

LUNCHEON PRESENTATION:

**THE SPACE REVOLUTION: Chapter 3**

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*Introduction: Lee Valentine: "It is my great pleasure to present Rick Tumlinson. He's been a longtime friend of the Institute. He's a founder of the Space Frontier Foundation, co-founder of MirCorp, and he's currently haggling with NASA on standards for trips to the ISS. He's got an enormous quantity of energy. He's the closest thing we have to a revivalist in the space movement, and that's something we surely need. So I give you Rick Tumlinson."*

Good afternoon and welcome to the revolution. We've had a lot of fun recently with Mr. Tito, taking on the powers that be and knocking on the airlock up there at ISS Alpha. I know there are people at NASA who are having nightmares as they see that little face of his floating towards them through the modules...not knowing what to do about his being there. It reminds me of a great *Simpsons* episode, where he flew in the Space Shuttle. At one point Homer's flying loose through the Shuttle and his momentum is carrying him towards the experimental ant farm, and the ants are panicking as this big face gets closer and closer - screaming at each other, "Save the Queen, save the Queen!" it must have been similar for NASA's people as Tito approached.... "Save the program, save the program!"

Well, NASA is working on some standards for civilian visitors to Alpha. Ironically, even as we were blasting NASA for their mishandling of this thing, we were actually working behind the scenes with people at headquarters to try to set some standards so they could have a roadmap to approving his flight. So the same day, for example, that I issued a press release calling them idiots for turning him away from using the training facility at Johnson Space Center, we were on the phone, and I'm telling them, "Well, that's for internal consumption, but we understand your dilemma." Just as politicians send out media for the folks back home, while quietly working the issue behind closed doors.

We kept talking with them and, in fact things are moving. I was at JSC last week. I've seen the new standards; I may be one of the only few people outside of the organization that's seen them. They're not unreasonable. They wanted more time, but Mr. Tito made the decision to fly now. He might have waited till October, taking a risk he might not have been able to fly or they might have organized against him, who knows? There were a lot of issues to consider. There's also a lot of people saying they signed him up, etc., etc. I want to say a lot of us were involved. Chris was involved in the study early on to put him on ISS, then he shifted towards Mir. I was the one who signed him to go to Mir. Then he went over to ISS as was outlined in his contract with MirCorp,

should the Russian station be unable to host him. The fact is the person who put Mr. Tito on ISS was Mr. Tito, and whoever has his picture on million dollar bills.

So we're working on standards, although, as far as I'm concerned, by the fact that they flew him the partners have now set de facto minimums. However, I have recently worked out some quick and easy standards, and I want to present those to you right now. This is what I call the Tito scale, and from now on we'll be measuring capability of the ability to fly in space by the Tito scale. So, let me roll them out in front of you privileged folks. These are the new human spaceflight standards I've come up with. They're part of Rick's "Handy Dandy Guide to Space." First is a Vomit Comet flight - that's a one-quarter Tito. Then you've got your sub-orbital flight, that's a one-half Tito. You've got a Shuttle or Soyuz flight, which would be a full orbital one, and that would be a three-quarter Tito. Next you've got a Station visit of one week, that is a one-Tito mission. If you're a station visitor for one month or more, that would give you a two-Tito on the scale. A Station stay, as in a researcher, would be a three-Tito. A Shuttle or Station or Soyuz staff or crewmember would be a four-Tito, and a Shuttle, Station or Soyuz commander or pilot would be a full-five Tito (For those of you who are sitting there nodding seriously, that was a joke. I love this SSI crowd! There were really people sitting there going, "Okay, that's a Tito calculated by..." Come on, folks, lighten up, space can be funny, too.)

Last time I was here, I talked a little bit about the philosophical, religious, and ideal-based reasons we go into space. This time, I want to lay out a few random ideas and thoughts I've had about our movement, and how it has changed.

This last year has been, as Jim Dunstan and a few of you know, amazing. By the end of last year, Jeff Manber, Walt Anderson, myself and all of us involved in the Mir project were getting conflicting reports every two days about the status of our dream and the Mir station's fate. It's going to stay up, it's going to go down; it's going to stay up, it's going to go down. By the end of the year, we were zombies, we just couldn't react anymore. We've come out of that state now. And it is time to look back a little. I am actually very proud of what we did, even though, by some standards, we lost. But what I've realized is I think we were helping start an era I call the Third Age of the Space Frontier Movement.

The first phase of the space frontier movement was approximately 1972-86. The social characteristics of the time were distrust of government due to the Vietnam War, the energy crisis and the environmental movement, with its renewable energy sources and when recycling was big. All of these are fairly broad periods. There were of course all types of changes and shifts within them and periods overlap in their starts and declines, so these delineations are, of course, arbitrary.

In space, it was the end of Apollo and the beginning of the Shuttle program. You recall, according to NASA it was going to fly 50 times a year, and access to space would become

routine. This fueled a lot of really high hopes for cheap access to space. Tying low cost access and energy needs together, people like Peter Glaser and Gerry O'Neill began to put forward the idea of space solar power plants, huge construction projects on the frontier, employing thousands of people who would live in space. O'Neill published *The High Frontier* and established the Space Studies Institute. Spinning off and out from this new optimism were the L-5 Society and the National Space Institute (later the two merged into the National Space Society). Still fresh from the triumphs of Apollo, with its steamroller charge outward to the Moon, plans were drawn up for cities in space, "L-5 by 95!" became a slogan. NASA, still seen as the heroic entity that had conquered the Moon, was of course central to all of these ideas. Optimism was incredible, based on the success of the Moon program, new ideas in engineering, astronomy and physics, and a *complete* ignorance of political reality.

The second age of space began around 1986. It was the end of the Cold War and the beginning of cooperation between the two former enemies. There was a very strong free enterprise climate with the so-called "Reagan Revolution". This also bred and re-enforced a strong anti-government feeling in many parts of our culture. The problems and challenges highlighted by the environmental movement were virtually ignored in a culture-wide denial. This period saw the end of any congeniality between the left and right in our government and big business began to recoup from its slow downs of the seventies. Underneath, the computer revolution was beginning to take shape in garages in California.

In space things were changing too, but in a very ironic twist of fate, a massive government space station was announced by Mr. Free Enterprise himself, President Reagan. The nations trust in our government to lead us into space was still whole at the end of the first age, when the Station was announced, to the point that such a pro-private sector Republican as Reagan would go to our Lewis and Clarks at NASA and say: "Mr. Clark, you will continue to operate our federal space ship and Mr. Lewis, you will build a federal space cabin."

The historic hook or turning point event of the time was Challenger exploding live in front of the world in 1986. In a historic twist of irony, it was also the year the National Commission on Space Report was released. It was the best report and roadmap for space ever produced, with such people as O'Neill, and Nobel Prize winner Louis Alvarez creating a clear path for the permanent opening of the frontier. It was still NASA centric, and focused on huge projects, of a scale appropriate to governments, but it was based on such things as using resources in space, and had a strong pioneering tone, showing some recognition that the private sector had a large role on the frontier. For the first time in our history, there was the beginning of acknowledgement that human settlement of space was the real goal of the space program. Unfortunately, it was essentially wiped from the public consciousness by Challenger going down.

This event helped the public at large began to realize that maybe the emperor didn't have quite so many clothes when it came to NASA. The Challenger event revealed the bankruptcy of the system we had put our faith in at that time. During this period, NASA also began to retain its hegemony in space by killing off things like the Industrial Space Facility, hindering efforts to develop External Tanks, and stifling anyone it saw as competing with its projects.

It was also during this period that a group of SSI Senior Associates began to create what we jokingly called "the benevolent conspiracy." Meeting at SSI conferences, people like Greg Maryniak, Morris Hornik, Alex Gimarc, Todd Hawley, Peter Diamandis, Jim Muncy and Bob Werb, Lee Valentine and myself would sit up into the wee hours and talk about how to transform these spacey ideas into a movement, and then to transform our entire culture. It was during this period that the second generation of organizations did begin to develop, and over the years to the present actually created the feeling of a movement, or at least a family of groups with common goals. The Space Frontier Foundation; the International Space University; Space Frontier Foundation's lobby, ProSpace; the Space Transportation Association; the Space Access Society; the Mars Society; and finally a bankroller in the form of F.I.N.D.S. all trace their roots back to that original O'Neill revolution, and directly or indirectly back to that "benevolent conspiracy."

Many of the founders of these organizations came from the frontier philosophy or were direct founders of the conspiracy, whether or not we're all after each others' throats right now. We all came from the same roots - and you know, the worst fights are always in the family. I think I've said this before ... but at times our community is like an Italian family -it's loud, but there's a lot of love.

As part of that Reaganite free-enterprise shift, we also saw the rise of an attitude which was, "Just get the government out of the way and we'll open space." Led by people like Jerry Pournelle the attitude was mainly directed at NASA, as the rising private space sector began to trip over NASA, and at times found itself in direct conflict with our government's plans.

Well, they did get out of the way in some areas, and we had the rise of the mini-Leo constellations, which promised markets. Responding to that hope, a lot of true believers from this movement said to themselves, "Here's our first market; here's how we can close our business plans and get started." As you know, Iridium and the others forgot that terrestrial cellular and fiber optics were about to eat their lunch, and so soon after their rise, we saw the fall of the mini-Leo constellations, with them, the collapse of what we in the Foundation called the cheap access to space firms, space transportation firms that were in the business not to be contractors to the government, but to carry commercial payloads leading to eventually humans in space. During this time we also had the first ripples coming out from what I call the space barrens as they began to rise to the surface. Such as Andy Beal down in Dallas, who unfortunately poured a few hundred million into re-inventing the wheel. Big mistake, he should have just bought a rocket motor from somebody. Yet, his idea wasn't bad, and would have worked, but then collapsed in

the face of what he said was NASA competition through subsidies of their two pet firms, Boeing and Lockheed Martin. He felt he just couldn't survive so long as Uncle Sam was underwriting his competition's R&D. There is Bob Bigelow, who is out there in Las Vegas, owner of Budget Suites of America, who wants to build his own Budget Suites of the solar system. He has said he wants to build space hotels and is pouring millions a year into it and has the resources to do so for a long time to come, in fact he has a factory right now. There is Walt Anderson, who has long been in the background and helped underwrite the Mir project and Rotary Rocket. They're out there. There are others surfacing. Meanwhile, having eliminated most of the competition, or so they thought, NASA just kept on chugging with their Space Station, and flying their Shuttles in circles

The end of the second age of the frontier can be characterized by the total collapse of the NASA illusion. They are four billion dollars over budget building a Space Station that will only house three people, but of course it's much more luxurious than Space Station for three people called Mir they just took out of the game. We see the failure of such projects as the X-33, X-38, X-34, and all the others Dan Goldin screwed up. And soon, I hope, Dan Golden will be leaving. That will be another marker of the end of the second age, as he dominated it from end to end, the person I call "J. Edgar Goldin" is finally going away. His mismanagement of our government program, his cover-ups and lies have slowed down the opening of space by at least a decade. Some talk about how Dan Goldin came up with "better, cheaper, faster..." Citing numbers, such as how he allegedly lowered the cost of an orbital space mission from \$750 million to \$200 million. My question is, then, if you roll in the four billion to 30 billion dollar overall cost overruns on Alpha, what's the real cost of a space probe? A lot higher, I assure you.

We are entering the third age right now, an age based on clarity of purpose on both sides of the government/private sector line, although some of that clarity is just beginning to appear. (As I said, these trends don't start and stop at any exact time in all areas.) As part of that growth and maturity, there are a lot of illusions out there that are gradually being shattered. And we need that. We need clear divisions of labor. The death of the X-33, as I said, revealed a lot of bankruptcy in the system. At the same time, positive things started to happen, much of it thanks to the conspiracy finally beginning to get some traction, sophistication and real financial support. New funding for space solar power was arranged by the groups working in Washington, led by ProSpace. But always the old dinosaur keeps trying to do its amazing tricks, for example, the Space Launch Initiative was announced this year. That's a mixed bag. I ran into somebody from NASA and thanked him for giving us the program's name. I said, "Look, you guys called it the Space Launch Initiative Project. Okay. You handed us that one." "S-L-I-P." Now, come on. That's like giving Clinton to a comedian."

Space is no longer only NASA's turf. And this time they can't snatch it back. We're seeing the rise of military space again, the same folks who gave us Clementine and the DC-X. We're seeing the first private citizens buying a ticket to space. Thank you very much. We see the NASA

shortfall announcements. We see some interesting shifts that are merely side notes now, but you watch, they will be central soon enough. For example, Seti is getting involved in Mars. They've taken over the former NASA Houghton Mars Project and are working with the Foundation. And F.I.N.D.S. gave Zubrin his first 4100k for their Mars base.

We have seen some really sad things start to happen. There are actually people out there now who believe Apollo never happened. Okay. That's scary, folks. I made a mistake with the first person who told me about that TV program, I must admit, as I chewed her out, I was angry, because I knew Pete Conrad and Buzz and Jack Schmitt and those people, and they did go there and walk there, it was real, now I know they did. But then I had to bite my tongue. It occurred to me, that it wasn't her failure to glean the real facts, that's my failure, that's our failure. Okay? If you're not believing we really went, that's something that I and my community have not succeeded in correcting.

And, you know, also within the last year we had a Space Station, folks. One year. We had a space station called Mir. The world's first commercial space station, privately owned for one year. We proved a market. The way I like to put it is that during a short period of time, the guys who thought up Mir Corp had to create a company, form a structure for an international firm, hire executive staff, put together a marketing campaign, create an image, put a business plan together, sell it, market it, and take on the two biggest countries in the world. And yet, also while in the course of that they had to begin signing up people to fly in space. Folks, they proved the market. MirCorp proved the market. The market is out there. Tito was just the first of a long line of people who've bought the dream and want to fly.

A lot of the battles we've had over the last few years of the space movement and with NASA and other agencies in the government is the confusion over who's supposed to do what in space. Whose job is what in space? What am I supposed to do? What are you supposed to do? When you have that kind of confusion, when you don't have clarity, that's when you have conflict.

I've seen a lot of magazines say, "Arthur Clarke got it wrong in 2001." And I saw an article in one of the magazines, it may have been *Time*, and they did a piece by piece breakdown on all the things he got wrong. Folks, Arthur C. Clarke had it right. Stanley Kubrick had it right. We got it wrong. Pay attention to the movie. From the ground to the station, a commercial space vehicle. The station was a commercial space facility. The Moon, some sort of huge mixed-use facility. And then from the Moon out, they climb into a government exploration vehicle to go check out the obelisk. That was the right mix of roles. Clarke and Kubrick got it right. WE GOT IT WRONG! The movie laid out a model we did not follow in this country. What we did, as I said, was tell Mr. Lewis build the cabin, Mr. Clark, build the truck. Instead of telling our explorers that their job was done here in the Near Frontier, now go over the next hill and report back. What we have to do is begin clarifying the roles.

The first thing we do in the Foundation to start that process is recognize, number one, as Bill Gaubatz, the director of the DC-X program once said, "Space is a place, it is not a program." And as a place it is a frontier, and frontiers are settled by people, with the assistance and sometimes in spite of their governments, but not by governments themselves. We have to understand, also, that if the Earth is the center of an expanding bubble of life, the edge of that bubble is moving outward. And if NASA, as Lewis and Clark, were our probes, our biological probes, our first sensory probes moving out from the center of the bubble, if that's their job, then they've done an excellent job from the Moon inwards. For 40 years they've been tromping around inside the edge. Right now, it's the equivalent of Lewis and Clark paddling around in canoes right outside of St. Louis and dodging tour boats. Been there, done that. Move on. That's what we have to do. We have to begin to understand who does what where.

So, once again, I refer to Rick's Handy Dandy Guide to Space. The Near Frontier is from the Moon in. It is within the range of teleoperations, which SSI proved years ago, with all those great little Radio Shack toys we were operating with time delays to test the idea, little mining vehicles and stuff, we proved you could work there from here. Medical evac is a possibility from the Moon, you're close enough to get someone back in a few days. (Did you notice the whole world just stopped for somebody in Antarctica who had a health problem again. This indicates a culture that is not going to support the Mars Direct idea of sending expendable people to Mars. And they are going to have to go to the same culture to get their funding.) The Moon is also at the edge of the giggle line for business plans. There are serious business people working on plans to go to the Moon. For example, David Gump and Jim Dunstan have a Ph.D. in being thrown out of corporate offices. If you want to talk about founding a space company at all talk to David Gump and Jim Dunstan. They know what to do. And recently, as times have changed, they are now having some success.

We have got to get back to this clarity. We have to understand that that edge is at the Moon, and we have to send our government employees beyond there, and get them out of here. This is the carrot I give to the NASA guys. I say to NASA and the astronaut corps, "We want you guys to go to Mars." Well, their egos are so big that everyone at the Astronaut Office thinks, "I'm the one going to Mars."

And I tell the scientists, "Look, we want to give you more money for science. If you weren't spending all your money on this albatross called Space Station you'd have more money for science. So the scientists peel off and join our pressure on the operations types. It's a political game, but it also has the beauty of being true.

To continue with the map of space, the idea is that beyond the Moon lies the Far Frontier, where no business plan makes sense yet. This is where we want the people in the form of their pooled taxes to support exploration, or with their contributions to the Mars Society, or whatever. The Far Frontier is everything else! It is the universe. Certainly there is enough room and exploring

to do to keep the government out of our hair back here in the Near Frontier. Let us hand it over to the settlers and shopkeepers and the business people and the entrepreneurs and let's start turning that into a new and productive domain.

You're seeing the first elements of that new order happening right now with Dennis Tito knocking on the ISS airlock. And NASA, still not able to grasp they are in the wrong place, blew the whole deal. Suddenly, and the people are totally confused and seem to be saying to them, "Hold it, NASA! You're trying to lock this guy out, what the hell have we been paying for all these years, what have you guys been doing this all these years, if we weren't supposed to follow?" Those are the kind of questions that are kind of just starting to come up in people's heads. NASA handed us another one when they blew the Tito deal. If they had quietly let him aboard, it would have been a minor story. By shutting him out they gave us a field day. If you talk to reporters now, they're just starting to get this idea, they're always about ten years behind in sensing trends, they're always reporting the last war.

In the last couple of years, we've seen the rise of the Mars movement, led by Mars-Direct's creator, Bob Zubrin, one of my favorite guys. Interestingly, I think that there's a point there for us to pay attention to. Over the last few years, we've lost our vision. Totally lost it. We had it; when Gerry was around we had it. We were all psyched about it. We were going around giving speeches to everybody about it. And then we grew up a little bit, and started getting into the trenches, and took on the *how* to make it happen. We forgot to keep selling the *why* it needs to happen, and *what* it means to our civilization. Instead of talking about the vision of these beautiful space colonies chock full of life and hope, we began to work on building that first phase, to get that first bolt up there, to put that first girder together, which is *extremely boring* for most people. It doesn't sell the vision. You know, if you were trying to sell, let's go to North America, to the Europeans at the time by telling them how to cut a notch in a log to build a cabin, sorry. Not a lot of takers. So that's where we are, as a movement. We got down in the trenches, which one is the right thing to do. We forgot the vision, though. I'm giving talks now where I'm still using O'Neill Colony pictures from the '70s. There's a problem there. Now, given all of that, there's one other thing we have to keep in mind.

The reason Bob Zubrin and the Mars Society are doing so well is because we quit putting our vision out there and it's been replaced by something with a red sky. Instead of looking up at the other side of the dome or the other side of the habitat, now you're looking up at a red sky. But it is the same demand. It's Pepsi instead of Coca Cola, but it's still hunger for soft drink. Do you understand? We quit putting our vision out, and somebody else stepped in.

We have to get back out there and put our vision back out there. I looked at my old conference agenda for the Space Frontier Foundation a few months ago and I realized that if you look at that agenda you would have no way of knowing we were Gerry's kids. You would have no way of knowing that we ever had anything to do with space colonies. We have sessions on Space Policy,

we have Space Law, we have Propulsion Systems, we have Near-Earth Asteroids, we have Solar Sails, we have everything else, but not a single mention of space colonies, yet we *even* had a Mars Session - we even had a Mars Session. And a Moon Session, but we had *no* Space Colony Sessions. We have gotten away from our own vision.

By the way, it's not either/or; that is an old battle, its over, and this is where we in the Foundation win in this community, overall, because we are inclusive. We are about all of the above, Moon, Mars, near-Earth objects--hell, ride on a comet if you can stand the cold seat, I don't care--it doesn't matter. But we are about all of it. We've got to get our vision back out there, a big vision, a grand vision, an inclusive vision.

There is no reason that an organization like SSI should be in the kind of straits it's in right now. There's no reason. There are 90 people here, there should be 900 people here. There was a time when that would have been almost possible. What have we done? We've all gone out, got in the trenches, and forgotten the artistic side of it, the beautiful side, the poetic side. There was poetry in this movement at the beginning. There were people talking about green things growing in space and children. Dr. O'Neill himself took direct aim at the Right Stuff paradigm. How? By writing his book in the form of a little girl writing home from her habitat. The world needs to hear that message now, the world needs to understand that that's what we're talking about, green-space, beautiful things, flowers and trees and people living up there, people like you and me. And the kinds of challenges you face up there, the real day-to-day challenges of life in space.

The problem we've got right now is there's no context for what's going on out there. Dennis Tito was seen as a tourist, not as a first wave of people like us going out there. *We* have to create that context. *We* have to revitalize the dream, and the organizations where it lives, like this one and the others that sprang from it must do that job. SSI has very much been like the monks in Ireland during the Dark Ages. Well, it's time to start coming out of those monasteries and getting the word back out there, getting the printed word back out to the people that there is hope. And let's be inclusive.

Let's all get back to the vision. Let's get the pictures out there, let's get Morris out there giving talks to science fiction fans about the relationships between space colonies and science fiction, the kind of things that got people like me excited, who didn't know diddly, and didn't have, ourselves, what I call "permission to dream." Permission to dream, the opposite of the current idea that some elite group out there is going to do it for us, that we can't do it ourselves. It was people like those here at SSI that got me involved and said, "You can do it, you don't have to wait for NASA, you can be involved in space." That's why we have the space movement now. But we've got to get back to the vision. We've got to get back to the excitement.

I would urge every one of you to look in your hearts and say, "What can I do to help? How can I help SSI get back to the place it needs to be?" You know. The Space Frontier Foundation is

doing fine, we're doing fine. We'll take your effort. We'll love it. And we'll use you up. But we will use you, and we'll keep doing it. But SSI needs your help right now. This organization needs your help. I'm willing right now to say that--and, you know, I don't want to put Bettie on the spot, but what the hell—I think SSI should go to an annual conference, to build momentum. I would put up 25 grand right now of FINDS money to say that we would help support that if that were to happen. The fact is that we all have to pitch in. We have to make it happen. At the Foundation we saw we had lost some of our vision, and we've now begun to correct that. We're going to have three hours on space colonies at our conference in the fall now. I want to see more of that here. Let's get out there. Let's get these people excited. Let's get them out of the woodwork. They're out there. The vision's out there. They're waiting. Dive in; take a stand. We have the shoulders of giants to stand on. The stars are ahead of us. We are so close, we can almost touch them. We are closer than we have ever been. And of course this is when people start burning out. This is exactly when people start burning out. So stay the course, get involved, climb up on those shoulders and reach for the stars.

We can do it. Thank you very much.

Amen.