

**ALPHATOWN:
THE FIRST HUMAN TOWN IN SPACE**

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Introduction

America Needs a New Frontier: We are approaching a new millennium, and we don't know what awaits us on the other side. As a people, we have created the greatest civilization of all time, yet we wonder aloud as to our destiny, and look to the future with apprehension. The answer surrounds us, it would shout in our faces if it had a voice. We even took our first few steps into the domain where it lies, but then we turned away to wander lost between the past and an uncertain tomorrow.

Space: After more than 30 years, space *should* be home of the leading edge of the American dream, a thriving economic and social arena, a place of hopes and vision for all humanity. But this is not so and may never be. Rather, our timid forays there are perceived as expensive and irrelevant luxuries. The reason is simple, our current space program is not and has never been designed to actually open the frontier to those who might realize its full potential, the people themselves.

To put it another way, after thirty years and billions of dollars, you nor anyone you know, nor their children, is closer to being able to go into space in their lifetime. When asked to compare what they would spend on our space program as opposed to other federal expenditures, most people put space last. They are not buying because they are not excited, not included, and they do not see where the program is leading at a fundamental gut level. It has no relationship to them or their children, it provides no hope of participation and addresses none of their perceived physical, economic and spiritual needs.

Let the People Go

To those in the Space Frontier Foundation the answer to this ironic dilemma is obvious and power ful. Let the people go. Opening the frontier must become the central activity of the nation as soon as possible. We can use this great tool called our space program, we can rework it so that it leverages large numbers of us into the frontier, and we can use it to pry the untold riches of space from a harsh and unforgiving place and make that place a human domain.

In other words, the federal government's role in space must be to help Americans begin their new national mission, the opening and settlement of the frontier.

Our current space program is not designed to do this. Therefore, we must change it. From the top down and the bottom up a new mission for the space agency must be created. It must be restructured to create an ever larger wedge of civilian activities and it must have as its explicit and operational goal opening the frontier to American enterprises as soon as possible. And as the centerpiece of that program we must transform the federal building in space we once called and will call again "Alpha."

Government's Role on the Frontier

Throughout history governments have often placed their own facilities along their frontiers. From major cities of Europe born outside the gates of early Roman forts, to towns all across the American West, the catalyzing effects of these tax funded government facilities on their respective frontiers is obvious. Governments have routinely worked through their military, with dominant religions and via quasi private corporations to establish facilities of many sorts along their frontiers. These have often functioned as the nuclei around which towns have grown. Staffed with government employees who purchased all they needed to live from those around them, these outposts functioned as micro market makers, creating demands for a wide range of goods and services, the purveyors of which also being the customers for each other.

As an official government operation, the forts had to be connected to their capitols, and transportation routes were often established or improved at government expense that could be safely used by all. Last and by no means least, the official extension of confidence in their dominion exemplified by the fort gave all interested in trying their hand in the wilderness official permission to go for it. We believe that if it is to be relevant to our future, the International Space Station (ISS) can and must become the heart of just such a new town on the frontier of space.

Alpha Town goes far beyond anything space policy planners have ever seriously considered, creating an overarching new mind set for the entire human space program and it creates a new relationship between the Federal and private sectors in LEO that is easy to understand, to explain, and lays out a new future path for human space activities that is inclusive, not exclusive.

Whereas many station proposals deal with the "how" when it comes to private and commercial activities, the nation has not yet bought into the "why" in this context. Alpha Town answers this question. It comes directly from our American heritage and feeds directly into our national hunger for a purpose in the new millennium. What follows is a set of Alphatown principles designed to work in concert to create the first growing and economically viable human town on the new frontier.

Opening the Roads

If you can't get people and goods to and from a place cheaply and easily, it is economically useless. It is no accident that our society is characterized by a highly efficient transportation system. The highways that provide us with quick and easy transportation to and from the workplace allow us to increase both our income and the wealth of the nation. Thus, our first need is for low cost and reliable mass transportation to and from the frontier for people and goods. Low cost access to the old west was accelerated by federally developed roads, canals and railroads, upon whose completion users began paying fees in the form of taxes and then competed for freight and passengers. After early support through favorable regulations and even some financial support, the government's role then became that of traffic cop and safety enforcers. Cheap Access to Space (a phrase coined by the Foundation) can be achieved through a similar relationship, based on the mutual needs of government and free enterprise.

The Era of National Spaceships Must End

It is absolutely imperative that NASA gets out of the space transportation operations market. Unlike the space shuttle program, the X-33 Reusable Launch Vehicle (RLV) effort must not be allowed to develop into another high-priced government system. They should be free to operate by commercial rules, free from NASA managers and the paper work they bring with them wherever they go, free to explore new markets. The owners should be free to carry any payloads they chose, at whatever prices the market will bear. The market must be allowed to decide the winners in space transportation. Once we begin Alpha Town there must be no more transportation monopolies.

To help industry develop the fleets which will compete for travel on these space lanes, the priority of the commercial RLV effort must be raised to the top level at NASA, and not just rhetorically. NASA should use some of the money saved by getting out of space shuttle and station operations to build a fleet of widely different X-vehicles with the targets of ease of use, reliability and low cost operations. In the 1960's we produced several entire systems from scratch in less time than that allocated for just the final phase of the X-33 program. Surely the agency can do as well thirty years later if the money is there and the goals are clear. Funding should increase immediately, goals raised and schedules shortened.

Once out of the truck driving business, the government's role in space will be to catalyze the creation of a transportation corridor by using its purchasing power. Such use of the state's market making abilities was employed in the early days of flight, when the US kick started the air industry by subsidizing the delivery of airmail. Just as in that case, the market created by the ISS's needs alone is not large enough to drive major reductions in the unit cost to orbit. But each flight can also carry commercial payloads, and as volume grows, costs will drop. Again, we must look at the fully operating town down the road a few years for a full payoff of our national

investment. Yet it is a beginning, and it is understandable by the public and the stockholders of the companies who must build and operate the rockets needed.

Therefore: Alpha Principle One:

After completion of the assembly phase, all US government transportation needs to and from Alpha will be competitively bid for by US private firms.

Preparing the Land

In Low-Earth Orbit we will not discover raw land to develop. This means we have to create our own "land" there, and that means pressurizable volume. From hangar to closet, if it will hold an atmosphere, propellant or equipment, it has great value. Thus, every usable piece of volume creating hardware we carry into space becomes an instant asset, even if on the Earth it would be seen as expendable. Much so called "space debris," such as discarded rocket stages, have a high value for in space use, if the costs of carrying them there are included.

We must create legal and financial incentives that encourage the recycling of all materials launched into space and the creation of new "land." For example, in the past, as the Russians have upgraded their stations, old facilities have been essentially scrapped. This is an incredible waste. Other examples are the Space Shuttle's external tanks, containing the volume of up to a seventeen-story building, and now flown 98% of the way to orbit simply to be trashed over the Indian Ocean. They represent true leverage for the new mission of Alpha. Although there are large hurdles regarding orbital inclinations, safety and available propellant on over manifested station flights, if we can salvage even one of these behemoths it would radically increase our usable "land."

Whether recycled or built and launched, any new "land" created in space will need early funding and development work that could be carried out in a cooperative arrangement with the government, much as some infrastructure is often created by local governments to encourage the building of commercial enterprises such as industrial parks, hotels or resorts here on Earth. Also, much legislation will need to be created (and some older laws killed) to enhance the prospect of those who chose to "develop" new lands in space. We must follow our very successful terrestrial real estate models, where communities often provide large tax abatements, tax-free zones, investment credits, a user-friendly regulatory environment and other incentives at the start, to lure companies to build.

Therefore: Alpha Principle Two:

The government will put in place legislation to actively encourage and regulate the development and recycling of all space assets.

Building the Town

The needs of government-funded researchers will soon outstrip the capabilities of the ISS. For example, the conflicting demands for stability in micro gravity research and high levels of other activity on the same physical structure suggest that some types of incompatible work would best be done off-site from the government's facility itself. Since our goal is not to grow a larger and larger federal building in space, this need must be accommodated by the government's leasing of facilities from those willing to build and fly dedicated facilities like the now double sized Space Hab module and the previously proposed Industrial Space Facility.

The Alpha Town concept also encompasses and greatly expands the concept of the ISS as the precursor and eventual hub of a business park. Towns are much more than just their industrial bases, and Alpha Town can be no different. Resort hotels are not usually built in industrial parks; people do not live in such areas, nor is building an industrial park alone an uplifting goal for a great nation. Just as here on Earth, Alpha Town will host all sorts of activities in all sorts of facilities, a whole that is greater than its parts.

There are many proposals for building orbiting hotels and tourist facilities in space, a potentially huge market. Although space traditionalists scoff at such ideas, tourism and entertainment are among the largest moneymakers on the Earth. (Disney, Vegas, and a few Caribbean nations come to mind . . .) This potential market needs to be studied and developed, and given the support it needs to grow.

Therefore: Alpha Principle Three:

All expansion of habitable physical structure of the US portion of Alpha will be commercially leased from US private firms.

Turning on the Lights

We have the land, we have a transportation system, now we need energy. (And the potential for a major cash cow down the road would be nice!) The need for electricity in space will be a major show stopper early on. As Alpha quickly becomes covered with gossamer sails of solar cells, it will become a space pilot's nightmare to dock with the station without blowing away a few million dollars worth of equipment. At the same time, each and every other facility in space will need considerable power. Yet, large arrays of solar panels in low Earth orbit also increase a facility's drag, requiring expenditures of station keeping propellants, which is expensive.

These needs converge nicely with the need to explore and develop what may become Alpha Town's equivalent of an oil strike . . . space generated power, beamed to the user. With Alpha as first a test bed in a two ended system, then as a customer, a well-placed constellation of free flying or tethered Solar Generating Satellites (SolSats) in higher orbits will remove the need to further encumber facilities in Alpha Town. Interestingly, there are many proposals for deep

space missions to fly on beamed power, which can be produced at the same facility. Thus, one exciting possible customer will be exploration spacecraft powered by beamed energy technologies.

As the other Alpha town projects come on line they can also begin to buy electricity from the SolSat. They will save millions of investor dollars on structural enhancements, complicated docking maneuvers and station keeping as the technology matures in the safety of the space environment. Once the technology becomes routine and the commercial operators of the SolSats develop expertise and credibility they may well find profitable markets to sell the first beamed energy to Earth.

If the terrestrial energy market can then be pried open by competitive prices, we will have hit the jackpot. Obviously, planning must begin now to use Alpha as the test bed and proving ground for these technologies and foster the development of a diverse space energy industry.

Therefore: Alpha Principle Four:

All additional energy requirements aboard Alpha after assembly is completed will be supplied by commercial vendors.

A Revolution in Thinking

The Alphatown concept is not about hardware. It is about a mind set. The details are irrelevant. The particular technologies do not matter. It is not a destination or facility, it is an intellectual framework around which we build the dream of human settlement on the frontier. As opposed to a boring Antarctic style facility on the edge of nowhere and going nowhere, it will be a symbol of hope, the seed corn of a new civilization.

The Foundation believes that it is imperative that this new common sense approach is adopted. Using the town model so familiar to legislators and business people, the institutional, regulatory and financial tools and incentives one might apply to encourage economic growth here on Earth immediately suggest themselves, and can be applied to this new domain.

Once planners and future residents of our new town agree on this concept we can then sell it to the world, for it is a very powerful idea. People come from towns, they live in them, they raise their families in them, they know without thinking how they operate, the social contracts that make them work and they know their potential. But the powers that be cannot pick and choose from it. It is all or nothing, just as a town with no roads or no energy or no buildings is not a town. It is the sum of the parts we must be focused upon. If the rhetoric and not the reality is all that is adopted and the government continues either controlling or killing all human space activities not their own, we can kiss the frontier good bye for another 30 years.

The Space Frontier Foundation believes that this is the only justification for the International Space Station that is supportable in the long term by the American people. If Alphatown is

adopted as our model, the federal space station in the year 2010 will not be teetering yet again on the edge of the budget knife, but will be the heart of our first new town in space. To Americans, Alpha's role will be obvious. To the world, Alpha Town will be seen as a symbol of America's commitment to lead them into the future.

It is time to understand the simple truth about space, that it is not a program, but a place. In fact, it is the next place for human beings to go to, and we must get on with the job, celebrate the dream, and rebuild our federal program to support that goal while doing all we can to aid those who would build the first space-based Fortune 500 companies of the next century. As the shopkeepers and settlers and entrepreneurs and industrialists build this new extension of our domain just a few hundred miles overhead, NASA and the other space agencies of the world will be able to use the funds they save from getting out of operating the buildings and trucks of the town to go to the far frontier and push outward, to Mars, Europa and beyond.

Within a few years after the town begins to grow, it will not matter whether the government station even exists as a taxpayer-funded entity, its job will be done. Alpha Town, "First Town," will be a growing and vibrant community, holding out the promise to a child on Earth that with hard work and perseverance she might be able to go there or to the worlds opening beyond and carve out a new life on the frontier. It will be a gleaming star of hope for Americans and all the people of the world, twinkling overhead in the night. And anyone asking where this nation is going will simply have to look up to find the answer.....