government, while well-intentioned, can end up foreclosing commercial investment; and, again, I think it's a sensitive issue. I know it's not a clean, easy answer, such as a piece of legislation; but I think Courtney nailed it by saying this Committee can encourage the agencies and the leaders in the agencies to be open to commercial activity. And if that occurs, we'll see some of these little flowers bloom into very large plants and you'll begin to get people working together. And there's nothing like the real-world experience of working together to give each other confidence and the success of these co-developed missions.

Senator BROWNBAC. Do you have an official advisory committee to NASA or to the space community that private sector interfaces with to give these thoughts to?

Mr. CHAFER. I'm unaware of one.

Senator BROWNBAC. All right.

Mr. CHAFER. There may well be. We've not been asked to come and speak to it but I think that would be great.

Senator BROWNBAC. I just would like to institutionalize—

Mr. CHAFER. Yes, sir.

Senator BROWNBAC.—this dialogue more. Maybe that's one of the things we could put in authorizing legislation that we have a private sector advisory committee. I'd like to give them more power than just advisory, so that the Administrator has to listen to it or has to meet with them. The administrator, whoever he or she is, has to meet with them two or three times a year, so, to make sure that that's happening at a high-level dialogue.

Mr. CHAFER. I think that would be a great idea. We'd love to participate in that.

Senator BROWNBAC. Bob, you lit my fuse or sent my rocket off here with thinking we missed out on \$5 billion that could have gone into the space program.

Mr. LORSCH. Let me light your fuse about a hundred million dollars that is on the table of this subcommittee probably within the next 6 months if you want to take a look at it. You know, we talked about encouraging entrepreneurship and private sector initiatives and I didn't mean to interrupt you in the middle of your stream of thought, Senator.

But my fuse is lit as well here today. So, I hope you don't mind if I say this. Things can be done now. We have a space shuttle mission that's going to go sometime soon. There's going to be a tremendous amount of public interest in that mission. There is no reason that a private foundation can't be formed for 50 sponsors to spend a million dollars or more to have their name, their logo just on a plaque on that launch to support this Nation getting back into space; and as soon as the legislation is passed that can get the money into NASA, the money leaves the foundation and goes to NASA. It just hits it as a holding spot.

Senator BROWNBAC. Well, let me interrupt you on that. If we just took a little piece out of this legislation right now and we just

said out of the overall reauthorization of NASA or toward this program and said: "Let's just take this little piece out and try to get it through fast so that this money can go directly to NASA," which is a key issue——

Mr. LORSCH. Yes.

Senator BROWNBACK.—you're saying that that needs to take place. Then we can have access to, you think, a hundred million dollars on a near term versus?

Mr. LORSCH. I think between the next shuttle mission and the concept of a screen saver, where photos that are not on the public NASA website, but for one dollar can be downloaded as a screen saver——

Senator BROWNBACK. Yes.

Mr. LORSCH.—for people who want to support the space program will generate a hundred million dollars within the next 6 to 12 months. And I would be amazed if it wasn't substantially more than that.

I think that even if the legislation can't be fast tracked because you want to start selling this, in essence, immediately I think the trust or the holding place for this money could easily be in one of two places: the Smithsonian Institute in a special fund Air and Space Museum; or perhaps in a special fund where that money, which may not go direct to NASA, might go to subsidize programs that NASA wishes it had money to subsidize, like some of the programs that Mr. Stadd is talking about.

Senator BROWNBACK. Yes. I want to work with you in getting that introduced soon. So, we just take that piece of it out and let's just get it in now and see if we can move that through fast and get access to those funds for NASA.

Mr. LORSCH. And I think the other piece that's important, if it can be done, is the comment that Mr. Mitchell made. I know of carnage and I say this with all due respect of NASA and government. But there are a lot of people that have been pioneering the way and working the halls of NASA, Congress and the Senate to give to the space program, who have come up with great ideas and great programs. And I think that to the extent that we have a body of law that covers intellectual properties, copyrights, registrations, presentations, concepts and ideas, it should be extended to outer space to protect and motivate the entrepreneurs that are out there creating the difference that's going to bring the hundred million dollars I'm talking about in the next 6 to 12 months—or the billions that I'm absolutely convinced we can generate prior to heading off to Mars.

Senator BROWNBACK. Would that have to be involved in this narrow piece of mechanism to get the money just to NASA, would this second piece have to be involved in it to truly access those private sector advertising dollars?

Mr. LORSCH. No, it would not have to be involved; but it would protect the individuals that were—I mean, I've just come up with two ideas sitting here at the table today. And I'm good but I'm not the world's greatest in marketing. And I'm sure there are a lot of other people that have other ideas that could make that pot \$300 million.

Senator BROWNBACK. Need to protect the intellectual property. I see what you're saying.

Mr. LORSCH. So, it would be nice to know that those people knew that if they invested their own hard-earned dollars into something, it wasn't going to be something that was presented and then was exploited by some multi-national corporation or NASA on a direct basis. But the real opportunity right now is with the excitement and the enthusiasm that's going on with the Mars landers and the next shuttle mission. If this Committee does not take advantage of it, it would be just a waste of another hundred-plus million dollars; and, again, Senator, I say that with all due respect because I know that government works in strange ways.

But this is a wonderful opportunity that can make a major difference toward getting us into space fast.

Senator BROWNBACK. I hope you will give us the benefit of some of your thinking, too, of what we could get in marketing resources for NASA regarding the space program, in a tasteful fashion that involves and works with the private sector.

Mr. LORSCH. I think every component mission that goes up, if you assume that we're going to assemble and build a spacecraft to go to Mars from the lunar surface, there's going to be a tremendous amount of activity between the United States—between here, Earth, space station, the Moon. Every one of those missions, whether it's to bring parts, to do work, or to develop living experiments, has the potential of generating between 10 and \$25 million a mission, easily, just for the rights of the companies who are sponsoring those missions to be able to say they're part of taking man into space.

The ultimate mission of going to Mars, there's going to be a tremendous amount of time, as I understand it, at least 7 months to get there, a year and a half up there, 7 months to get back. A tremendous amount of television time, tremendous amount of photos; and every aspect of any piece of intellectual property or broadcast that's communicated from the lunar surface, the spacecraft, back to Earth or from Mars back to Earth or news conferences with astronauts that can be standing in front of nothing more than a Nextel logo, a Northrop Grumman logo are worth hundreds of millions of dollars. If the Super Bowl game, which is one Sunday, can generate a million and a half to \$2 million for 30-second advertisement, a lifetime of changing the way this world exists and contributing to science, technology, education and the future of our children has to be worth billions of dollars and without a lot of work.

The difference between what I'm talking about is these are programs that if next week the Senate said: "We'll somehow create a mechanism by some type of executive order where on the next shuttle mission 50 corporations can put a sponsorship plaque, minimum \$1 million the 50 highest bidders," I would not be surprised if that mission took off with a hundred to \$250 million of sponsorship money because there's so much enthusiasm, support and goodwill from corporate America toward our space program. There's no way for people to demonstrate it. There's no way for the teacher in a classroom to encourage their student to design a piece of artwork using a photograph from Mars and entering a contest that for 25 cents or 50 cents could generate \$10 million.

Look at how much money was raised in quarters for the children of Afghanistan in one week, in one speech——

Senator BROWNBAC. Yes.

Mr. LORSCH.—by a President.

Senator BROWNBAC. And for me, just looking at it, we've got to get resources in this program to make it work. It's just we have to do that, and I think this represents a real way that we can get resources we need.

Mr. Mitchell, when your comments came forward, I was thinking that we probably need to do a full hearing on what the scientific community is saying about the near-term prospects of asteroids hitting Earth. And we may lean upon you to get us scientific community names you think will be good and we'll do our own research as well on that who the best minds are.

Mr. MITCHELL. Yes.

Senator BROWNBAC. I'm looking at this, just the timeframes that they are considering this to be a real prospect for us, as being another part of the factors that we put forward to the public and to Congress about, "Here's the reason why we need to do these things and do them now." So, I'm hoping you can work with us on that.

Mr. MITCHELL. Will be glad to, sir.

In that light, starting Monday, actually Sunday, David Morrison of NASA and Rusty Schweickart and a whole plethora of scientists and individuals are holding a Planetary Defense Conference in Los Angeles on the very subject and the proceedings of that hearing will be, I think, very interesting to you and——

Senator BROWNBAC. Good.

Mr. MITCHELL.—anyone else in Congress who might be interested in the subject. And I'll be glad to help you in any way to put another meeting together.

Senator BROWNBAC. Just on that topic.

Mr. MITCHELL. Just on that topic, yes, sir.

Senator BROWNBAC. We've got to build a case for why to move these on forward and expend the resources from the government to do this.

Mr. MITCHELL. Yes.

Senator BROWNBAC. And this will be another platform issue.

Mr. Stadd, thank you. Thank you for your thoughts from both inside and outside the organization, and I think those are good thoughts for us to have.

I hope you put forward even the idea of having the commercial sector run the space station near term. You think there are a number of groups that would be competent and capable of doing that?

Mr. MITCHELL. Let me caveat by saying, one, I was thinking more in the context of working with the government pending an exclusive license to broker and market the U.S. portion part of the station, recognizing that there are some safety issues and so forth that will have to be taken into consideration.

Yes, I do believe that under certain conditions there would be interest by individuals with substantial resources. I know that some people I've talked to are, quite frankly, somewhat concerned that, if you'll forgive the metaphor, but as the center of gravity, if you will, sort of shifts beyond lower Earth orbit in terms of focusing be-

yond the station over the long term. The American taxpayer has spent billions and billions of dollars in nonrecurring investment. One investor said to me, it's like having a house guest in your house and if you're not using the house, the house guest naturally is inclined to spread their belongings around a bit and end up with a defacto ownership.

And I would presume that the taxpayer would prefer that the United States make full use of that capacity. So, I'm simply suggesting that under the right conditions I do believe there would be interest.

Senator BROWNBAC. I had a guy tell me previously that with all that private sector, you're going to be able to get that same work done for, he was suggesting, a fourth of the cost and a third of the time frames to get it done. Which the governments do great work, but we are inherently a bureaucratic big monolith to move.

Mr. MITCHELL. We are. And I've had the honor of working on both sides as you indicated, Mr. Chairman. I certainly would not want to, at least on my part, the record to reflect that this is tough stuff when you're leaving the gravity well and going up to what is a pretty hostile environment. It's pretty complicated, pretty risky stuff, particularly when you involve people.

So, I don't think any one of us certainly at the table would underestimate the challenge; and some of the costs associated with, particularly with human systems, has to do with protecting those lives; but having said that, you're absolutely correct. As Mr. Chafer said, the genius of the American entrepreneur is if you give us a challenge within a certain set of parameters, I think we have a pretty good track record of stepping up and meeting that challenge.

And I do want to emphasize his point, particularly if we can do so as co-partners with the agency. I think that we could be having you, sir, holding this hearing 10 years from now and I think we could see much of that initial part of the vision being executed with benefits to everybody in the American society and, quite frankly, on a global basis.

Senator BROWNBAC. Well, as we celebrate 200 years of Lewis and Clark, it was a government operation, Lewis and Clark was; but they didn't settle it.

Mr. MITCHELL. No, sir.

Senator BROWNBAC. They opened it up, set a pathway, proof of concept; but then it was the millions of people on foot that followed, settled and opened it up. Many of them settled in my state of Kansas. Off of a really well-designed government program, the Homestead Act. I'm critical of a lot of governmental programs; I don't think they work very well, but this one worked great. Five years you stay on it, you get 160 acres; and the number of people that tried and failed at that were enormous. The number of people who tried and succeeded were significant, but it was just: "OK. Here's the field. You guys go at it. God bless you."

And I hope we can take some modeling, you know, from prior activities of when we've opened up other frontiers and do it right, do it thoughtfully and we don't want people to risk lives in fashions that they clearly shouldn't. But at the same time we want to engage that spirit, entrepreneurship, energy, and capital to move us on forward.

Mr. STADD. Absolutely. If I may, sir, sometimes it's been my observation that there's a bit of a disconnect sometimes between the Nation's political system and, ironically, the very people the system is representing.

Often I think the system underestimates the resiliency and the capacity of the American public for risk. I had the honor of being the chief of staff in the midst of the Columbia tragedy and it was awesome the bow wave of cards and letters, e-mails, the faxes that we received from people of all ages in America. And the common theme was: "Go forward. Please find the problem, fix it, but move forward." And, in fact, we had an exhibit in the lobby that I was very proud of that juxtaposed CEOs of large corporations with 6-year-olds and Crayon-written cards with the common theme that it is important for this country to proceed forward.

Senator BROWNBACK. It is.

With that note, Gentlemen, thank you very much. It has been quite a stimulating discussion. It has been an excellent hearing and input. We are working with the Chairman and the Ranking Member's on authorizing legislation. We'll be working on this budgetarily as well certain of the Appropriation's Committee. So, we'll be working on that issue, too; and it's a good moment. The thing I'm really interested in right now is that we get the design as close to right legislatively as we can, because there's a legislative architecture that is being chewed and stewed on right now and we want to get that as right as we can.

We don't ever get them a hundred percent right, as is obvious by a number of some missed steps; but, hopefully, we can get those close to right to be really able to stimulate this and move it on forward.

Thank you very much for appearing. The record will stay open for the requisite number of days. Thank you all for attending. We appreciate your being here. The hearing's adjourned.

