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WHY SEND HUMANS TO SPACE? COLUMBIA AFTERMATH

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Many people ask, Why do we send people to space - especially when it is so risky and so costly. After the Columbia disaster, news crews asked that question to a number of astronauts. The answers given were usually pretty lame. Some of the reasons they cited are not enough for me to support space. So why support human spaceflight? I offer two reasons, inspiration and survival of the species. If we are to survive and prosper as a species we have no choice but to go.

Inspiration

In the school systems students are shoveled large doses of what is wrong with our world today. They hear of awful environmental problems, future shortages of materials and energy, and the potential devastation that modern war and terrorism could bring down on all of us. With such dismal prospects for the future why should we expect teens to work real hard and excel in their studies? Why should we expect them to do anything but cop out and turn to gangs and drugs?

The human exploration of space provides us with hope for our future. Thousands of school children have been inspired by the prospects of space exploration to follow technical careers. Most of these students never go to work for NASA or its contractors. Rather, they go on to become productive people contributing to the economy and well being of society. Those who become NASA contractors often cycle between NASA, defense, and commercial work. These individuals make scientific discoveries, invent new things, innovate new ways to do things, design, engineer, and build important high value products in our society.

The vastness and grandeur of space inspires us all. Space is practically infinite with respect to our limited existence here on Earth. People are excited to learn of the wonders of space. Many people are even more excited to know that people can go there and be part of that. Many people want to go themselves, or at least they like to think that their descendants can participate in this new endless frontier. Exploration is a basic human trait. People need a frontier.

One important aspect of the inspiration of space is practically spiritual. We are a part of this universe. We bring conscientiousness to it. It is through us that the universe may know itself and appreciate its own beauty. Yes you can send a robot camera but it is not the same as sending a person. A camera field of view is limited. Looking at a picture is like looking at something through a soda straw. What had you rather do, surf in Hawaii or surf on Hawaii.com? The difference is huge! We must not rule out the possibility that we are alone in this universe. We may well be the only ones who can enable the universe to experience itself.

Then there is the inspiration of space development and settlement which breaks the old notion of limits to growth. The energy and resources available offer the promise of an everlasting tomorrow on the endless frontier. There is the hope for prosperity, and survival. There is the hope that we can avert ecological disaster on our home planet, divert future asteroid strikes, and spread Earth life through the cosmos. There is the hope that we can bring the gift of life to the cold dead cosmos.

The most important spin-off of manned space flight is not a stickless frying pan, computer technology, or any other material innovation. The most important spin-off is the people who found a new lease on hope for the future. No one has ever attempted to measure the value of this spin-off to the economy, but surely it far exceeds anything we will ever spend on space as a nation.

Survival of the Species

The survival of the species and preservation of Earth-kind should be the ultimate goal of our space endeavors. Space development and settlement offers the prospect of playing a number of goals toward that end. Some of these roles which I shall expand on here are: 1) redundant communities for earth-kind, 2) mitigation of cosmic disasters, and 3) mitigation of ecological disasters.

The Case for Redundant Communities in Space

Having multiple independent communities thriving on other worlds and in free space each with adequate life support systems that would enable them to support themselves would do a lot to ensure our long term survival. Many people have recently become aware that either comets or asteroids crash into the Earth about every 26-30 million years and devastate life on Earth. That this occurs with such a regular periodicity underscores the certainty of our fate if nothing is done.

There are other perceived threats that are much more immediate. Biological and nuclear war offer grim prospects for destruction. There once was a time that we only had to worry about a war between the Soviet Union and the west. As technology progresses the ability to produce weapons of mass destruction becomes more widely available. Now we have learned that a third-world nation, Iraq has produced enough anthrax to destroy the world two times over. Even terrorist groups grapple with trying to attain these capabilities. As time marches on technology and proliferation both increases. Bio and Nanotechnology may pose the gravest threats to our future. Just imagine the day that almost anyone could produce a terrible weapon of mass destruction in a small laboratory, or even in their kitchen. Multiple that power over the billions of people living on Earth and across the spectrum of hatred that riddles our planet today. That is the reason Steven Hawkins has expressed doubt that our species will survive another thousand years. Maybe he was optimistic. If one considers world tensions today along with the pace of genetic engineering and where nanotechnology could go the time span in question may only be a

matter of decades, if that. Given the lead time required to establish a space settlement we would be wise to get started now.

Mother Earth is also capable of serving up mass destruction on a grand scale. Catastrophic volcanic explosions can devastate life on Earth. Geneticists believe that humankind was almost wiped out by such an event 78,000 years ago. They believe that we were down to just maybe 2000 survivors.

It is clear that we cannot trust all of our eggs to just one biosphere. For our sake and the sake of all Earthkind we need to spread life to the cosmos. It has been suggested by some that maybe mother nature created mankind just for that purpose, to spread life to the cosmos. We all know that the life-force has reached into every niche Earth has to offer. Only we can satisfy the desire to carry that beyond Earth. It is time to step up to the plate and do what we can uniquely do for life in this universe. This higher calling alone should justify any and all expenses toward that end.

Mitigation of Cosmic Disaster

If we do not venture out into space, and even if we manage to find the means to deal with our own self-destructive tendencies the fate of mankind would still be sealed with utter destruction by the comets and asteroids. If we do nothing but sit on this third rock from the sun one of those objects will check us out long before the sun becomes a threat to this planet. There exist technical solutions that can enable us to avert this type of disaster, if only we develop them. Many of these same solutions also promise the means to enable us to tap into the resources of these heavenly bodies, to enable us to establish an economy in the boundless skies of space. If we are to survive this is not an option.

It must be noted that the occurrence of impacts that could destroy a city are much higher than the occurrence of impacts which could wipe out a civilization. The probability of these type impacts is in dispute. Estimates range from more than one per century to one per millennium. A century has not passed since the 1908 Tunguska explosion leveled 800 square miles of trees in Siberia. Such an impact over a city would make 9-11 look like a Sunday school picnic. Damage would be in the 100's of billions of dollars, not to mention untold loss of human life. In a world where so many nations are getting nuclear weapons, where nations like Pakistan and India are on the hair trigger for war we must consider that one of these events could trigger a nuclear war. Even one of the much more numerous high atmospheric explosions, such as one that occurred over the Mediterranean during one of the high points of the Indian - Pakistani tension, could trigger a conflict. It may only be a matter of time before one of those objects explodes above a critical tension spot.

Some estimates conclude that every 3,000 to 5,000 years an impact occurs in one of Earth's ocean basins large enough to create tsunami's over 300 feet high, moving at the speed of sound in water which could ring that ocean basin with absolute destruction. 90,000 years ago a tsunami deposited coral over 1,000 high on the Hawaiian Islands. Given the vast number of

people living near the Oceans 100's of millions, maybe even a couple of billion people could die. Property damage could be in the tens maybe even hundreds of trillions of dollars.

The problem with these smaller impactors, especially the city buster class, is that they are extremely difficult to detect. Currently no one is looking for anything under one kilometer in diameter. Even if one did map out all the asteroidal type bodies capable of causing this type of damage there is no way one could map all the potential cometary sources on long orbits to the Kuiper belt and beyond to the Ort Cloud. To avert this type of disaster some type of rapid response needs to be established, always on the ready to go and protect life on Earth. There are numerous reasons I assert that this should be a manned capability. (I shall go into these at a latter time. Some of you have already seen my charts on this subject.)

The price for space development is very small compared to the potential cost just one of the small impactor could incur. This alone establishes ample reason to send humans beyond low Earth orbit. The flip side of this coin is that the same technologies that could avert disaster could enable us to tap into asteroidal resources. Indeed this could be the key that would make possible independent communities beyond Earth. How can we afford not to establish these capabilities while the time is still good?

Mitigation of Ecological Disaster

Our expanding civilization places an increasing burden on our planets ecology. As we dig and drill deeper in more remote places we put more ecosystems at risk. Even then, eventually we may run into severe limits which could permanently endanger our economic well being. If civilization finds itself running out of resources humankind is more likely than not to do an Easter Island number upon our planet. In desperation people will strip the forest and consume everything in site in order to maintain short term survival. Many environmentalist would have us shut down our technological civilization because of the burden producing product places on the environment. The problem is that would just accelerate the day that the hordes turn on the environment to subsist.

By tapping into the resources of space, and using space derived materials technology we may be able to mitigate the effects of the horde turning on the environment. By learning how to build self-sustaining biospheres beyond Earth we may learn how to keep our planetary biosphere from failing. Ultimately the lessons of space colonization may be the saving grace for life on Earth.

If we can find a way to tap power from space, that could help too. Consider the price we pay for oil. It is not just the price we pay at the pump. How much did it cost us during the Reagan Administration to maintain a fleet in the Persian Gulf to protect Kuwait? In those days we were worried about Iran. That was plainly done for oil. Then there was the first Gulf War. We next found ourselves maintaining no-fly zones over Iraq and military units in several neighboring countries of 12 years. Now we face another Gulf War. Many think these Gulf Wars are fought for oil. Our troops in Saudi Arabia is what made Osama Bin Laden mad at us. We defiled his

holy homeland.ç The destruction on our World Trade Centers and the impact on our economy cost us dearly.ç I have heard figures of up to a hundred billion dollars.ç Then there was the war on Afghanistan, and our war on terrorism.ç How much did all of this cost us, 300- 500 billion dollars?ç You didn't pay for it at the pump.ç You pay for it in taxes and you will pay more in higher insurance rates.ç What about the potential cost of global warming.ç It is debatable if global warming has actually began.ç But just how much carbon dioxide can we continue to pump into the atmosphere before it does.ç No one has a clear answer.ç If global warming does occur the cost of lost coastal areas could be in the trillions of dollars.ç When you factor in all of these cost, solar power from space starts to look a little more attractive.ç Again, how can we afford not to go?

All Taken Together

When you look at the different aspects of the survival of the species and the need to inspire our people one could envision that there may exist integrated approaches to dealing with all of these matters.ç The price tag may sound high at first glance.ç When compared to the alternative, in just any one of the cases mentioned above it should look like a bargain.ç If we choose not to continue human space flight then all is for naught since civilization will be ultimately doomed.ç If there is no point to anything then the kids who cop out and turn on to gang life and drugs are the ones who got it right.ç Then you should feel justified in tearing down or destroying anything you desire.ç After-all - there is no future in it.ç The moral implications of discarding the future, of not embracing the future are horrendous.ç I equate it criminal ignorance.

The future of manned spaceflight is something we MUST fight for.ç We have no other choice.ç Unfortunately the number of us who can see this are few.ç It IS up to US to spread this message.ç The fate of humanity, indeed the fate of Earthkind is in our few hands.

The real reason to go to space is to provide inspiration to the people and survival of the species.ç After that, spin-offs and all the other cited reasons - they are just gravy!ç Let us work together toward that future, and may the gravy flow!

My Story - My Career as a Space Spin-Off

When I was in grade school in the late 60's I thought when I grew up I could take my honeymoon on the Moon.ç I wanted to be a scientist.ç The kids in grade school called me 'The Mad Scientist'.ç I started to read about pollution every week in my Weekly Reader.ç Then the Apollo program was canceled.ç It was announced that we would build a space shuttle which would never go beyond low Earth orbit.ç To me the space age was over.ç I read more about pollution.ç I was doing quite well in school.ç I only spent 12 weeks in 7th grade before getting moved up into 8th grade.ç Then I read about the Meadows and Meadow book 'Limits to Growth'.ç They used a computer model to prove what the Weekly Readers had been telling me all along, the world would fizzle out by the year 2000.ç Even Jacques Cousteau talked of the

seas dying by the year 2000 leading to global suffocation. I was a member of the Cousteau Society and received all of their literature. It was very negative. No longer did I want to become a scientist. I just wanted to escape society and live off the land in the wilderness. My grades plummeted. I built muzzle loaders, practiced with bow and arrow, built shelters in the woods, and studied which wild plants I could eat. I had a huge wall map of British Columbia and maps of all the freight train routes to get there. I practiced hunting and camping skills. I practiced with throwing knives and learned how to broad jump a creek with a loaded muzzle loader.

I had given up on the world. My only objective in high school was just to pass so that my mother would be reasonably happy. Then I would be off to the wilderness.

In the summer before my senior year I found a book review in the "Huntsville Times" about T.A. Heppenheimer's "Colonies in Space". Considering that the space program had been whacked nearly to death I thought that the space settlement concept was at best an extremely remote long shot. But maybe it just could work. I was excited to know that a number of people were thinking in these terms. I had seen O'Neill concepts a couple of years before in "Popular Science" or "Popular Mechanics". But I did not think anyone would give it a second thought. Now I discovered that there had been a summer study. That a number of people were interested in this. Suddenly there was a glimmer of hope for the future. There was something worth fighting for. This turned my whole life in an about face. I joined the space movement and eventually graduated Magna Cum Laude in Electrical Engineering, in spite of the fact that I was a single parent at the time.

Since I have worked on the space station program on three different occasions. I also have worked on defense and in commercial industry. Presently I am working on search and rescue helicopters. If it had not been for a glimmer of hope for the future offered by the vision of space settlement I would have been a rather anti-social not- too-productive lost individual, that is if I managed to survive my intended trip into the wilderness. I consider my life a space spin-off. I am ever grateful to those who inspired me.

Ad Astra!