TESTIMONY OF RICK TUMLINSON
FOUNDER, SPACE FRONTIER FOUNDATION
BEFORE THE SENATE COMMITTEE ON COMMERCE, SCIENCE AND TRANSPORTATION

Wednesday, October 29, 2003

Rick Tumlinson Biographical Information - October 2003

Rick N. Tumlinson – Born to a long time Texas family whose pioneering credits include co-founding the Texas Rangers and fighting in the Alamo, Rick Tumlinson is a well-known firebrand and evangelist for the space frontier. He is the son of an Air Force Sergeant and his English wife, and was educated primarily in England and Texas. A regular contributor to the space industry paper "Space News" Tumlinson's writings and quotes have appeared in the New York Times, Wall Street Journal, Los Angeles Times, Miami Herald, Reader's Digest and dozens of other publications. He has appeared on such national television programs as ABC's World News Tonight, the CBS Morning Show, and Politically Incorrect. Internationally he has appeared on TV sets from Russia to China's CCTV and the BBC and been quoted in a wide range of journals, from the Economist to China's People's Daily.

Tumlinson worked for noted scientist Gerard K. O'Neill at the *Space Studies Institute*, produced the animated videos used to gain funding for the Air Force's DC-X rocket project and created the first ever paid political announcement for space. He was the first space consultant for the Sci Fi channel and played a major role in raising funding the International Space University. He helped pass the Space Settlement Act of 1988, testified before the National Commission on Space, was a founding trustee of the X-Prize and has been a lead witness in three congressional hearings on NASA in the 1990's. Rick is Executive Director and co-Founder of the Foundation for the International Non-Governmental Development of Space (*FINDS*), a multi-million dollar foundation which funds breakthrough projects and activities such as Helium 3 research, laser launch studies, and asteroid processing projects, The organization provided $100k in seed money for the Mars Society, operated the Cheap Access to Space Prize and supported such projects as The WATCH asteroid search program. FINDS was also the primary funding source and co-sponsored a very successful series of Senate Space Roundtables in conjunction with the Space Frontier Foundation and the lobby Pro-Space over the last few years.

Mr. Tumlinson co-founded the firm LunaCorp, which produced the first ever TV commercial shot on the International Space Station for Radio Shack. He led the team which turned the Mir Space Station into the world's first commercial space facility, co founded the space firm MirCorp, signed up Dennis Tito, the world's first "citizen explorer," and has assisted in numerous other such projects.

Recently, Rick has appeared as an expert guest on the "CBS Evening News with Dan Rather," CNBC's "Open Exchange" and was quoted in the *Washington Post*, *LA Times*, and the *Orlando Sentinel*, regarding the Space Shuttle Columbia disaster. He appears often as a space commentator on CNN and is working on his first book. "Manifesto for the Space Frontier."

In his spare time Rick collects vintage tin space toys and robots from the 1950's, is into four-wheel drive off-roading, raising tropical fish and riding his motorcycle.

SPACE FRONTIER FOUNDATION

Background

Who We Are

The Space Frontier Foundation is an organization of space activists, scientists and engineers, media and political professionals, entrepreneurs, and citizens from all backgrounds, beliefs and nations. Our central and driving goal is the large-scale permanent settlement of space as soon as possible, using the resources we find there, and the imaginations we bring to the task.

We believe all people have the "right stuff" and that everyone will benefit from opening the space frontier. Given the fragility of our planet we also believe that it is vital that we not only preserve the biosphere of earth using the resources of space, but that we expand that biosphere, taking life to worlds now dead. If successful, we see our future as exciting and full of possibility.

We reject the ideas that the world's greatest moments are in its past, that the advancement of our technological civilization must mean the decline of our ecosystem, and we are determined to transform the image held by many that the future will be worse than the present.

We believe that free people, free markets and free enterprise will become unstoppable forces in the irreversible settlement of this new frontier, and that our world is on the verge of a truly historic breakthrough – access to space for all.

To make that happen, we are engaged in the transformation of space from a government-owned bureaucratic program - into a new partnership between the public and private sectors - that will lead to a dynamic and inclusive frontier open to all people.

This all means we are about opening space for you and your children, and doing it now!
So get involved!

The Business of the Foundation:

Foundationers inspire!

Foundation speakers present a future that excites inspires and includes citizens from all nations, and through awards, briefings, gatherings and presentations our ideas are driving the portrayal of space into new directions.

Foundationers Are Active!

We work on policy issues at the national and international level, interacting with those who make the decisions. We speak to the media, challenging their old assumptions about space and the future, and using our access to let the world know what is possible on the frontier, and needs to be done today to get us there. We teach, letting the children of our world know they have a better tomorrow in store, and using the vastness of our universe to bring them together as we all reach for the dream of a tomorrow that is full of choices and hope.

Foundationers Make Things Happen!

- Remember the Lunar Prospector that found signs of water on the Moon?

Foundationers helped start that project.

- Recall the breakthrough flights of the little rocket called the DC-X?

Foundationers helped get it off the ground.

- Who were the people who made the Mir the world's first commercial space station?

Foundationers put up their sweat and cash and took a stand.

- Who shot the first TV commercial on the space station?

Foundationers worked with the space station partners and put Radio Shack in space.

- Who signed up Dennis Tito to fly and fought for his right to go into space?

Foundationers did the deal and helped clear the path for his incredible adventure.

- Who are the people building many of the new and innovative vehicles to fly people like you and I into space?

Foundationers are building new re-usable rocketships right now.

- Who threw the world's first global space party known as Yuri's Night?

Foundationers put the "rock" into rocket and reached out to a new generation.

Our members are encouraged to take actions that help to open the Frontier in their private lives jobs and businesses. Dozens of our members have formed companies and organizations that further our goals in different ways. From other non-profits to rocket companies to space services and travel groups to publishing and internet firms, they are getting the word out and making space happen!

Events and Projects of the Foundation

Space Enterprise Symposiums – In space, nobody stays until somebody pays. That means we either create profitable enterprises or remain dependent on the government and taxpayer largesse. In our SES events we bring space entrepreneurs and real financiers and investors together, to educate both on the economic promise and peril of this new frontier.

Return to the Moon Conference -
Yuri's Night -
Roundtables -
Conference - As a manifestation of our "All of the above" philosophy, the Space Frontier Conference (SFC) is the center-piece event in the Foundation's annual calendar. It brings together entrepreneurs, scientists, engineers, entertainment leaders, government representative and private citizens to talk about, present, share and debate the latest and greatest ideas and activities affecting space.
The WATCH
Permission to Dream
Vision to Reality Award
Vision of the Tomorrow Award
Chained Rocket Award

Events and Projects of the Foundation (cont.)

Return to the Moon Symposium – One of the most important ways we can accelerate the exploration and settlement of the Solar System is to Return to the Moon to establish a permanent government and commercial base. Held each year in Houston on the day humans first stepped on the Moon, the RTM Symposium is the world's premiere gathering of experts, entrepreneurs, astronauts and activists working to make this happen.

Senate Space Roundtables – The Foundation keeps a strong presence in Washington D.C... From the asteroid threat to commercializing the space station and space solar power, our Space Roundtables

provide an important forum to educate lawmakers and staffers about issues facing the space frontier movement.

Yuri's Night – Each April this global space party puts the "Rock" back into "Rocketship". Aimed at the under 30 set, Yuri's night celebrates the historic flight of Yuri Gagarin that opened the era of humans in space, bringing a new generation into the fight for the frontier.

The WATCH – The WATCH program is focused on leveraging and focusing the attention of astronomers and the media on the threat and promise we face from near Earth objects such as asteroids and comets. To date the WATCH has funded discovery and tracking programs, and supported important NEO educational outreach events and meetings.

Permission to Dream - PTD uses space to deliver a message of hope, unity and involvement to youth around the world. To date PTD has supported the placement of donated telescopes and lessons in countries as diverse as Chile, Iran, Zimbabwe, Russia and India, and is developing classroom projects and hands on space educational outreach in Los Angeles and other US cities.

Awards – The Foundation uses various awards to move our agenda ahead and reward those who help create and realize our vision of an open Space Frontier. Our Vision to Reality Award goes to those projects and firms who make things happen in space, and our Vision of the Future Award is given to the film or media project that best inspires and educates people about the possibilities offered by the Frontier.

"The Space Frontier Foundation is pound for pound the most effective space group in the world."
Dr. Robert Zubrin, Mars Society

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Why space?

"We choose to go to the Moon. We choose to go to the Moon in this decade and do the other things, not because they are easy, but because they are hard, because that goal will serve to organize and measure the best of our energies and skills, because that challenge is one that we are willing to accept, one we are unwilling to postpone, and one which we intend to win, and the others, too..."

Standing in Houston, Texas in the early 1960s, a young and vibrant President named John F. Kennedy looked skyward and offered a new and hopeful future to his generation. In the middle of a Cold War, in the heart of a time when the threat of total annihilation loomed over the heads of everyone, he dared to challenge those listening to take on a higher goal. Rather than succumb to the darkness, he held out light, and rather than cast what was in reality a technological face off into the mix of that shadow war, he held it aloft, a beacon to all who could hear and understand what he meant. At just the time when it seemed there was no choice but the continuation of a pointless global wrestling match which at any moment could result in the end for all, he spoke of choices.

Choices

Today we must ask ourselves again. What kind of tomorrow do we want to give to our kids? The choice is ours. You might say we have three possible futures we can give them - less, the same and more.

Our first possible choice, and the one lots of folks sometimes seem to believe is inevitable, is the worst. It's what might happen if we keep on rolling along and do nothing about conserving our natural resources or accessing new. The characterization we see in popular culture and films such as the Matrix, the Terminator series, and other dark dystopian images. It is an apocalyptic vision, the result of a time when all the world's cultures rush to create consumer societies such as those in Europe, Japan and the USA. Eventually our excesses exceed our limits and we end up with a polluted and stripped world whose environment collapses, bringing down whole societies, leading to war, famine, the end of global culture, and the dawn of a new dark age.

Our second choice is to attempt to sustain the human race on this one world through rationing of resources - at the cost of personal freedom - as we anesthetize ourselves with virtual realities and sensory distortions… Under the heavy hand of global Big Brother, our lives, actions, and even our very thoughts will be monitored and controlled. Imagination and innovation will be seen as threats to order and safety. Risk will be avoided at all cost. Perhaps we will eventually become so physically and intellectually passive that we finally load ourselves into banks of virtual electronic realities and pass the eons in a bliss of pretend adventures and paradises uncounted, until some global catastrophe such as an asteroid strike sends us into oblivion.

Or there's the third choice, opening the High Frontier of space and breaking out into the galaxy. Celebrating the spirit of exploration and individuality, we begin to truly explore and open the space around us to human settlement. Turning debates between free enterprise technologists and protectors of the Earth on their heads, we unleash the power of human imagination to create ways to harvest the resources of space, not only saving this precious planet, but also blazing a path to the stars. This is a tomorrow where life is exciting, new possibilities open up each day, and humanity spreads outwards, as the harbinger of life to worlds now dead. This future is characterized by new ideas and cultures spreading every where, the entire human race engaged in spreading life to the stars and a future that is ever expanding and hopeful.

Opening the space frontier will also change what it means to be an American. The effect of the space frontier on America will be profound. Our pioneering past will at last have a direct link to our future. Our heritage will be connected with our tomorrow in a visible and exciting way. The paths blazed by Daniel Boone, Davy Crockett and Lewis and Clark will continue onward and upward across the stars. The spirit of family will be resurrected as the frontier ethics of hard work and familial support are reinforced through the simple need to survive and prosper in a

hostile environment. Our relationship to the rest of the world will change, as we throw open the doors to a better tomorrow for all, and as we always do, offer to hold those doors open for all and everyone to follow. Opening the frontier will change what it means to be a human being. We will become a multi-planet species, assuring our survival, and that of the life forms for which we are responsible. And a child living in such times will know why they are alive, and be able to see an unending and ever opening panorama of possibility stretching out before them

A Human Need

The simplicity of the needs which are fulfilled by opening this frontier is what makes it all so compelling and at once so elusive. We always want to make things seem more practical. In conversations and talk we speak of the need for "down to Earth" answers to such questions as those the frontier poses. But the real needs are often much more spiritual, much more about the core issues of life, and those of us who speak of the frontier often do ourselves a disservice by trying to dress down our Vision. We want to answer engineers and accountants with numbers, politicians with political reasons, environmentalists with new fixes for the seemingly intractable challenges we face in resource utilization and pollution.

The reasons we must open the frontier are as varied as the people who want to see it opened. And almost all of the reasons are good ones, although some, to me begin to rise above the rest. But in the end, most either enable or lead to a few basic and very core rationales.

We must open the frontier to expand this grand experiment called freedom, because without an arena to feed and nurture the ideals of liberty, individual choice and the right to do and be whatever you want they may well perish from the Earth. We must open the frontier because without an edge to our packed culture of individuals, nurturing and then bringing in new ideas and giving release to bad ones, the center comes apart. We must open the frontier to find and create new wealth for humanity, because everyone in the world deserves the chance to have the same fine house, fine cars, and good life you can potentially have, and this planet alone simply cannot provide support that, unless you give up yours (and someone, sometime will try and make you do so). We open the frontier to help save the planet we love from the ravages caused by our ever growing numbers and our hunger for new forms of energy, materials and products. Finally, and most importantly, we must open the frontier as humans to survive as a species and to protect our precious biosphere from destruction by the forces of the universe or ourselves by making it redundant.

As you can see, there are "Big" reasons, such as species survival and the need to provide new choices to future generations. For example, to those who must look into the eyes of a child who carries their immortality, we must open the frontier because our children deserve a future of more and better, not the drab and boring and potentially scary place we hold before them now. As Kennedy was pointing out, we must offer them more choices, not fewer.

Yet, many of the real reasons we reach outwards aren't easily quantifiable, often boiling down to the examination of history, the faith we have in what is possible in any new arena of human endeavour, and in fact, down to a deep, almost mystical belief that this is the "right" thing to do. And then, just below the surface of all of these lies something that is simply genetic – the drive for any species to expand its domain.

I believe that the human species is pioneering creature, that for us to be at our best we must always be pushing out from the center into new realms, that we must always be expanding outwards or we turn on ourselves. I believe it is the destiny of the human race to open the Frontier of space, and that if we do not we shall be doomed to the long slow spiraling decay of stagnation. Our move into space must be irreversible before this occurs, or society will turn inwards and our destiny in the stars will be forgotten for decades, if not centuries.

These aren't all the reasons, but they should give you the flavor of what this important movement is all about, for as you can see, they touch on the central issues of our time, of all times.

How are we doing in relation to these goals?

We aren't.

As driving, important and exciting as the possibilities offered by the frontier are, we aren't trying to open it. We are wandering around and around in circles at the edge of this new ocean, going nowhere and doing nothing of

importance. It's no mystery why our space efforts are in trouble. As currently structured the US national space program not only cannot open space, but has no intention of ever doing so!

IT IS NOT NOW, NOR HAS IT EVER BEEN THE POLICY OF THE UNITED STATES TO OPEN THE SPACE FRONTIER TO HUMAN SETTLEMENT AND DEVELOPMENT.

Any belief amongst those in the space community that opening the space frontier to wide spread participation, development and settlement is national policy is self delusion. A delusion well fed by those promoting projects originated by our space agency and its totally dependent contractors, who's rhetoric is often sprinkled with references to the space frontier and the inevitability of its settlement. Using loaded terms, such as "the next logical step," the public has been repeatedly sold lavish and expensive projects. The goal we are supposedly "stepping" towards is illustrated by beautiful propaganda art and simulations portraying the great and glorious frontier on which we are supposedly putting our multi-billion dollar down payment. Yet the projects and programs promoted actually have no connection to the opening of a frontier in a historical sense and there is no "logical" progression from today's program to an open frontier in space. Such "future fluff" is actually verbal and visual candy, cynically used to excite and titillate those whose support is needed for constant budget battles in Congress.

Even if one does not buy the idea that space is a frontier for human settlement, the current human space program is a failure. It will perhaps surprise you to hear me say this, but if NASA's charter in space is purely to expand our scientific understanding of the universe, then we should cancel our human space flight program right now. If the question is phrased that way, I find myself agreeing with a large portion of the scientific community who say it is neither the most effective nor cost efficient way of doing this type of work. Cancel it now and spend the money on probes and robotic spacecraft.

But for me that is not the reason to have a human space program. It is all those I listed above. The expansion of the human species beyond planet Earth. The creation of a better future with more choices for our children. The opening of a new and endless frontier. Unfortunately when judged by these criteria as well, the current US space program is a failure.

If the job of NASA's human space flight program is to support the exploration of space in terms of the pure quest for knowledge and to prepare the way for others to follow as we expand the human domain, then they have failed. In other words, if the agency's job is to explore and survey the unknown "lands" of space for both scientific and economic benefit in the same way that James cook explored the then unknown world of the Pacific for his nation, or the way Lewis and Clark explored the west for ours, they have not succeeded. And if the agency is to be judged on how well it has trail blazed, opened new paths and created a route to the frontier for the rest of America to travel, it has been an utter, expensive and embarrassing disaster.

The Space Frontier Principles

To date our national human space flight program has been elitist, exclusive and a dead end. It has never included the people for whom it was allegedly created, and who foot the bills. Our space leaders to date have also ignored at their own peril several essential truths. And, although the propaganda and imagery they put forth as they seek more and more taxpayer funds may seem to indicate other wise, most people would be shocked to learn, it is NOT their intention to open space to human settlement. Our space programs are just that – programs - they are not part of any larger cohesive or visionary agenda. These programs are a hodge-podge of activities that just happen to use space to achieve their short-term goals. Composed of projects with no long term unifying agenda there is no over arching and transformational goal, and no plan to blaze a path the rest of us can follow into space. The low level goals they do have include technology development, military domination, enhancing national pride, indirectly inspiring education, supporting terrestrial industries, and at times advancing science. Nowhere is it written in their operational guiding documents or principles that space is a place to be pioneered or opened to permanent human habitation.

Foundationers see space as a place, as the next frontier for humans to explore, utilize and settle as their home. This to us is the real goal of any national or international human space flight agenda, and we are working to make it the goal of our activities in space, both public and private. **Although it may seem academic, this difference**

is key, and completely changes the type of space activities we undertake, how we spend our money and what investments we make.

We also believe that the ideals of free enterprise based democracy should be extended into space. Democracies consist of free peoples bound together by the belief that the people have primacy over the state, and that individuals should have the power to create new wealth unimpeded by that state. The settlement of the American western frontier was a result of the application (often by default) of these core concepts.

Extended and applied to space, they add up to what I call the Space Frontier Principles. I believe that unless these ideas underlie our future space plans they are doomed to failure. After all, space is a frontier then we should treat it as one, including our government space policy leaders.

- Without low cost, reliable and regular access to space there can be no Frontier.
- Space is a Frontier, not a Program
- If space is a frontier then the government should treat it as one.
- In free societies opportunities are exploited by individuals or groups in the form of companies and private institutions.
- Frontiers are not opened by governments for the people - but by the people - supported by or in spite of their government. Put another way, our federal space program must be designed to help the American people open the frontier. It *must not* attempt to open the frontier for us.
- A Frontier based space agenda must focus on creating technologies and infrastructure that are long term in nature, re-usable, build a foundation for those who follow, are low cost to build and operate, and supportable over time by the wealth they create.

I believe that unless these ideas underlie our future space plans they are doomed to failure.

The Near Frontier and the Far Frontier

We have the wrong people doing the wrong job in the wrong place for the wrong reasons. To understand what I mean, we need to have a new way of looking at space. One that can create a context for our discussion. To help with this I developed a map of space that can be used to see where we are in the opening of the frontier, and who in our culture should be doing what, and where.

The way I see it, the Earth is the center of an expanding bubble of human activity and life. As we have lifted ourselves off of the planet, that bubble has grown outwards with our human presence. First Gagarin and the Mercury astronauts moved the edge of that bubble to LEO, and then Apollo pushed it even further. Now its edge sits at the Moon. This area of space I call the Near Frontier.

The Near Frontier

The Near Frontier is comprised of the Earth, and the surprisingly large number of comets and asteroids that either inhabit or pass regularly through our neighborhood. It is the next step outward for our species, the next zone for expanded human activity. This area is unique in all the Solar System, since the costs of accessing it are far lower than other areas, and much time has been spent exploring its potential. I believe that NASA's Lewis and Clark's have done their job here in the neighborhood of Earth.

In the Near Frontier the presumption is that the first stages of exploration are complete. One might say that Lewis and Clark have surveyed this region. And now it is time for the rest of the nation to take over. The Near Frontier should be handed over to universities and private firms to explore and develop for human use. The billions of dollars now spent on constructing massively expensive, non-focused and expendable government housing and developing and operating incredibly inefficient elitist transportation systems to support them is a complete waste of taxpayer funds.

The Near Frontier is the wrong place for the Federal government to focus its energy and funding. Rather, it is a place that is not only primed for the private sector to develop but is already seeing its first potentially successful private operations, and rather than being a drain on the national treasury, it is ready to become a prosperous zone of human activity and a generator of wealth for our nation.

- To encourage this, our government should end its inappropriate operational activities in this area and hand it off to the people by creating a climate that incubates, enables and encourages private sector activities of all sorts.

The Far Frontier

Beyond the Moon lies the Far Frontier. This is the place yet to feel the touch of humanity, and it includes Mars, the rest of the Solar System and the entire Universe. This area is beyond the reach of commercial entities and projects based on private investment. But, like pure scientific research, the Far Frontier does qualify as a place where long term cultural investment makes sense, both for its own sake, and as the next place to be developed and opened to human activity, where appropriate. This is where the pooled resources of the people can be used to support exploration in the quest for knowledge and as a precursor to the following wave of civilization. Such support can come in the form of taxes, academia or the dues collected by a membership society such as the terrestrial National Geographic Society. This is where NASA and the space agencies of Earth should aim themselves now their job is essentially done in the Near Frontier.

But first they must pry themselves from the useless activities they now cling to in low Earth orbit. If they do so they can give society a new domain to explore and open to humanity. The entire rest of the universe is their reward for getting out of the way in the Near Frontier. Thus the Far Frontier is where we must set the sights of our national space program. It is beyond the known and out into the new and untouched horizons that we need our 21st century Lewis and Clarks and Cooks to go. It is on these unexplored worlds and places that we should focus the eyes of science. Our corps of highly skilled government astronauts should not be driving trucks from Earth to buildings in the sky. Instead they should be climbing over the hills of Mars and telling an anxious world what they have found, or combing the skies for evidence that we are not alone in this vast universe.

ISS and AlphaTown

If we are to develop a true space economy, not only must transportation costs be brought down, but the entire mental framework of our past "mission orientation" must change. In the past our forays into space have each had an endpoint and each was intended to achieve some near term goal, often without being used as a stepping stone to the next. We have traded the success of short term stunts and triumphs for sustainability, making it more important to get up there at any cost, than to be able to operate in space cheaply and efficiently. The frontier mindset rejects this thinking. We go into space to stay, and whatever we do there today is meant to become a "foundation" upon which others can build. Just as in space transportation, we reject the idea of "use it once and throw it away" that was the hallmark of our dead end space efforts in the past and continues to this day, as NASA and its partners in the international Space Station begin plans to de-orbit the massive facility a few years from now, even as they are still building it.

Based on the Frontier concept, and staying true to our pioneer beliefs, we reject these plans and will fight to see the ISS retained in space as a nexus for future activities, even if it must be flown into a storage orbit and mothballed. We believe in using what we have at hand to leverage the opening of the frontier, be it the discarded parts of the old Cold War space program, or the shiny new government works programs orbiting overhead today.

It is ideas that change actions, and mindsets, once created take a long time to change. The Cold War space program was a win at any cost activity, and led to a mindset that short-term success can come at the expense of long term sustainability. Goals, no matter how arbitrary or non-realistic, were to be achieved by throwing large amounts of money at them, so long as progress could be shown – no matter how dubious. As government centric, it also engendered a mentality that to sustain legislative support, the importance of the government effort must be highlighted and take precedence over any commercial or other efforts to achieve the same goals. In fact, government managers came to see other efforts to create space facilities as threats to their own program, and in many cases sabotaged or in other ways worked to undermine private efforts. After all, how would a government bureaucrat, having spent years lobbying for billions to build their space station, be able to defend those expenditures in the light of a commercial facility operating more cheaply, and producing better results just down the orbital street?

Thus the challenge is to create a new way of thinking in the minds of those currently dominating the space field, and also those who might wish to join in space activities in the future. Rather than seeing commercial efforts as threats to their turf and jobs security, the Foundation has been working to show how new partnerships can be created in space that parallel those on Earth. For example, here on Earth government activities are often used to catalyze commercial offshoots, and federal investments in technology often lead to private sector economic drivers. From highways funded by taxpayer dollars to forts on ancient frontiers that became the seeds of cities, we see the government and private sectors as complimentary to each other, not competitors.

In 1995 the Foundation started a campaign called "Alpha Town" to create an image and conceptual framework in people's minds that related to how our culture and communities work here on Earth. One goal is to transform the International Space Station (ISS) from a multi-billion-dollar public-works project, into the kernel of the first human town in space. The Foundation is working to promote policies and activities that will turn ISS into the catalyst at the center of a true LEO community. "AlphaTown" encompasses projects that are policy oriented as well as technological.

A Space Station Authority

The Foundation believes the right management in charge of the space station is critical to making it an outpost for all humanity rather than stagnating as a government lab and public works project. Although built and operated today by government for government, we believe that if the station is to achieve its full potential and truly become "the next logical step" to opening the frontier, it must begin to serve a much broader constituency, including the private sector. We believe a civic/private authority would function as a landlord for the entire space station, and act as a catalyst for new activities and growth, while streamlining operations and lowering costs for all. Much like a terrestrial port authority, its goal would be the economic and scientific success of the station.

ET

The US space shuttle's giant external tanks are one example of an extremely valuable artificial space resource that now goes to waste. At present, with each successful flight of a shuttle, an empty tank with mass greater than the full payload of the shuttle itself is brought to 99 percent of orbital speed and then discarded to burn up in the atmosphere. Over a 10-year period about 10,000 tons of that tankage will be brought almost to orbit and then discarded, with a value on orbit of about $35 billion. The ET project is determined to stop this waste and begin to have this valuable resource stockpiled in orbit.

Mir

In keeping with our frontier philosophy, the Space Frontier Foundation began in the mid-nineties to take a stand in favor of keeping the Russian space station Mir from being destroyed. Our Keep Mir Alive campaign stood in direct opposition to those who wanted to "bulldoze" the facility to clear the way for the new ISS. Yet, to Foundationers the Mir, as old and aged as it was represented yet another "place" in space, and perhaps not as shiny as the new facility, could still be used as a lever for future space activities by those with imagination.

Foundation members led the team that eventually leased the Mir, converting it for a few months into the world's first commercial space station. Although we lost the battle to save the facility, this action showed human activities in space weren't exclusive to governments, and that individuals and non-government groups could take on big, human oriented projects in space - a historic first that eventually led to the flight of California businessman Dennis Tito a year later.

Space Hotels

With the flight of Dennis Tito into space, the door opened for a new industry to arise on the frontier. As we have seen he was not the last, but the first of this new type of visitor to space. Given the difficulties presented by his stay on the currently government operated space station; some are advocating and developing plans for separate commercial space hotel facilities. Even if ISS were to become a commercially operated facility, it would still be mainly a research and technology oriented facility, and not truly suitable for "casual" visitors or those simply wanting to experience space for periods of time. After all, a laboratory and a hotel are different things, and serve different roles. There are many proposals for building orbiting hotels and tourist facilities on orbit, a potentially huge market. From re-cycled spacecraft and external tanks to new facilities, perhaps based on inflatable technology, these new "buildings" and facilities will increase the size and economic potential of Alpha Town, creating new destinations and locations for development.

The Moon

The Moon lies on the edge of the Near and Far Frontiers. It represents a transition zone between the area that can be best developed and whose over all activity base should begin to be led primarily by the private sector, and the Far Frontier, where business plans don't yet make sense, infrastructure is non-existent and travel times and mission costs preclude most private concerns from operating. As we reach the Moon, although we find there are businesses in the embryonic stages who have realistic plans and even funding for Lunar projects, we are just on the edge of the "giggle zone" of private finance. Yet, our feet have literally been upon it several times. For the Moon, the time has come to move from being a totally unknown entity, to one that, although it still needs major exploration, can begin to fit into plans for development and utilization.

If we are successful there will be facilities on the Moon, such as hotels, mining, science and training facilities such as I discuss below, and over time some will choose to live there perhaps. But, given the difficulties of differences in gravity, day/night cycles etc… it may not ever become a thriving space metropolis with a breeding population of humans (whose children might well be forever bound to the lightly gravity world and unable to return to Earth…) By the way, I do not recognize the spurious Moon vs. Mars debate. They are different places, and we have different ends in mind for them. To Foundationers they are complimentary, not competitive.

Planetary Exploration Training Base

Most serious participants in the space community realize that as NASA sheds the burden of trying to operate the ISS and begins to look at sending humans to Mars, they will need a place to go to train, to develop infrastructure and transportation systems and "get their feet wet" (or dusty in this case). The moon is the perfect place for this exercise. LEO to Lunar transfer vehicles, lunar orbit to surface vehicles, habitats, life support, energy systems, all can be developed and tried out on the Moon before we risk human lives on a one way trip to Mars. I believe that a Planetary Exploration Training Base should be a high priority on the Moon. Potential Mars explorers need to be trained somewhere with high radiation, extreme temperatures, and temperature differentials, lots of dust and dirt, where, if they tear their space suits or damage their equipment, they can die. We need to know what happens to a space suit when it is worn in such an environment everyday for weeks at a time before a Mars explorer can trust her life to it, and that can't be done on Earth.

There are many large scale Lunar based science projects which demand a strong and ongoing infrastructure that could be commercially provided. One exciting idea is the construction of a new Lunar far side observatory, made up of dozens of small telescopes that scientists say could combine their power to see objects as small as continents, on planets circling other suns. In this case the NASA might well help form a team of co-operating universities and observatories. This team could then contract out the construction and operation of this project to companies which would specialize in economic lunar surface operations.

NASA and the space agencies can build training facilities for future Mars and planetary surface exploration and operations, scientists can build far side observatories shielded from the light and radio noise of Earth, others can study the Lunar crust for hints as to the formation of the universe itself. At the same time, the private sector can develop and supply housing based on its learning curve in LEO as it takes over ISS and builds new commercial space stations. Such industries can provide economic leverage and support for the agency's activities, saving the government millions. For example, a private firm might build a luxury hotel facility for those who might want to fly under a lunar dome on their own human powered wings, or relax in the low gee for a few weeks while contemplating the blue marble of Earth on the horizon. Meanwhile, also renting rooms in the hotel are those specialists listed above, and space agency teams, perhaps managing a group of astronauts in a nearby crater as they develop a simulated Mars surface base and test their systems.

All of this then helps argue for a strong and robust interplanetary transportation system. Again, the interests of the two cultures coincide. The commercial firms will need low cost and regular transport to and from the Moon, and cannot afford to fund the development of transportation infrastructure. The governments need such systems for any future human exploration of the solar system and/or Mars settlements, if future exploration of Mars is not to be a dead end set of stunts. The government can support the technology development and help build the highway, much as they do on Earth, and the private sector can build and operate the "trucks" over time, also as they do on Earth. And everyone

wins.

NEO's

Contrary to the view that space is empty, our Solar System is filled with millions and millions of small objects. Those that approach the Earth or are easy to reach in terms of energy are called NEOs or Near Earth Objects. There are several types of objects in the area referred to as NEO Space, some orbiting in relatively the same place, such as the small clusters we find at various stable points, which are caused by the interacting gravity of the Earth, Moon, Sun and other planets. But most follow long looping elliptical orbits, crossing the orbits of the Earth and Moon in a predictable manner. And yes, somewhere out there the younger sibling of the dinosaur killer is hurtling towards the Earth at thousand of mile per hour. When it hits, be it tomorrow, next week, or in a hundred thousand years, our party will be over.

What to Do Now?

I believe that the space aware (us) have a duty to point out such threats as those posed by NEO's, after all, the potential destruction of our home world is a great argument for getting our eggs out of this one basket. By the same token, and why we should care about such things as sky searches and asteroid shield plans is that it makes little sense to try and expand the human race into space if we are going to be wiped out by some careening solar iceberg while getting our act together.

Valiant sweaty Bruce Willis's saving the Earth and spectacular "we all gonna die!" scenarios aside, the promise of the resources such rockpiles might contain that excites us from a frontier perspective, and it is here where we focus our attentions. Many believe that long term, such resources are integral to the human break out into space.

The threat from asteroids and comets is often the focus of the media, highlighting the need for a much expanded search for these objects, which could wipe out life as we know it. But the same rocks which could kill us can help us live better lives due to the resources they contain. Many of these objects are literally floating gold mines, continuing amounts of gold, platinum and other precious metals that would stagger the imagination. They also offer us the chance move environmentally destructive mining operations from the living Earth to the dead emptiness of space.

The search itself, with its broad societal implications, is the proper domain for the government to provide support. As with the Moon, NASA should support early exploration now and later, transitional missions, with large commercial participation in the form of partnerships or outright purchases of data. But eventually, it is the private sector that should lead the actual exploration, characterization, sampling and utilization of these important resources. I would like to see the Federal government offering prizes for the location of potential threats and acting as a clearing house for NEO information.

It could also offer to buy data from those who can mount missions to NEOs privately, thus saving tax dollars and catalyzing a potential new industry. The government has an important role in updating laws regarding ownership of such data, and of course the thorny issue of mining and ownership rights must all be clarified before anyone seriously tries to stake a claim on one of these floating goldmines.

Mars

I and the Foundation have always been for the exploration of Mars, particularly as a prelude to permanent settlement of Mars and the rest of the solar system. But we are against dead-end stunt type missions to Mars that do not provide stepping stones to possible future settlement.

However, although we may support the concept, as mentioned above, the idea of settlement was and is still not our national goal in space. In the past NASA's planned paper missions to the Red Planet have simply presented it as a place to perform the Apollo Program Mark II. For government planners, flags and footsteps are the goal for Mars, as they were for the Moon. In fact, all of the official plans so far introduced for sending humans to Mars fall under the category of stunt. Somehow, the lessons of the past failed to reach the ears of this group, and they do not understand that we simply cannot afford another let down like that we have seen since the end of the Apollo era.
To advocates of human settlement "Das Mars Project" used to represent all that was bad about our government space program; centralized in the traditional government/aerospace cabal, stunt oriented, elitist, vastly overpriced and with

no long term growth plan for growth from first missions to settlements. Unfortunately, thanks to the NASA attitude that all space is theirs, this entire debate is based on confusion between the roles of government and the private sector. What both sides have missed is what I have laid out in the Near Frontier/Far Frontier paradigm. The government is never going to succeed in developing space businesses, and those planning space businesses are not going to propose going to Mars in a business plan.

The Settlement of Mars

We must greatly expand and accelerate the exploration of Mars, particularly as it enables the settlement of Mars and the rest of the solar system. Money's saved from space station shuttle and center operations should be used to fund the development and demonstration of pioneering technologies that will enable the exploration and settlement of Mars. And yes, humans should go to Mars, as humans should go everywhere that it makes technical, economic, scientific, environmental sense to go. That's what an open frontier means.

The drive to open Mars to human settlement will fire the imaginations of our youth in a way that the more routine operational aspects of settling the Near Frontier will not. It is a symbol that will have a positive effect on all space activities, if it is part of the agenda I have outlined here. It will be seen as a national endorsement of space as a frontier, and it will be the most visible aspect of the government's role in the new space partnership I suggest. In frank political terms, human exploration of Mars also provides the carrot needed to pull NASA's management, human space flight centers, the astronaut corps and its cheerleaders away from the Near Frontier.

If NASA needs public support, it need not fly members of the Senate in space. The camera shot from the helmet of the first woman to peer down the vast depths of the Valles Marinaris canyon will be enough by far.

Defining the Roles is the Key to Mars

The key to making Mars a real frontier is to understand the separate and very different roles the government and the private sector must play to make it so. These roles are not only differentiated by the area or location, but by the activities themselves. Just as on Earth we see the government's role in this new field of human activity as one of catalyst, cheerleader, guarantor of safety and lawful behavior. Right now, and until Earth's governments either begin to divest and hand over Near Earth space and we see the development of low cost space transportation, there simply is no money to even begin talking about large scale plans for Martian exploration, let alone settlement. However, if the nation adopts the Near Frontier/Far Frontier model, NASA can release its grip on the Earth-Moon system by privatizing and commercializing all operational activities such as the station and space transportation systems and move its focus to the exploration of the Far Frontier. If structured correctly, government could prime the pump for the creation of leading edge technologies to aid in that quest, and be a good customer for the private sector to provide the bulk of needed services for such a program. If this happens, enormous resources would then become available to begin the quest, IF the taxpayers can then be persuaded to do so.

Continuity and economic viability must be designed into any exploration program from day one. Remember Lewis and Clark. Just as Jefferson's mandate was not just to explore but also to survey the Louisiana Purchase, so to on Mars we must explore for both science and development. The Reagan appointed 1986 National Commission on Space report did recognize the need for permanence to be built in to any Mars planning, but it too was based on a massive infrastructure and in-space transportation build up, and would not allow any permanent development to occur on the Red planet for decades.

The Space Exploration Initiative presented during the Bush administration not only didn't build on the permanence idea presented by NCOS, it retreated to the old flags and footsteps approach to space exploration. With its unspoken mandate to rationalize then current NASA projects such as the space station, it called for the station to be used as a port of departure. For their money, the taxpayers would get to watch three to six people plant a flag, and once again leave our spoor behind in the Martian dust with no plan or promise of anything of substance coming from the adventure. Needless to say, it was DOA in Congress.

Even the smallest humans to Mars missions will require a substantial investment and to spread out that investment across an entire culture is not a bad idea. I believe in democracy, and if the taxpayers can be persuaded and the goal remains the first permanent human settlements on the Red Planet, we support the concept - as long as all aspects of the project utilize commercially provided data and support systems to the maximum extent possible. Any agenda that

includes the Moon and Mars should be designed to create infrastructure that will support long term access and transportation to and from those worlds, and be carried out in a way that leverages one off of the other and all off of the activities of the commercial sector - as well as the taxpayer funded specific missions and programs along the way.

The Right to Own New Land in Space

Finally, for all of these new areas in both the Near Frontier and Far Frontier (including the Moon, Mars and the NEOs) to become the great sources of wealth and possibility they can be, we need to begin putting in place the rights of those who explore and develop such new "lands" in space to own them. Throughout history, it has been the ability to gain and hold land which has driven them forth, and given them the will to carve new human domains out of wilderness. Space is no different. If people are going to invest their wealth and lives in opening the frontier, they should have the right to pass what they have done down to the next generations. When the time is right, the US should stand up and recognize that in space, the same rights to won property exist as on Earth.

Earth to LEO

The primary goal for the nation in this decade must be achieving cheap access to space. Because if you can't get there regularly and cheaply to develop, test and manufacture your product you can't make a profit. If there is no profit, there will be no frontier.

Unfortunately, costs about the same today to put a human in space on the government shuttle as it did 30 years ago thanks to the incestuous, self preserving and self feeding institution that our shuttle program has become. And according to NASA the new OSP program will not help that situation and may make it worse, while costing us billions of dollars we need not spend.

The development of cheap, reliable and regular transportation to and from space is THE key requirement for opening the space frontier. Once again, there are strong mutual interests between the private and public sectors to be satisfied, once again, there is a chance for a partnership, and once again there is the chance to create new industries and jobs. And unfortunately, once again we are faced with a government controlled monopoly - this time operating the only human capable space transportation system in the United States.
It is time for change. NASA and the US government need to get out of the trucking and passenger carrying business as represented by the shuttle and OSP programs, and back to supporting exploration and scientific progress. NASA and its parasitic contractors must no longer be allowed to manage the designing, building and operation of what are essentially glorified government space trucks/vans. Can you imagine if the government had done the same thing with an airline? It is as if the FAA owned our single national air carrier. With no real competition it would never get cheaper, better or more efficient…and no one would be able to afford to fly on it. That's the socialist monopoly we have in space flight. It has not improved safety or access and wasted billions of tax dollars. And with the announced plans for the Orbital Space Plane (or what some call the Orbital Stupid Plane) our nation will be pouring even more billions into a giant step backwards when it comes to access to space.

In contrast to this dinosaurian penchant for repeatedly getting stuck in quickly evaporating swamps of old ideas, a new lean, mean set of alternative space firms are out there building truly innovative systems for carrying paying passengers and payloads on sub-orbital flights for what may turn out to be less than a hundred thousand dollars a flight. Unencumbered by traditions, bureaucracies and structures designed to siphon tax dollars rather than realize profits, these firms are where innovations and new ideas can be born and tested on the anvil of the market system. But they face enormous challenges on the road to success. Often self funded and working close to the economic edge they have waited and watched as our government hasn't done the job and are now going to open space their way – if they survive. These little mammals are doing their best to dodge the smothering feet of government regulations and paranoia and hold out hope for a whole new path into space, but they need help to survive. And if they are truly to contribute to our national space efforts they need the current system changed dramatically to acknowledge them, to support rather than hinder them, and to let them in.

Rise of the Alt. Space Firms

Several years ago in writings and talks I pointed out that I thought the new so called "robber barons" of space would come from the computer world. I saw these people as pre filtered for technological savvy, comfortable with new and innovative ideas, definitely out of the box thinkers, and raised on the space program, science fiction literature, and

media such as Star Trek, B-5 and Star Wars. Oh, and also - although I was saying this before the dot-com melt down - they have lots of money in a culture where they will feel the need to do something great and important. In other words they would want to give something back. Well, some of them made it through the rough times in their own industry, and have done as we hoped, and jumped into the space field.

I call these new players Alternative Space Companies, or to put it into techno speak, the Alt.Space movement. They do have the money and the dreams, and yes, in their hearts they want to see the human species expand into space, of this I am sure. Or as Paypal founder and rocket builder Elon Musk said in meeting in his living room recently, our job is to "Back-up the Biosphere."

The first shots of this revolution were fired when telecom millionaires Walt Anderson and Chirenjeev Kathuria joined with the Jeff Manber (former Executive Director of the Space Business Roundtables) myself and other Foundationers to go to Moscow and found *MirCorp,* with the goal of transforming the old Russian Mir into the world's first commercial space station (which led to Dennis Tito and others flying aboard the ISS). Shortly afterwards, the X-*Prize* was founded. (Which directly influenced Rutan to finance and build his spaceship.) These activities began to fire up the imaginations of private citizens, who had thought themselves shut out of the space game. Within a couple of years, several new firms had been founded by those wanting to leverage off of the potential for flying what I call "citizen explorers" into space.

Within the last few months we have recently seen the first ripples that will be caused by the new Alt.Space "barons" and their own rocketship projects, in the form of Scott Bezos of Amazon.com's *Blue Horizons,* Elon Musk's *Space-X*, and John Carmack (owner of Id Software – created the hugely popular video games "Quake" and "Doom") who owns *Armadillo Aerospace*. The recent highly publicized roll out of famed aircraft builder Burt Rutan's test vehicle, which was apparently financed by a major software firm's founder gave the world it's first Alt.Space poster child, yet there are also many other firms working in this field.

Serious, business oriented, successful survivors of a tough industry, with big dreams and deep pockets these sole source funded projects join with other not so new players in the field with funded firms like Bob Bigelow (sole owner of Budget Suites of America) whose *Bigelow Aerospace* is building a prototype space hotel, Charlie Chaffer's *Celestis and Team Encounter* whose Solar Sail Project just contracted with NASA to collect data on its voyage out of the solar system, and *Constellation Services Incorporated,* whose cargo containers promise to reduce cost to re-supply ISS at this critical time. Others, like Dennis Wingo's *SpaceCorp.*, Walt Anderson's *Orbital Recovery*, John Powell's *JP Aerospace*, *Pioneer Aerospace*, and *X-Cor Aerospace* complete a mix that is wide and deep in its potential to profoundly change the space transportation habitation and services field.

These are real firms, and are poised to transform space access and operations as we know it – if they get the right breaks, and the support of the nation they call home.

According to some experts, $1 in market potential offered to the private sector will produce $10 in the type of technological and operational breakthroughs we might get from the current government -centric approach we have today. Some put the ratio even higher. If Burt Rutan can build a re-usable sub-orbital space ship system for under $40 million, what can he and the other alternative firms out there do for let's say the $10 billion we are about to waste on OSP? (The equivalent of 3 or 4 shuttle flights.) Rather than waste that money on yet another specific-use dead end program, let's offer that money to the private sector to carry humans and cargo to and from space and get $100-200 billion of innovation and common sense. A few billion dollar a year market for separate payload and passenger flights to and from ISS and to fulfill other NASA and DOD needs would produce a huge change in our nation's space access capabilities. Imagine, rather than one or two inside firms working on cost-plus contracts to fulfill single use needs they helped develop in the first place, we could have a dozen space delivery and transportation firms. NASA and DOD would no longer fund multi million dollar studies, multi-billion dollar development programs or prop up aging technologies, but would simply pay on delivery when their payloads were delivered…just like the rest of America and most of the world does on Earth. These new commercially oriented space trains, trucks, buses and taxis would carry not only government payloads, but also compete to carry commercial passengers and payloads to what could become a rapidly expanding human frontier in space.

To get there we must make radical changes, not just operationally, but most importantly, mentally, and in the structure and management of our current system. To that end I offer a ten point plan to turn our space agenda

around. This plan will assure the maximum science and commercial activity in space, while creating an expanding wedge of human activities that will lead to a prosperous and growing human frontier in space. (It will also save the tax payers a huge chunk of change!)

- NASA should immediately be ordered to begin planning the retirement of the shuttles, and all human oriented shuttle and Earth to low Earth orbit (LEO) vehicle development offices, centers, programs and studies should be canceled as soon as possible.

- Congress should kill such projects as the Orbital Space Plane and its current space capsule program immediately and transfer the $10 billion it was about to waste to a set of new activities to open LEO to the people and new industries that should by right follow our 30 years of federal exploration of this area. To do this, while also seeding the agency's return to real exploration beyond the Near Frontier, the following things should be implemented ASAP:

- The agency should be mandated to begin creating new procedures that will allow it to sign multiple payload and passenger delivery contracts at some date certain in the future, just as it does today when it uses Fed-Ex, UPS or American Airlines to move its valuable cargo and employees around on Earth.

- At least $1 billion of former OSP/capsule related funds should be transferred to the Alternative Access to Space program immediately to begin the re-education of agency managers away from exclusionary cost-plus contracting methods and start implementation of commercial LEO freight delivery.

- A set of National Space Prizes (NSP) should be created. – To incentivize the development of the vehicles needed to serve the former shuttle/OSP/capsule market and to assure multiple players and real competition down the road, several billion dollars of the saved OSP/capsule/shuttle money should be used to fund four/five prizes for the first teams to fly four people (or relative mass) safely to and from LEO at the lowest demonstrated cost, with the shortest turn around period. (Perhaps funded using a portion of current OSP/capsule development money, as a means of helping.)

- To provide an ongoing market for the NSP winners, all federal entities needing access to LEO should be mandated to use their current multi-billion dollar budgets (such as that about to be wasted on shuttle flights) to buy their rides using roughly the same criteria as the NSP. They must begin creating new procedures that will allow them to sign multiple payload and passenger delivery contracts at some date certain in the future, just as they do when using Fed-Ex, UPS or American Airlines to move valuable cargo and employees around on Earth.

- To further assist their new partners in the national space effort, all federal space transportation regulations should be streamlined to allow the maximum freedom of development for the alternative space firms. This includes giving them the same regulatory over-rides now given to government systems such as government space launches, the space shuttles and the airline industry.

- As this space revolution is implemented, near term access to ISS should be purchased from the Russians, using Soyuz, Progress and other very capable vehicles.

- NASA and the Department of Defense should implement a series of X programs in cooperation with the private sector based on the old NACA model of enhancing commercial and military capabilities. And this effort must not be allowed to morph into development programs for government vehicles. Potential areas of research might involve thermal protection systems (TPS), and robust (airline-like) engine development projects.

- We should mothball or give our very capable Russian friends managerial leadership of the current high inclination space station and use the remaining elements still on the ground to build a lower inclination, more commercially accessible station.

- In either case, the ISS management structure on both should be changed to an Airport/ Seaport Authority model, not a scientific institute, which will be too narrow in focus, expertise and bias. A Space Station Authority can do a much better job at creating a safe, efficient and productive environment for all users, commercial and

scientific. This ISSA will be encouraged to lower station costs in all areas of operations, and not just allow, but encourage access to the station and its airlocks by the widest range of commercial space transporters and suppliers.

- All NASA vehicle and habitat development activity should be re-focused from Earth to LEO operations to in-space missions aimed at the Far Frontier, such as a permanent Return to the Moon and the long term exploration and opening of the Martian frontier.

Heavy Lift

If massive heavy lift is needed for such things as supporting a permanent human return to the Moon or a humans-to-Mars initiative, we have two choices. The first is to utilize the existing shuttle infrastructure investment in people, hardware and facilities. The current external tank and solid rocket stacks could be used as the basis of an automated re-usable cargo ship (near term this could easily be the existing space shuttles, as they apparently can be flown remotely) or grown into a very heavy lift vehicle. If this path is chosen, I would encourage the use of the external tanks that it would be carrying into orbit as part of any planned orbital infrastructure.

However, if I am to stay true to the idea that NASA should get completely out of the Earth to LEO transportation business - and that our goal is to grow a strong space transportation industry for all sorts of payloads - my answer in the area of heavy lift is a bit different. As I have been educated over time by my peers in the field on this issue, my preference has become more pure in relation to this cause. I believe the best way to get heavy lift to support a return to the Moon and a human mission to Mars is to have NASA stay out of it entirely and buy the rides in this area as well. Rather than a massive new NASA vehicle development project, the agency and its contractors should instead focus on the development and construction of the habitats and transportation systems it will need on and between those two worlds, and stay out of the Earth to LEO transportation arena entirely.

There already exists capability in the US Delta class and Russian Progress vehicles to loft many tons of payloads to LEO and Lunar orbit. Using the new and exciting concept of on-orbit assembly or in-space construction that the agency has been allegedly learning by building ISS, these components can be assembled into any size needed for either project. Although not available on the scale of a potential automated shuttle derived cargo vehicle, if one considers the development and operational costs of such a brand new system versus the eventual freight bill of a competitively bid delivery to space contract using modified current day systems or those in development already in the private sector, the taxpayers could save millions. Meanwhile, such an approach would continue to fuel, rather than compete with the space transportation industry.

The time is now.

It is time for America to step up and face the future.
Time for the United States to push into a new frontier of technology and leadership.
It is time for the White House and Congress to give the people of this nation a new and positive tomorrow.
It is time to show the world that America doesn't just drop bombs, but can build dreams.

Let's be frank. NASA as currently constituted cannot do the things I have outlined. It is bloated, self preservation oriented, and is spending it's time wasting billions of our tax dollars re-inventing the wheel and re-reinventing the wheel and so on…without knowing why it even needs a wheel, and where it wants to go once it has a vehicle. The agency and its encrustation of existing contractors need to be totally re-vamped. This can be done by Congress and the White House via enacting new policies and changes over time, or by giving the agency a tough clear and hard to achieve goal, which may well force the needed changes. After all, as Kennedy said "we don't do these things because they are easy, but because they are hard!"

Some call for the agency to be shut down, and I admit there are times I feel the same way. The private sector is already beginning its own space program, and the agency, especially its human space flight component, may soon be redundant. One former shuttle astronaut pointed out recently that the next American to ride into space on an American spaceship will be a civilian riding in a private rocket! Think about it! The contrast between the Alt. Space firms approach to space and NASA's reveals a true split in the genetic line of the evolution of human space flight.

Those who lead our nation can ignore this reality, try to stomp it to death, or embrace it, nurture it and leverage off of it for the greater good and glory of all Americans.

The Frontier is Open and On to Mars!

It is time for dramatic action…or the future will pass into the hands of others…

The Congress and White House should unite behind a declaration that the Near Frontier is open for business, and the nation is going to explore and open the Far Frontier of the Moon and Mars…this time to stay! No hesitation, no endless timescales, no wimping out for the greatest nation on Earth. We must do this hard and fast and do it now, and on a very tight and challenging time scale. (Don't tell me we can't do it quickly and well, this is the same nation that went from a standing start to the Moon in under ten years – forty years ago!)

As President Kennedy recognized in the middle of the darkest days of the Cold War, there is no perfect time to do something bold and beautiful. Or perhaps, such times as then and now are exactly the right time to take a stand for what is great and honorable in humanity. If such incredible boldness can be summoned in such a time, then it can be summoned now. And we need it now more than ever. America needs a shining light. The world needs a shining light. Space can be the place where that light can hang for all to see. And now is exactly when such choices must be called out by those of vision.

Within my lifetime I want to be able to cast my eyes upwards and see a string of pearls in the night above the Earth as the first orbital community of Alpha Town celebrates its first quarter century, while glittering lights shimmer at the South Pole of the Moon…as the first Lunar city celebrates its first decade. And shooting like a star across the night, the glow of nuclear motors in the night above, as the first regular space liners begin their service to and from Mars…where a whole new branch of humanity is being born beneath the amber skies of a new world they call Home.