

# **SPACE MEANS BUSINESS**

Remarks by

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Thank you for your invitation. It is my pleasure to be with you.

I will talk today about space as a business with an emphasis on the emerging business of private human spaceflight.

I am not a business person, so I am unable to speak as a player. But I can offer you the perspective of the FAA official on the field with the rule book in her pocket. It is a very good place to see what's going on. And a great deal is.

Let me explain.

## **LAUNCHING THE 21<sup>ST</sup> CENTURY**

When I spoke at the Space Business Roundtable in 1999, Space Adventures Ltd was only a year old.

In 1999 Bigelow Aerospace was founded. So was XCOR. At that time, there was no Armadillo, no Blue Origin, no SpaceX or Virgin Galactic.

The X Prize had not been won.

The Commercial Space Launch Amendments Act of 2004 obviously had not been written. The FAA was not yet the agency in charge of private human spaceflight.

There were no regulations for experimental permits governing the testing of suborbital Reusable Launch Vehicles. There were no regulations governing crew and passengers on suborbital flights. Between 1999 and today there have been nearly 200 expendable launch vehicle launch attempts.

As the result of a steady and durable momentum ... matched to a growing awareness of opportunities in space ... all those things are now realities.

Spaceflight is changing. The wide circle of activity is expanding. Future vehicles will not all have "Property of the U.S. Government" stamped on them ... whether they fly from the States ... or from states overseas.

The fact is there is a private industry out there building the next epoch of transportation.

There are no parallels. Nothing compares. The new civilian spaceflight business is altogether different from predecessor carriers.

The genus might be familiar, perhaps the species, too. But this is the first time they've appeared together. In Latin ... *Volatus per inane homo privatus*. "Spaceflight. Human. Private."

Whatever space has been up until today, it is an emerging business now. The evidence is growing.

### WHO SAYS ? THE AMERICAN ANSWER

In April of this year, I attended a Space Investment Summit in New York. As I speak, another Space Investment Summit is underway in San Jose, California, where entrepreneurs have been asked to submit space commerce business plans.

It is Space Angels at work to expand the definition of space to include other kinds of investments perhaps currently less exotic to the tastes of investors. That's a good thing. Whatever it takes.

But there should be no question about the underlying asset here, and that is private human space flight. It is the new business driver.

I certainly heard that message during the Third International Space Symposium on Personal Spaceflight at the X-Prize Cup event in October.

The people who gathered there are as eager to get a sound financial return on their investment as anyone else. And they recognize that the business of space is a diverse world. But I had the strong sense among those people that the important things they were doing ... work with serious profit potential all its own ... still amounted to a prelude, the opening acts for the main attraction.

I will give you a space angel example.

In July, when the internet carried reports of Boston Harbor Angels investing in XCOR, one of the investors was quoted this way. "XCOR Aerospace," he said, "has a team that understands the value of staying focused." He went on to say that the company had presented "a strategy to align all activities toward a specific, attainable, and profitable set of commercial products and services."

It is not unlike saying we will do what is required on the way to what is desired.

One thing for sure, the commitment is out there. I have seen it for myself. I see it all the time.

This year and last, for example, the FAA hosted a summit for private entrepreneurial Reusable Launch Vehicle Developers to meet with Air Force representatives. The purpose was

to explain the quality of their hardware, the ability to deliver, and the potential for lower private sector costs. Private sector. That means space entrepreneurs looking to serve customers. Sounds like a winner to me.

I heard the message again this August at a Workshop on the Future of Space Commerce sponsored by the Center for Space and Defense Studies.

Look around.

- We all know that NASA is offering private space prizes in the form of COTS and the Lunar Lander Challenge.
- Google has announced the Google Lunar X-Prize to put a performing rover on the moon by the end of 2012.
- The Colorado School of Mines has organized a program, the “Eighth Continent Project” to promote the development of space-oriented companies.
- Bigelow Aerospace has offered a contract worth \$760 million for the development of a commercial space vehicle to take people into Earth orbit.

For all the years that people have wanted to do this ... to make spaceflight a private enterprise ... they are finally getting there. Vehicle developers and potential vehicle users alike understand that commercial space services extend the promise of more direct, less expensive access to low-earth orbit.

It is a message that should invite investment.

It is also a message that others understand, too ... if not exclusively as a commercial effort, certainly as a powerful instrument to command the notice and regard of others.

### WHO SAYS? THE OVERSEAS PERSPECTIVE

In the last two years I have spoken about commercial space at conferences in both Japan and China. I came away from both events convinced they know a good thing when they see it. So does Russia.

Japan has a satellite orbiting the moon. China does, as well, and has sent men into space and spoken often of its ambitions to explore. Russia's proud history in space is reawakening with plans for new launch sites and a partnership with India for unmanned moon flights.

It is fair to ask if those are commercial or state-sponsored efforts. Right now, it doesn't matter. What matters is that other countries with skill and initiative are involving themselves in spaceflight. What once was the exclusive domain of two nations is now within the reach and the interest of many flags.

It is something I have seen first hand during a trip to French Guiana.

A year ago this week I was there at the Arianespace facilities to watch the launch of a pair of American built satellites. It was as professional an enterprise as you can imagine by a company that has become a world-recognized leader in commercial space operations. And now the Astrium subsidiary of the European Aeronautic and Defense Space Company has expressed a strong interest in space tourism. In fact, they were in my office just a few weeks

ago talking very specifically about becoming a competitive player in the evolving space tourism industry.

There is more.

This September, a space Congress in India attracted 2,000 delegates to discuss what the sponsors termed, “multi-billion-dollar business opportunities in satellite launches and broadcasting and telemedicine.”

The European Space Agency is calling for proposals from entrepreneurs on how space technology can be turned into business opportunities in non-space sectors. They have three of what they term “Business Incubation Centers” to help promote the initiative.

In England, the International Space University has established an Institute of Space Commerce.

All these things are far more than a wishful litany.

This list is a product of government and corporations who often back their choices with capital. The American private enterprise entry into space ... together with this litany of world interest ... represent the collective evidence of an idea climbing on the horizon of commerce telling people world wide that space is where the future is.

### SOME BUSINESS BASICS OF SPACE

Since my subject is, after all, business in space, let me give you some numbers.

In 1998, worldwide space revenues were \$97.6 billion. For 2006, the Space Foundation reported worldwide space revenues of \$220 billion and that by far the largest sector was commercial space.

I believe investors would call that serious money in any business.

What about those investors? What are the fundamentals of their interest? What can entrepreneurs tell them about the private space business?

To begin with, potential investors reasonably will want to know what the term “space business” means. There is far more to the business, of course, than fire out of a tube. But does it mean rockets? Payloads? Manufacturing? Infrastructure? ELVs? RLVs?

In fact, while private human spaceflight is, as I have said, a central goal, the space business is everything I have mentioned and it will be all those things and more as it grows.

Potential investors will also want to know if there is really a market for space services.

Good question. If your plan is to ship tennis balls to Wimbledon, a rocket will likely not be on your list of options. But rockets drive their own markets. Listen to NASA’s Mike Griffin: “We didn’t just create new jobs, we created entirely new markets and possibilities for economic growth that didn’t previously exist.”

What applies at NASA is at the heart of commercial space.

It is almost axiomatic that there are plenty of things that have not yet been done by private enterprise because they have not had the opportunity to work in space.

That is changing.

With affordable space access, business people will create markets. They will look at this new financial opportunity and say something like this: "I couldn't do that before because I didn't have access. Let me think about this and then I'll show you what I can do."

Those last 14 words ... "Let me think about this and then I'll show you what I can do" ... are the most powerful words in the history of American business.

- *There is money to be made in space.*

Once private enterprise in the United States sees a money maker, it goes after it. In the ELV world, Boeing did. Lockheed Martin did. They sold the services of their vehicles and because they did, we take for granted internet correspondence with New Zealand. We listen to XM and Sirius radio in our cars. We can talk to friends or family on Guam or in Tokyo or watch live TV from Cairo.

- *There is money to be saved in space.*

Space work responds well to business efficiency on a number of levels. Business techniques create order and eliminate waste.

Business tends to seek the most direct path to success, working hard to simplify and assure dependability. Business clearly understands economies of scale, the payoff for volume, and the advantages of marketing. Smart business defines prudent finance and how far you can make a dollar go ... which, in this case, is literally a very long way indeed.

In short, what we have here is a complex exercise ... launching rockets on a frequent basis ... combining with disciplined business practices to produce a new commercial alloy for the 21<sup>st</sup> Century.

And, of course, in the business of spaceflight, it is also understood that the chief operational asset is safety.

- *Safety always has the deciding vote.*

In space, business understands it must act as a safety sentry because risk will always attach to rockets. The industry I have seen is so radical, feisty, defiant and committed it has no problem whatever with testing a vehicle and concluding: "Just a minute. We're not ready yet."

It seems to me that is the kind of sound judgment an investor would want in the lead of a risky effort. These private space entrepreneurs are many things. One thing they are NOT is reckless. This may be a business with adventure written all over it, but it is a business conservative down to the smallest wire.

I have said there is money to be made and there is money to be saved in space.

- *There is also work to do.*

NASA's focus is shifting to exploration. When it comes to low earth orbit, for the foreseeable future, NASA will be aiming higher. For now, private entrepreneurs will focus on low earth orbit and ways to make it work for customers.

Until now, governments did that alone. Now business will gradually become more involved and customers will set the agenda. The competition of private enterprise will determine the prices. The opportunities will lengthen and broaden into market-driven enterprises of science and technology stretching all the way from health research to imagination-knows-where.

Today's space business person has a brand of determination to put a down payment in the field, to do it for less, do it smarter, and to brazenly do it outside government with a new style of efficiency and agility. They know breakthroughs mean business, and space is a field of virtually unlimited breakthrough possibilities.

- *Is it important that we do this?*

Is it important to the country to do this well, to do this our way, to set the standard, to show again what private enterprise can do?

Let me put it this way. In today's fractious world, in today's economy where there is no word in the language robust enough to describe the intensity of world economic competition ... reputation and prestige count. A lot.

The United States has built a reputation for excellence in science ... by being excellent, by being the best.

We were pioneers in manned spaceflight. We are leading the way to private human spaceflight. In so many areas of spaceflight, we have earned the right to be known as the best. We have more to earn.

It is vital that we approach future space enterprises with the same spirit of pride in our work and confidence in our leadership.

I do not believe we should ever try to disguise our ambition or restrain our dreams of space business, space adventure or space advancement.

## UNVARNISHED

Let me round out this talk about space business with some things often left unsaid.

Investors in the business of space will be betting on the unknown, the uncertain and the unexpected ... in return for the unbelievable.

Elon Musk of SpaceX calls this "a very difficult business." If you visit the Blue Origin website, you will find these words: "You must have a genuine passion for space. Without passion, you will find what we're trying to do, too difficult. There are much easier jobs."

President Kennedy said something like that at the beginning of our trips to the moon.

I would tell any investor to look closely.

Space is a business with a split personality.

One side is vision. One side is apprehension. Both are at work at all times. Get there. But get there safely. Do it now. Do it right. Lives depend on it. So does your business.

This unending creative tension ignites the spark that drives an industry fixed on the dream of private human spaceflight.

At this year's X-Prize events, the President of Arianespace did not hesitate to address the subject of question marks. He said that back in the 1980s, "a lot of people were questioning our business structure ... how we were going to make money. But here we are today, over a billion dollar a year enterprise."

So there is risk here. There is also reward.

I have said in the past that it is not so much that space is changing hands. These days, there are just more hands. I now believe it is more profound than that. We are moving from international curiosity to international competition.

We must be in it. I believe we must win it. I believe private enterprise must lead the way.

Ultimately, the people to make the best business case are, of course, the business people themselves. But the one conclusion that seems to surpass challenge is that, in the United States, the future of space ... low earth orbit space ... depends on private enterprise.

Now I realize the Earth itself is the only real crystal ball we have. I also understand there are many different vantage points to read our future on it and in the space around it.

## PERSPECTIVES

So, as I prepare to end these remarks, let me give you a pair of business-related perspectives right down here on solid ground that I believe are worth listening to. And then I'll offer one more that speaks to the broader picture.

In October, retired Coast Guard Vice Admiral and Deputy Secretary of the Department of Transportation, Thomas Barrett, spoke to the Commercial Space Transportation Advisory Committee. He said he was confident that "America's creative entrepreneurial companies can deliver the safe ... and affordable quality that will make private human space flight a good investment ..."

Two months earlier, Dr. Neil deGrasse Tyson had written this in a *Parade Magazine* article called "Why America Needs to Explore Space": "Science and technology are the greatest engines of economic growth the world has ever seen," he wrote. "We are a sufficiently wealthy nation to embrace this investment for tomorrow – to drive our economy, our ambitions and, above all, our dreams."

Those two observations taken together are eloquent wisdom reminding us all that space is permanently part of our future and we must make the most of it.

I will stop right here ... even though it is an equally good place to begin.

But before I sit down, please listen to just one more writer. His name is John Tierney and he wrote this about space investors in the New York Times this September: "This is a once-in-a-planet's lifetime opportunity to win eternal renown – and perform a lasting public service that won't be done by any public agency."

Those are words worth thinking about. And worth remembering whether you are in the field of business or the field of dreams.

Thank you very much.