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Special Series on Warfare: The Evolution of Space Warfare

Feb. 25, 2021
Webinar transcription

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Meredith Friedman:

Hey, it's about four Oh one. So I think we can start welcome everybody to our evolution on space warfare, special series. This afternoon, we have had this a little later than usual because we're hoping some of our Asia Pacific friends can join. So I hope we have somebody there from Singapore, Australia, New Zealand, Hong Kong, anywhere in that area. And today we're going to start out with having two speakers. We have George Friedman who most of you know, and then we have the asset [inaudible] who many of you know some of our new club members may not have met him yet. JASA is the founder and owner of strategy and futures, and he is in Warsaw, Poland, and it's very late there. So we thank you all much for coming in sort of late at night, but I understand you're always up after midnight anyway.

So that's a good thing. Jacek is also the author of three books and soon to be four because he and George are working together on a book about space. Some of which they'll give you a preview of here today. And then we have Rob Kirkland who will be our moderator. Rob is a retired army Lieutenant Colonel. He served as a professor in the department of history at West point and was the chief historian for the multinational force in Iraq from 20 2009 to 2010. And he will be moderating a panel. We have an expert panel who will join us after the speakers, and then we'll open up for questions from the audience. So for those who are new, please remember to type your questions into the Q and a box. And with that I will hand over to something much more interesting and asked George to give us a little bit about why we have this transition into space and into warfare.

George Friedman:

Well, it wasn't the romance and the adventure, although that emerged.

When we went humanity went into blue water. Maybe it was because of the technological evolution, the Caravel, which was a deep water ship and necessity Portugal and Spain were competing for power. There was a stalemate and Iberia on land, and this was an attempt to flank in the same sense when the airplane emerged, it had been a fairly useless technology, but it was a requirement in the first world war, the first world war one of the great vital weapons was artillery. The problem was that artillery, his range had outstripped visibility on the ground. The airplane provided intelligence on targets that could be used by the artillery people. So each time we have entered in U domain, our motivation has been in some sense, military and in some sense, technical, and it was military, which is really very efficient at

metabolizing new technologies, much more so than private industry, which people don't believe that, but really the beginnings of new technologies like the internet are best made by the military.

They entered the new domain and evolved in it. So the Caravel ultimately becomes the aircraft carrier and it becomes a submarine. It becomes all of those vessels in the long history of things. Air power has had a shorter history where you found the evolution of the biplane of rights plane of the various world war one panes fairly rapidly into the F 35, which is the most mysterious plane in the world because we're playing that you can't afford to let be shot down because it's so expensive is interesting, but that's another story. Okay. let's explain how this led to space. Modern warfare is industrial warfare. It is based on the mass production of war, making goods from masses of Liberty ships, two masses of B seventeens and B 20 nines to masses of soldiers to win an industrial war. You must attack the enemies industrial base.

If you remove the industrial base or some of the necessary elements such as petroleum, or what have you you make it impossible for them to wage war to create the weapons that are needed to replace it. What does it happen? So on one of Hitler's great mistakes was attempting to win the war by attacking London on the assumption that that would create a reaction from the people that would stop the war. He didn't go after it, the factories, he didn't understand the nature of industrial war. He still had kind of a pre-industrial perception. When the Americans came into world war II, they only understood industry. Their view was that they had to destroy Germany's Frances were making capability and they created aircraft, especially intended for that purpose.

The purpose of the man bomber of that period was the devastation of industry. It had a side effect that was unpleasant contrary to the notion of precision strategic bombardment that the army air force spoke that they couldn't hit the side of Barton. The solution to that problem was massive applications of bombers thousand bomber attacks, which in the course of destroying the factory, the various resources also had the result of destroying the city and with enormous numbers of people. When this war came to Japan the city of Tokyo suffered more casualties in the series of bottlings than Hiroshima. It was a war of industrial production, industrial destruction, and the side effect of imprecision was massive by Barton and saturation by Martin mins. Okay. better us than them. So good enough. Okay.

The problem was inherently that the amount of industrial effort that had to go into that sort of warfare enormous, the number of aircraft that had to be built, the number of pilots that had to be trained, the amount of POL petroleum, petroleum oil and lubricants in military jargon. It was just stunning. So if warfare was now industrial and the purpose of the, of air power was the pivotal purpose of crippling, the enemy's ability to produce weapons and therefore allow the army just a lesser extent, the Navy to operate well. This was a level of effort that was amazing. The amount of planes the Americans built, the amount of bombs they dropped just stunning, but it was interesting as the Americans understood this, they're very comfortable with this because unlike the Germans and the Japanese who were quasi medieval powers, who truly believed in will, and this, the Americans had no such illusions, okay.

The key here is the ball bearing plant. Let's go in and get the ball bearing plant. But with somebody in operations research had determined that the one single most important components of every weapon

system was the wall bearing, not questionary determined. That buddy determined that. So we had an intelligence blitz, find the ball-bearing plants and bombed the ball-bearing plants on the assumption that it would get rid of that the rest would go. It was in fact it's as successful more, maybe achieved it, but it created as the war went on a realization that counter industrial activity is not efficiently carried out by manned aircraft dropping that generation of bugs running parallel to that was another program to make it more efficient bomb. The purpose of nuclear weapons, atomic weapons was the same as it was for the B 29 bombers. It was counter industrial, but it had a greater precision and a greater killing rate, although the roughly the same effect on people they died.

So there is a continuity here between the man bomber his mission and the development of the atomic bomb. The time a bomb was simply a far more efficient means of counter industrial operations or so it was conceived once atomic bomb existed. However, it was realized that the real effect of this bomb was what was the unintended effect of the [inaudible] not counter industrial, but counter population where the war evolved to this at that point, was that what you could do with a nuclear weapon was yes, knock knockout, the Naval yards in Hiroshima, but much more important annihilate the city very efficiently. Now, bear in mind. Again, we had an isolated much of Tokyo, very inefficiently. So this was a logical evolution. If we're going to have counter industrial bombarding, we need a more efficient bomb. If the upsize effect of the bomb is going to be killing the population let's shift and make counter population operations, the key.

And so what came out of world war two was an understanding that the nuclear weapon had made everything else obsolete. So, but that was the assumption, but also that the problem of warfare now was to be able to destroy the enemies nuclear facilities faster than they can launch. So the purpose of it began with following world war II, but we came to a new point, a point of speed, but speed, not of the rockets speed into detection of weapons. We had to know with enough time that we could respond when the Soviets launched at us, if they launched at us and we have to know it in a way that the Soviets you it. So they would know that we had a reaction time fast enough. So they wouldn't try that. And versus vice versa, you did not want to give the enemy the sense that you actually could detect and respond.

You don't want to give them the idea that you won't detect and respond, and you don't want to give them the idea that you think you have the opportunity to preempt. That sounds dizzying. You really need to read Herman Kahn to have no idea of what anybody's thinking. His book, a thermonuclear war was a Bible at a time when everybody leaves that Wars coming, the development nuclear weapons created a new pivot in warfare time, time to response, which created a new imperative technologically detection, the entire op that entire sort of warfare depended on detecting incoming enemy attacks to deter those attacks or to accounting, whatever it was from the standpoint of the United States. Our first response was radar. There was something we had to do line to distinct or a really warning line. And the do line was supposed to detect incoming Soviet missiles, incidentally to our Canadian friends.

You may not all know it, but we're could not just allied, but right now, Canadian is a command North American air defense command. And if you've ever seen pictures of the holes, you know, the mountains that you're in, that's in Colorado Springs, it's called Cheyenne mountain and Cheyenne mountain hooked

into offload air force base, which was strategic air command. And this complex technical communication system and detection system was all there to in rapid execution, detect an enemy launch and trigger an effective counter attack. In the early days of the cold war, we still had man bombers. The Soviets did not have a missile that could reach the continental United States do United States sorta had a missile that could reach somewhere, but we never knew where it lands. So we use bombers to be 52 was created for the purpose of carrying out a world war two style tacks on Soviet cities, dropping bombs. This definitely scared the Russians. They did not like that fact because they did not have a counter. They never really built a, a bomber force where they went to was missiles.

We also went to missiles and with missiles, we could detect much more easily, but we could launch much more easily. Missiles were created to cut down the response time, launching a beef 52 wing, getting into air and having it kind of wattle over Soviet territory that would take hours. Okay. And that was the response time. And it wasn't sufficient missiles could, if we had detection launch and hit a target in 30 minutes, it was claimed I never knew exactly what the truth was, but it was really fast. Okay. Now the problem was that the due line that we had sucked, yeah. They would detect it sometimes because radar is an imprecise tool at that time. And the communications system, which went from the radar system to North American air defense command to sack, to commanders various basis, just, it didn't work. It broke down and had to break down.

So the question was, how do we detect Soviet launch more so and Soviets us, where are their bases? Where are their silos? Or are they based? The first American solution to that was the YouTube. The YouTube, his purpose was to map out the Soviet missile basis, which is why Kennedy knew there was no missile gap because we knew there were no missiles. Then the photographs taken for the U2 said the Soviets have not yet deployed their missiles, which was good. Cause we had either, but we were not behind the problem. The U two was very simple. You could shoot it down. We didn't think they could shoot it down and surprise, surprise. They had to range. And Francis, Gary Powers very famously was captured. And that's another story. Now at that point, we had that a means and the means were being found by experiments with satellites, putting something in orbit, put something into space and see the ground, do exactly what happened in the world, in the world war one with biplanes detecting targets on a global basis, the Soviets were at that game.

And we were at that game because we had German scientists, they had German scientists. We said we had better ones. Well, what do you know, Vernon Navon Brown member of the SS. And the person who had created our own missile force was instrumental in it was he wrote a book that Tom Lehrer said, wonderful comment on the book was called. I aim for space. And Tom Harris says the book should have been called. I aim for space. Sometimes I hit London. And I think that's one of the great lines of full-time. So the satellite systems in orbit, being able to detect what was on the ground and provide information directly to multiple commands on what to do that was the goal. And the problem was that the Russians launched Sputnik first. Now that was not a great achievement in the sense that we were almost there.

The Germans knew how to put a split Nick into his face, but it gave such an impetus to the American space community that they jumped generation and they jumped generation, not with the ability to put things in space, but the ability to photograph things, the ability to develop photography that could

record what's on the ground and returned to earth very quickly was the key to this first phase. Okay. the first one, by the way, they took pictures on a Kodak camera and dropped it. The earth were a fighter plane or intercepted it and quartered on the way down now, while this was really cool, this was not an outstanding solution to the problem. The solution to the problem is contained within your iPhone.

It is the ability of sensors to detect light various levels, put it together into a picture and deliver it by radio, right? Beaming the diet, the data back down, and both sides were in various points here. And it gave us the ability to map out Soviet capabilities. It gave the Soviets ability to map out RS. And now that became game became what we called Hyde. Typical sense that it was most important thing is hide missile. And if you couldn't hide, the missile create so many possible locations that are missile might be in to overload the attack capability of the enemy. You could spend an entire career doing this stuff. It was, it was really amazing when you go back to this, okay. Now in space, we developed the capability of seeing the earth and later radioing the information back and a very efficient reduction in time of reaction. So rather than the absurd amounts of time that we used to have in the fifties with the do line, by the late sixties, we had rapid detection of high quality of high quality pictures.

This was our entry to space. This is why we went there. It was to detect Soviet watches. And this is why the Soviets were there. Yes, it was wonderful. And it was, you know, it was, you know, I find Apollo 13, wonderful. But we went there a way to wage war. We took war out of the atmosphere. We not only did that, we created GPS. You have in your cars, it was originally built for the Navy GPS. Was there be in order to give the Navy a targeting set set for nuclear launches. So also that they should know where they are. And that was also a very important point, but it was also a nuclear launch capability. Okay. That's why GPS was created. The camera on your computer was created in order to see the earth in order to be able to allow us to see things we needed to communicate and we put something called Telstar up and Telstar was a military project that also allowed you to see TV programs from all over the world.

What I'm getting at here is that the entry into space was not a romantic adventure, but any more than the Caravel was, it was a military necessity by the nature of the, of the weapon. Once in space, other uses were found, okay. GPS was one the ability to detect a launch from a, an infrared capability in geostationary orbit down, won't go through all the stuff here, but a lot of cool things could be done in space. Oh, we could also go to the moon. And there's a story there about what we thought we could do in the moon. And it couldn't. But the point is that air power and space exploration space, they are on a continuum. They're not disruptive. The man bomber posed a problem that was solved. Industrial society required a use solution, nuclear weapon. There was no way to deliver it.

Missiles became the way to deliver it satellites or needed to see them. And now the question is, how do we blind? The enemy probably have at this moment is of course, if you're going to use missiles to take out a ship, you have to locate the ship. Okay. And if you locate the ship, then you can hit it. So satellites locate the ship or, or UAVs, but mostly satellites. So you have to kill the satellite. How do you kill the satellite? Well, now war is beginning its process of unfolding. And I stop here and ask Jacek who represents the entire Polish space program to tell us about this, Jessica.

Jacek Bartosiak:

Yeah, thanks. I will take it. Yes, it has some, and now it floats the idea of satelliting objects and have the sort of a constellation of satellites that monitor Russia and Western approaches. And we have some nanosatellites industry but you know, I mean, we are not a space power at all, and this is it is true that why I'm one of a few guys who speak about space at all, you know, so it's a complete different ecosystem than the United States as far away from the United States scale and dimension, as you can imagine it's a major difference between being a real space, power conceptualize objects, and send humans into orbit and to the moon and to be just a countries, you know, and it, it's very expensive to simply move people and loads into the space and very sophisticated than neighbor.

Jacek Bartosiak:

But I'll take the story from the place from the moment when George and so we arrived on the 19th of the 20th century, Soviet union collapsed and suddenly the space became less of interest and more of scientific research, which ended up in almost nothing. Because as you know, recorded the history of humanity shows that people are driven by competition, not by I, you know, I mean, ideas you need to, to, to, to really strive for the markets for money and for competitions, for ultimate domains for advantages. And that was a beautiful moment when the global economy expanded and the globalization arrived and the capital and investment, especially private investments simply could flood the global arena, labor, labor markets, and even China was invited. So space sort of became only scientific thing. And we had this bizarre period of do almost doing nothing right in terms of progress.

Jacek Bartosiak:

Now we got all stalled, but it was only on surface in a way because George was mentioning detection, all those objects in orbits and especially in Leo and meals, but also geostationary moved from being objects that render services for this new cleric exchange thing with Soviet union towards the, the, the space-based infrastructure that slowly but steadily gradually provided the U S global maneuvering force with sensors with you know, intelligence, reconnaissance and strike capabilities that were mostly focused on the space-based infrastructure and in time became entirely, almost entirely dependent upon it. And th this is why United States was, that was one of the reasons why United States succeeded so well in the first Gulf war, the second Gulf war, and in many contingencies of the last 30 years, by the way, that was the symbol of the U S global dominance as a main maneuvering force of planet earth, you could move everywhere.

Jacek Bartosiak:

You could strike almost everywhere and you, for sure you could reconnaissance with impunity from outer space. And that infrastructure became so important that as, as I speak today, it seems completely impossible to imagine that the United States global PO global posture and global power couldn't could be sustained without space-based infrastructure. And because that became so important. So suddenly the needs for defending it became important. And now we arrived at space force. Also, we moved from this nuclear thing that provided the math, the mutual assured destruction, which was a deterrent factor into a sort of a conventional battlefields aspect, which is much more unstable. So Americans based their military action on the global, on the space-based infrastructure and Russians and Chinese were wondering how to obstruct the U S a power projection into Eurasia. So they started thinking to not only to use this, NTX certain a cup of blueberries in earth, so obstruct to blunt the U S edge, but also how to

the stabilize, the U S conviction that it controls all escalation ladder steps, dominance starting with a space-based assets.

Jacek Bartosiak:

So the competition in recent years moved again into space because of the fear that the American vertical flanking as it's called in the military level. And it was all gone through information base battlefield dominance that is derived from space. Infrastructure could be blunted by both Russia and China. So as we speak, we have the right or the new era of competition, and the space force is an obvious response, but there is also an additional factor that kicks in as well. In recent years, the fundamental called new space over the last 30 years our kids not only do not read so many books. So they started watching the, we had the digital revolution information, became a commodity and not only works, but also visions films, images, and space-based assets, as well as it's served the military to detect.

And scent now serves the new space industry as well. The civilization today is more about the data has become a commodity of today and oil of today collecting processing, selecting, categorizing, NEC choosing one from another, even manipulating a data. This is the oil of the global economy. And increasingly more and more pivotal assets are dependent upon the space-based a new industry, which is called new space. This is why there is more and more money in this orbital space, close to earth. And as we all know, from the history where there is marketplace, there must be military that protect this marketplace, where there is a marketplace, there are coursers and pirates, and there must be some norms that you need to impose in order to, for this marketplace to flourish. And here again, we have this tension between the ideals of some people. That space should be a place where everybody cooperates and we have 10 commandments of cooperation.

While I'm personally of the belief that still the balance of power will decide who will be imposing the norms, the rules of the road, and to the next, even further, the same will be with the moon in terms of minerals and the supply line to the moon, because you need to have the cavalry that will be protecting the pioneers and settlers and robots that will be doing things on the moon. And you need to sustain this celestial line of operation as well as not only speaking about physical celestial line of communication, but there are, there are also nonphysical celestial line of lines of cooperation, because as we all know in space, everything moves at cosmic speed and it has so movement is something different from the movement. Physical movement is something different from the movement of information will go South the speed of light which creates in terms of the real structure of movement and structure of movement creates strategy.

There are two different worlds that need to be together in order for the things to be effective. So different speeds, different geographies and humanity needs to conceptualize all this. And on top of that as we simply dipped our toes in the cosmic ocean, because as George rightly stated, it was all about the orbits of the earth to detect it was the, actually we are, we were all in earth. And then you domain, that was like a coastline to the continent because it's so close to the earth served for the purpose of domination or war fighting on earth, the political outcomes on earth, but with technology technological progress, the competition will move further, not only to geos, but also to [inaudible] to the moon and to something that is called earth moon, do our planetary system, which is actually our hometown in, in, in the, in terms of the dimensions of the universe.

This is our home place, the earth moon gravity related planetary system. And this is where in the future will be infrastructure that will be servicing all people living on earth, but also exploring moon, exploring many other many things that are coming from universe like sun energy and so on and so forth. The competition has already started about it even today. The news, I think Reuters Felice, the news that the Americans experimented with a solar energy base beaming of electricity back into the earth from the orbit through the [inaudible] plant space plane. So now it became even an open source in Reuters. Okay. And we discussed with George about it six months ago. Right. And could you imagine what sort of transformational change it could create for the energy system on earth, if it's efficient and industrials at industrial scale, that you don't need to plug in your iPhone to the wall, to the socket or you, you don't need to, I mean, so you move and your engine is running all the time because it takes it from air, from this, you know, cage of radiation that electricity is in, eh, it, it has a space will provide incredible transformational capabilities if, of course, properly capitalized use conceptualize and so on and so forth, but it is it is coming and there will be great power competition in space between China and us.

So there will be an incentive to invest in it and compete and fight. But speaking of the purely military domain, there will be three, maybe four critical breakthroughs that were really take us to the space warfare because so far even given the hundreds and even that already thousands of objects and, and orbits around earth, moving around the earth, detecting things, seeing even through clouds collecting data, sending back all this, even with this X 37 37, it is still the earth that has an edge. It is still the surface of the earth that has an edge. It, that it doesn't look like that because the United States global monitoring force has had such an advantage as was fighting the non-peer competitors. So if today, the, the real global war erupted my guess is that it will be still the earth that would be capable of dominating the space by hitting the launch facilities hitting the Raiders, the deep space radars, and that, you know, orbit orbital detections stations based on earth downlinks and uplinks command centers, all those vulnerable places that service the space-based assets, but are located on earth.

Plus technologically, you can also strike assets on our base, even just stationary as provable by us and Russia and even China. And also you can maneuver objects to have so-called soft kills and disabled you know, the orbital objects. And that's a problem because it's not easy to replace them these days. So it is still if really pressed hard, the earth will win, but for the time being there will be, as I said, three or four technological breakthroughs that will change this paradigm. The first thing that is already being sort of implemented across the board in in the United States and maybe in China and Russia is the cruise misery the hypersonic Christmas by hypersonic Christmas. I mean the real Christmas isle and real hypersonic Christmas, not Tomahawk, but something that moves at speeds between five and 25 marks, which is something extraordinarily technologically sophisticated.

Jacek Bartosiak:

And although I speak about space and the transformational paradigm space for, for, I w this hypersonic Christmas, I should move within the atmosphere to change the warfare and take it to space because then it's hardly detectable. It's very effective. And the Americans could sit in Washington DC and manipulate all the battle field outcomes, even at tactical levels everywhere in the world. And also the Chinese could do the same if they invented it. So there will be a hard, you know, pressure, tough pressure then to put the real detect detection systems like brilliant eyes of Reagan's era into space to

detect such systems. And with this will come the pressure to have the system that will be killing those very fast hypersonic, cruise missiles, and perfectly they should be because of curvature of the earth. That's what you call it in English because of many other things that obstacles within the atmosphere fighting that it should be taken into space. And that will be the first change. The second change will be another step. Once we are in orbit and think about shooting out those hypersonic Christmas Christmases within them, it's not easy to shoot them with anything that is ballistic. Not only because it's so difficult to bomb.

Orbital bombardment is very tough because you move so fast that you can simply drop things because you didn't, you need to adjust earth, earth rotation speed, like precision is very tough and hypersonic Christmas and moving within, or that most fear is very fast. It's much faster than the bullets, the miles much faster. So the, the, the, the natural idea would be to think about something that is like 25 or 30,000, 30,000 times faster than the fastest Intercontinental ballistic missile, which is the laser energy director's weapons speed of light so far. The problem has been that it's not effective moisture, some other things, plus it's not portable. It's not transportable. And especially into orbit where you can still have to sustain it, load it and fire it. Once we have moved behind this point and have it, the, the space warfare will be dominating the earth. But at that moment, point number two, not entirely yet, because the real transformational moment will come when we will need to have the C2 control and command stations up there in space because of their vulnerability on earth, as I said before, and because of the latency and because of the time delay if you need to automate, calculate and automate all tactical engagements at once, it takes time.

If it's not close to the battlefield and space provides closeness in terms of the cosmic speed, and you need to have humans there to sensitize the battle, the battle management, and that will be a game changer. And with this game changer, what will think where to put those, those, those, this new infrastructure, whether it will be close to earth or in the library like his in English, liberation points like ground points and, and the, the dual moon and earth system on me, maybe even a moon and solar system earth and solar liberation and untold systems, which are close to earth by the way, very close to, to, to moon as well. So

George Friedman:

Liberation points or coins where gravity gives you a stable point that will never require you to move. It's like a rock. I just want to, sorry,

Jacek Bartosiak:

So that, so and, and then the really science fiction novels will come through because then we will really have the real full, flat space warfare in place and who will control. And then we will start figuring which spaces, which areas and our do our plant, our system are the most important because we will already have the mission command that CTOs in space control and command systems. We'll be having capabilities to, to, to, to, to deliver lasers with a speed of light efficiency. We will have the detection system around the earth to control the earth. And now we'll be, where is the commanding height within the system? And we will start thinking about like, Grant's points the moon, which is a very interesting place for military, you know, sort of application. And then we will have the real Wars about control of the space and earth, then for sure, we'll be already a domain, which is inferior in terms of the

possibilities of imposing your will and the military context to the space-based assets. Right. And, but that's, that's the future. I don't want to go to distance. I, maybe I will stop here.

Meredith Friedman:

Thank you Jacek. And George and Rob up in a handover to you now to get a discussion going with your panelists and attendees. Okay.

Robert Kirkland:

Sounds good. Thank you, Meredith JASA, just to stop for keeping us we're still in suspense. Can you briefly say what number three and four is? I've got one critical breakthrough is the hypersonic cruise missile to his command and control space. I E George Freedman's battle stars. What's number three and four. Can you just in a couple sentences,

Jacek Bartosiak:

Eh, Robert, maybe my comment of English is not perfect, but actually I enumerated all those four maybe not in a sufficiently distinctive way. So one was the hypersonic Christmas. I, another, another thing was a detection system based in space to detect them then lasers based on that building on that lasers in space, shooting them. And then the, the, the man controlled command stations somewhere in space to be decided where,

Robert Kirkland:

Okay, great. Okay. Thank you. Yeah, so that, that clear certainly clears it up for me. So thank you. Okay. so one first question George, back to you is from Lee prior on our panel and he wants, he asks, you know, one of our reading assignments for today was the was your book on the future of a warfare with that you wrote with the Meredith. And he wants to know what additions changes, modifications from the chapters that we read are from that book for to what, you know today.

George Friedman:

None, it was perfect. It was the speed, which we're beginning to move into the moon. I didn't anticipate the Chinese are now have a base in the back of the moon human beings. They're trying to get there. But the speed which Luna has become conceptually part of the system, a lot of the things remain in place. I mean, the centrality of hypersonic systems is one and the problem of explosives and hypersonics instance, you call it all that fast. You got a lot of kinetic energy, but still, if you've got to take down a ship, you're going to have to blow up something. And the struggle between speed and weight the degree to which does read to which you can actually manage battles already on the face of the earth from space, or at least highly dependent on space as speed it up.

So I guess what's really changed is the speed things okay. And already how absolutely necessary space is any future war between us and China has to begin by trying to blind the enemy. And that means space strike. And that sounds easy, but you know, it's different. So I would argue modestly if I could, it pretty much it's happening to way but faster about what we haven't gotten to is where we have to get to that. JASA was talking about math 20 hypersonics that allow us to have mission basically fire missions times to target at the same rate as you do. If you go overseas, let me just say the basic battle, probably not. It

States is that it fights its Wars in the Eastern hemisphere. That means we have to move people there, which means we have to move a lot of tanks into place in desert storm. We took six months to get into position. We need to be able to place fire on an enemy early up. They of course will want to place fire on us. But to me, that is next issue. I have, my, my issue is somewhat different. It is, we don't have the ability to wage war efficiently because we don't get there in time. And the logistics browser problem hypersonics Mach 20 or above will allow us to solve that problem linked to which space-based system.

Robert Kirkland:

Great. and this is a, my question is regarding, I know there's people that are probably asking it in the panel, not the panel, but in the people who are participating today, we talked about, you know, the first, our first session was the Arab Israeli Wars. The second was the army. The third was the Navy. And we've sort of, I think in your introduction, you kind of made this seamless transition from kind of the air force to kind of space.

George Friedman:

And so why is it that we're moving that what we did this together with the air and space together rather than devoting separate Session to the air force, or I regard the air force from that point of view apologies to my son as an interim solution. It solves the problem of industrial warfare. Okay. But as we see developing the incredible complexity of air breathing aircraft, like the F 35, okay. Place a certain limits on training cycles and certain, very real issues on attrition. So we have to understand that the, the dominance of air as amazing issue really had a 40 or 50 year cycle. We rapidly went past a, B 52 to missiles. We rapidly, you know, we moved rapidly into airstrikes. So not that it was trivial, not that it is trivial, it continued to last, but more and more, it is linked to space operations.

Robert Kirkland:

Okay. Very good. Evan, I see that you are not, I don't see any mountains and back you, so I, I think you're around my neck of the woods. So I know you've got a questions. I'll, I'll open it to you here.

Evan Marks:

Yeah. I moved from Aspen to Palm desert to get a 10 days or so out of the snow. Although I think the Santa Ana's conspired to ruin a day for me today. It's pretty dusty out there. I have a question for Yassic. Just like the stuff that you've written on geopolitical futures, a website that's posted there, it's really fascinating. And at the risk of potentially compromising some of the secrets that you and George are ginning up in your to be released collaboration, could you please could you please link the your recent dissertation about choke points in space in which you have analogized them to Persian golf the Strait of Malacca to how you believe a future war in space, maybe waged taking advantage of this new spatial topography that you've taken great steaks gone to great lengths to outline

Jacek Bartosiak:

Well, perfect question. And in order to answer that, I need to say two sentences about the concept of strategy flows.

And we have described already, we have written the chapter though, strategic close in the book with George and that is a good sort of a pattern to explain the human behaviors everywhere. Actually, people live work make money where strategic flows, traverse. This is where the cities are built, where people, you know, live established businesses and so forth and so forth. Strategic flows are movement of people, data commodities, goods technology, you know, knowledge and everything. Both these days, both in physical domains because people were carrying something on camels. Okay. or on the world, ocean and tankers or something, but also now digitally when information became a commodity, but it still has some physical dimension because there are places where those flows traverse more efficiently, cheaper, or faster. And there are nodes where they cumulate. Okay. And they result from geography like Malacca, like Panama canal, like, you know, many other, I don't need to explain to the Americans and then the speakers about it.

Okay. Because your prosperity was built on it over the centuries. And the same is with space, both in physical Kepler, neon, Newton and movement of Hoffman transfers that are better orbits and worse orbits, there are better and worse places. There is radiation belts. There is CIS lunar, there are librarian points and so on, so forth. So there are places with better efficiency for station keeping and for structuring the movement and structuring the movement is all purely strategy thing, because it's all about efficiency and having a better maneuvering place and limiting my adversary and making it more costly. And the same with the information, the main non-physical lines of communication, because there are also worse and better places to do it, like places exposed to solar flares. So, you know, the, the, the dark side of the moon or light bright side of the moon better orbits for service, you know, for a reason, GPS is on medium earth orbit or some sort of, you know low, low earth orbit service, the, the optical intelligence satellites, right.

And that means something. And if you are on Leo, you can't be shut down from earth while in your other meal, you have some time to react from maneuvering. And that creates a topography of space, which is very much structured. Also the, the, the, the, the trajectory trajectories are very predictable because of the speeds involved and because of this topography, and this is why ended up was my last point. And this is why the U S space plane [inaudible] is so important. If the rumor is confirmed, that it can in agility, maneuver in space, by lowering down the sending and touching the upper atmosphere so that it could make unpredictable movements using this, you know, in the picture is way using the wings to sort of surprise the enemy that could really think about shutting it down by predicting the trajectory. So, as you see, it's all about movement, and there are places of better and worse efficiency and space.

George Friedman:

Let me add, you need to places that are stable, that can support production as well as you have to have a logistical tail that the goal is to support you will eventually run out of ammunition, or what have you, the place you can put that is either an orbital position as very vulnerable, or has it the moon preferably the back of the moon or deep into the moon or something like that. You're not having a stable platform. You can fake out, you know, where people go and the flow from that point, which isn't the most efficient to cover most of the earth. That point there becomes a point of flow that develops because up there will doubt develop social life technological development and so on. So we have to remember that this is a two planet system. One planet is not yet utilized, not visited. We've now discovered there's water on the moon, which was a critical issue. So think of the two planets and their dynamic between

themselves as the wound develops, and also read Robert Heinlein by the way, who's fiction writer. That is absolutely essential here. Moon is a harsh mistress. Go show you the geopolitics of the moon, whereas one way. Okay, thank you. Okay.

Evan Marks:

It strikes me that I had this conversation with Pat Khan commander, Harry Harris, if you remember Admiral Harris. And I asked him what he thought about the Chinese installations in the South and East China sea on the, on the reefs. And he looked at me like I was a complete dummy. And they said, they looked like stationary targets to me. So what you and Jacek are discussing our funding, even if it's on the dark side of the moon are a bunch of stationary targets. When in fact mobility among these platforms is probably their key to survival. So how do you, how do you address that intrinsic vulnerability, which doesn't sound like it's much different than stationary targets on earth.

George Friedman:

We're making requires logistics, okay, whatever you have, you have to fix the laser beam and to think, okay, you can do that by having vehicles in space that will intersect them, which are the most vulnerable, because that will be the targets of the enemy, backing it down, and they can be seen, or you begin to think in a composite form of the way in which we protect vital assets on earth while managing space-based assets. So in other words, the problem of fixed targeting is not one that can be simply avoided unless you avoid a problem of production. If we get infinitely, capable, laser speed of light weapons. Yeah. It's not a problem, but we don't. I doubt we get that. So the question is, how do you do that, Jeff? One way you can take the repair to the platform, or you can take the platform to replace the repair. Each have their drawbacks, probably we'll do both, but as the moon becomes more important, it's just going to have more assets, more people, more things on it, and there are ways to protect it, but that will be in 2200, a very interesting war between earth and the moon or a domination of deliberation points. I look forward to it. This is where we get the entire point is we continue to be humans. We continue to fight Wars. We continue to have the same vulnerabilities, but we expand constantly domain after domain.

George Friedman:

Did anybody write that down by the way?

Robert Kirkland:

Well, you're being in charge of being recorded right now. So I just realized that anything can be used against you. So the seal, just a quick question for [inaudible] says what about Mars or are we erase the red planet only prestige, or does it have another purpose beyond kind of what Jacek referred to as kind of the earth moon neighborhood?

George Friedman:

Well, there Martian princesses that look really good, and that's why they're doing it. I have no theory on that. The asset we've talked about that, you know, every time we get to that point, we leave it fast.

Jacek Bartosiak:

Yeah. I even read a month ago, a veteran from Brown's book called project Mars that he wrote in the us captivity in the forties where he was sort of you know, in the follow-up to what George was saying, that he aimed for, you know, for space for Mars or other planets. And he was hitting London. So he wrote the book how to get to Mars with calculations. And at that time they were really, really thinking that there are Martians living underneath the surface. I mean, they were 50, 50% certain that they would be people that, I mean, some beings there so things changed. So let's let me put it that way. But for the, for the time being, I see now I, I, at the horizon, I see no influence of Mars which is too far away from earth and too far away from our space, which is a moon earth dual system planetary system.

Jacek Bartosiak:

So Mars doesn't have any influence, of course, moving further in the, into the future with the new technological advances of, for, for short blood propulsion because we need to get faster and to sustain the supply line communication line to, to Mars. We will be thinking about the inner solar system like Mars and asteroid belts, maybe for robotic automated exploration, with enormous resources of minerals there. And there are four science fiction movies like expansion. I know you've seen them about this us Sariah Belden the war between the Mars and the earth, by the way of controlling it. And by the way, George and I, we didn't talk about, there are some principles of military power projection there that we apply in our book, by the way. So We understand we can put a principal in, yeah, it took centuries three, at least for the European encounter with the Western hemisphere to be rationalized sufficiently that we could understand what was happening. Okay. So both to understand the people living there and how to kill them, which is what was done. But the important thing to understand is that while we're talking about immediate things, these things will unroll over a surprising period of time. No, when we went into the blue water, it's a very long time to understand what that opened up. So at this point, I think they're Marsha princesses, and I want to go there and that'll be it, but more important than that the most important literature that you will find on the subject is science fiction. It is superb. Some of them, some of them were awful, but, and I asked them of Heinlein. I mean, they showed us, okay. Was what was possible. They imagined it. And it's extraordinary how right. I think they got it. I personally built my life after Harry Seldon. In fact, I am Harry Seldon.

Robert Kirkland:

Well, I got off on the Mars tangent here and I'm hoping that Fred Borowski can save us right now. I notice he has his hand up, but I can't see his face. So, Fred, do you have a question for the, for the panel? I mean, for the group? Yeah. can you hear me? Yes.

Fred Borowski:

Okay. So I want to go back a little ways in the conversation. And George was talking about the next war and how that's going to involve blinding the enemy. Okay. My question is, if one is able to succeed in blinding the enemy as a CNA, Quan, non of the starting a war, what prevents a response that is cyber or nuclear?

George Friedman:

Well, cyber, I think will evolve sending obscene pictures to the other side. Nuclear is the danger and a very great danger. We have kind of moved away from the idea of nuclear as a function within this, but there is exactly that scenario that you put out there that if we went blind or the Chinese went blind,

okay, how do we read that? What do we tend to be? One of the things that prevented the cold war from getting hot was the risk on both sides that it would not turn out well. And each side was very careful in not doing we'd have to be done. Yeah. The U S and the Chinese don't have that relationship yet because one, the Chinese are not there yet, but more importantly the stakes about that high for either. Okay. they appear to be, but try to do it.

Okay. And the U S is not going to close their ports and we have way more. Avoidance is one of the interesting characteristics of nuclear weapons on earth will that work? I'm not ready to call on that, of course. But yeah, that really is Fred did the danger point, which is that somebody is going to get too lucky and scare the hell out of the other guy. And there's not transparency yet between the two sides and that war, but we'll play that out as a factor when we get to playing us, try to work the apes, which is real soon.

Robert Kirkland:

Yup. You know, that this this point that Fred's making is a lot of our people who are on this today have asked us these questions. Andrew OD was asking if one country to stores, a satellite belonging to another country would re retaliation be just confined to space or what had happened here on earth. The idea of kind of blunting or spoofing, for example, GPS and other things. So there's concern from a number of people on the on this video today about what the, what the fallout would be for any sort of anti sat or other types of of attacks.

George Friedman:

Well, here, here's the point you do go nuclear. You don't know if the other guy has had his nuclear capabilities wiped out. You're pretty certain that he hasn't so going blind nuclear carries with it or retaliation. The cost of that is way higher than anything you were fighting for. So the question is, at what point does losing become the optimal maneuver? And I think that was built into the cold war I tried to base, and I didn't do well in the cold war. Losing in a conventional sense was read by both sides as a better option than a nuclear ship. Do the Chinese see that way, nothing in their behavior indicates that they don't, the Chinese are actually quite cautious the way they behave. Now, you know, the question is, do you, how is the national command authority structured? Could she go spazz and go nuclear? Yeah. But the fear of what happens as a consequence, which will be noticed on the other side, I think puts a tamper on it. But that is the real issue. The real issue is that for now we have pushed nuclear war off to the side for things like cyber warfare or things like that, that nuke stills there. And it could show up,

Fred Borowski:

Well, George, if I just could follow up there with what you just said it doesn't that make a first strike in space, more valuable because of what you just said, that there's going to be a hesitancy to win at all costs. The preference would be to lose.

George Friedman:

Well, it was like this, the first strike in this space is successful. You're trying to the Chinese say, okay, what was the purpose of the first strike? Why are you blinding us? What do you don't? You want us to see and how they answer the question? You know, it gives the answer. I think there's been a delimiter on systemic warfare. Systemic warfare is where the entire global system spasms world war II obvious

example. Then there are sub systemic Wars. The Israeli air was already a war that we talked about with surface substance Stevic. It was not taking it over, but even there the Israelis, when they thought they were about to be nailed as the Arab, as a series of going down to the Galilee, even there, the, they apparently armed to play in one story is the nuclear weapon, but what were they going to bomb? So here we have something that requires extensive thought, and I'm not bright enough to play out the various hands that you could play there, but it's there. Well, if you say you're Harry Seldon, you gotta be, well, I haven't done the math yet. Are you capable two plus two?

Robert Kirkland:

I wanted to open up the question either to Lakey or Tom if they had a comment and then move to the some of the other questions from the from the people in the audience.

Laky Pissalidis:

Thanks, Rob. Just wanted to add some point, I think George mentioned a date and I think that's important as well. When we're speaking of these developments, often in geopolitics, we don't necessarily have a fixed timeframe in mind. It's important to keep in mind that all that we're talking about now is not tomorrow's war. Yes. We're going to have to obviously knock out what they can see in a war, but we're not going to be seeing all this advanced tactical mechanisms and equipment in tomorrow's war that we're talking about here. Georgia, you said 22,200 something. I think he thought that that date outside of the things that we're talking about. Sure. So, yeah, I think that is important to keep not saying that's your actual date, but obviously, but keep long, keep a long view on this is what I would say to, to everybody else. I mean, this is what we're talking about. Yes. But thank you. And that's important, but assets blinding ASAP is a possibility now both sides have facilities, capabilities of doing that. The satellites are, you know, it used to be called confidence builders, Nicole, to where you showed them what you were doing. Okay. Take them away. And the confidence goes away and we have to play the war game. How do you read blindness? Okay. That's now the other things are far, far away.

Robert Kirkland:

Yeah. I seem to remember George, you were predicting battle stars in 2040. Was this correct?

George Friedman:

No, not 2040, 20, 80 Oh 28. Okay. The, I still have a chance at least to be dead for a wrong.

Robert Kirkland:

I got to go back to your book and remember what the, what those dates were. So, Tom, Tom has a question.

Tom Fedyszyn:

Yeah, sure. I want to compliment that original point that you made with respect to the evolution from from industrial warfare to population warfare. And then you, you, you phased into nuclear warfare. I'm just wondering at what point do we are we stuck? Because when you have nuclear warfare, you always have the possibility with great power competition for basically ending the world as we know it. And as long as you're faced with ending the world, doesn't perhaps it just get down to the psychological question. Is anybody out there willing to end the world? And if not, let's just find a way to avoid ending

the world and play our war game as much as we'd like to blind each other and space costs each other money Lou pocket change number of lives, but not in the world. So therefore, if mad is still operable, does that not affect the entire, your entire equation of space warfare?

George Friedman:

Well, I think of Indian Pakistan, two nuclear powers screwing around with each other constantly at sub critical levels, never going nuclear. So there's a kind of limitation paced on that. Okay. Now the problem of space is that you created an entirely new domain. We treasure our cities, but what do we feel about the assets and space and so on? So when we went into the Atlantic, okay. In the Atlantic, there was now an entirely different rule of warfare with the pirates. And so on Meredith is just reading a book about Jewish pirates. And I want to point out that the pirates were Jewish. And I didn't know that before, but now we found it out, but you had a completely different rule of warfare. So where the Europeans had a very clear set of rules on how Wars are acting in a new domain, the North Atlantic, it was very, very different. It was not the nation States or the Kings that were in charge. It was the criminals or not, or what they might be called criminals. So yeah, I think you're right. We have to think through this problem. But one of the things I noticed that's this world war two Wars have subsided in intensity.

And if you take a look at, say from 1914 to 1945, the level of casualties and the structured regimes was stunning. And since then, particularly because the United States only picks on people smaller than it used to. So since then, no one has even nuclear powers come close to it. I was not close to the Cuban missile crisis, but that's another story I'll tell you get.

Jacek Bartosiak:

Yeah. If, if, if I may add some, you know, some substance of answer to Tom's question I was thinking about it and I have to sort of a two fold answer to your question. First of all, is that space is providing a new cut capability to answer the Klaus of its requirement for war fighting as a political outcome and nuclear nuclear dimension of war. And they relate to the cloud service in equation. It really was killing the political goal, a mil, a war as a political instrument and a spaces returning it. But not only because it's an ideal, it's nice to have Wars that could have some outcomes, political outcomes, but because right now the center of gravity has moved from population industry and from the mass and concentration of power of military power. So information dominance notes see tools and the system that spans all that.

And the space here is that ultimate domain of imposing the will on the nodes and on the information dominance, it might theoretically in the theoretical model, it might be so that if you have the space-based assets that can control, I assert on earth and you, you have the laser speed of light weapons that could kill all nuclear forces on earth. First, it will have a wholly destabilizing effect on mad. That's why putting you so anxious about us crew hypersonic Christmas Island is, you know, space-based assets infrastructure right now, but it will also initially the nuclear they mentioned in terms of the strategic equity broom and the nuclear thing as something ultimate, okay. It will return the nuclear power as explosives and, and it, in a way, and also in the purely theoretical model, it might be so that if one of the parties sees that it doesn't have any chance of having seizing the information dominance based on the space assets that are expensive and sophisticated, it will simply not fight on earth. It will simply accept that it's about to lose in a way it's very provocative. What I was saying is very provocative, but I just wanted to say that I think that this pays based assets somewhere in the future. We'll create first is the

stabilization of this equity broom. And we'll create a completely new paradigm of thinking of strategy strategizing in that respect. That's my personal opinion of very recent weeks. So I I decided to share it with you.

Robert Kirkland:

As we were planning this I came to the conclusion there was no way we're gonna limit this to 90 minutes here. So we're going to go beyond this and perhaps for another half an hour or so. Depending on the questions, because we have about 17 additional questions here from people in the audience. So I, but the I guess the next question would be regard would be from Alexander flock, where he is kind of going to to Jacek your fourth point about the about the commanding control of space and, you know, the, the fourth critical breakthrough as you call it. And I mean, and George says is 2080 that, you know, this is probably going to be happening, but what does our experience now and living in space like with the ISS and others, show us about the ability to kind of create this technological breakthrough in the next 60 years to allow people to live in space for a long period of time to to kind of make this command and control happen, you know,

Jacek Bartosiak:

Of course. Yeah. Yeah, of course. I have no idea, especially that I'm not a scientist you know, involved in scientific research on that. But I think that the hypersonic Christmas is just around the corner. I think that detection systems in space are right. It's only a matter of investment that you need to put the lasers or the energy, their energy direct weapons is a major breakthrough that it's not operationalized yet. That, that, that is a challenge. And also, I think of a lesser challenge would be to put people in the abrasion points, eh, but it will be a philosophical challenge and some sort of geopolitical necessity must emerge on earth to do it.

George Friedman:

And I want us to take a look at the difference in warfare between 1960, in 2010, the radical evolutions that have been made along many lines, but particularly along the communications lines, particularly a long command and control, but also with linking space-based. Now take us forward another 50 years at the same rate where although with technology, we'll have an accelerating rates as you learn more, you do more. Okay. And you're going to see some of the changes that are likely, I mean, the transformation of warfare in the 20th century, it was stunning your world war two world war one begins as if it were a Napoleonic war. So we have to really understand that on the one hand, these radical things come much later, but that we are living through a process driven by the military, that drives things forward. So what is the F 35 mean for commercial space for commercial air travel?

George Friedman:

What assistance need for space? I don't know. Could I, can, nobody can tell me what the thing does, but let's assume it actually worth the money. Just imagine what the technology is that we have embedded now will look like. But the interesting thing to always remember is that when we look at the great developments and technology in the United States included a railroad, the military was the driver of the first step, and they never knew what they had. It took somebody in the private sector to say, I can make money off of this. And this is the American process. And we're the main power.

Robert Kirkland:

Yeah, George that's Andy Taylor asks and this is a follow-up to just, what you just said is what can we make of you know, space acts and other commercial exploitation that are happening now? Is this the follow-on that you're talking about? The commercial exploitation after the military exploitation, or what do we make of this?

George Friedman:

What did I make of this phone? There's value in space, energy free, unlimited harvestable. Okay. We have a massive problem. We're told global warming electrical cars are the solution. Good. All right. Now,

In my book, I wrote about microwave radiation from space being transformed into Powerade. I talked to some guys in the Navy who at the Annapolis, and who said, we can't we've studied it. We can't do it. It's too vulnerable. I stopped talking. Okay. There was nothing to say. Now you look at Musk and his definition of vulnerability and risk are totally different from that of a military. The military is at a non-failure point. They're at, okay, happens. That's going to be the position of Musk. So the entry of these people into space is as important as the entry of, you know, I D Apple into the space that was occupied by the iPhone, by the phone, by the cell phone, the army immense, a cell phone for maneuvering don't know what to do with it, work on it. Job's says I can do something with this and these people and moves on. So the military creates what to the civilian sector is merely a prototype. So the military is a well done thing, you know, we're, we're, we're ready now. The prototype is transformed. So what do you say about all these people going to space? You see the end of the period in which space is dominated by the military and the commercial opportunities? I think how did you first we'll start verging.

Robert Kirkland:

Thank you. Rafael please go ahead and unmute. Do you have a, you have a question for either for anyone in the group here.

Speaker 9:

Yeah. Thanks. So this is going to be kind of a long one, but bear with me. So I wanted to ask you about the overall trends of us military and its ability to have about allies on time and with enough force in case of conflict within 20 years timeframe. And I'm talking about contested areas far away, which are difficult to resupply quickly, like Latvia or Taiwan, not somewhere that is easy and convenient. And that is putting aside the nuclear question, because currently the Americas don't have adequate answer to small tactical nukes, and they would like, and they will be unwilling to escalate using the bigger strategic muscles. And there are some really worrying signs about its long-term credibility, credibility in cases like that. And for example, in space, they seem to favor all contractors like Boeing clock heat North of groundman, their lobbies.

There are the SLS and world panel Rockettes where are costly and quite frankly, already obsolete instead of innovations like star ship or new England stadia to fly this year in maritime dimension dimension, they have plans to expand their fleet, which are as impressive as they are unrealistic because you know, the budget, the budget is made out of rubber. And that is not to mention army, which is basically always underfunded. The only light in the tunnel seems to be the air force, but even that is

uncertain. Do you think that's in light of these developments countries like Korea and Philippines, that question money in Europe, what varietals check out backbone, but it's necessary to come to age around that time or what most allies would be unwilling to become potential potential targets themselves apart from Japan and maybe Australia in case that the supply of equipment or effective strike for space is impossible. And I pose this question to you because unlike George, we want to try to weasel out of its things.

Jacek Bartosiak:

Okay. So that was you know, like 2000 questions in one go but let me put it that way and con contextualize it with space. I just yeah, so this hub is at anti-vaxxer. Then our capabilities are pushing a way that us power projection into Eurasia and really exposing the vulnerable, extended external lines of communications across the oceans, towards the, the, the place where the history is made, that is called Eurasia. You know, where the Peter, you know, us Navy is trying to impose and in the rim land of Eurasia as well with a U S global power projection net. So it's very acute for people based in Eurasia to understand this concept, probably the Rapha who asking the question feels it so acutely. And sometimes in the, in the, in the U S people don't feel as because, you know, it's such a safe Harbor, you know, it's, it's so easy Eurasia as a congested nasty place to live, and we always fear.

So that, that is why space comes as cavalry here, so to speak, because if if the lines of communication on earth are contested. So can you imagine what happens if you transform the battlefield by changing the paradigm, and suddenly you can do something called vertical flanking from above San pedis supra as the motto space for saying always above. So if you have vertical flanking from above in terms of the reconnaissance and strike up abilities, that McConaissance is already there, vertical flanking. And if we agree that the center of gravity is information dominance warfare. So we have this information dominance warfare, because maize mainly because of the space-based houses that are both global, because they move at cosmic speed, but also they are tactical and lockout because there are like 200, 300 kilometers above the heads, which is really close to everybody like neighbors being neighbors to everybody.

So you have the vertical flanking of the [inaudible]. I think this is the domain that the us should move to blunt the Russian and Chinese and tax certain capabilities. And if you develop the strike like hypersonic Christmas, where are you effectively using the space-based asset can have situation even like tactical levels everywhere in Eurasia that changes the calculations in favor of the us influencing global pollster and global power projection. And here a space comes to help and changes the paradigm of the battlefield on earth. Of course, it can be contested, as I said before, but here are the game begins. As we write the book,

George Friedman:

Let me try to weasel out of this please. What is happening is that the United States is asking the question, what do we care? What happens with Lafayette? The idea that the United States has an interest in being a global power is increasingly dubious. Naturally the world sees this as a great weakness on the part of the United States when it actually is a growing selectivity. So we look at that area. We, that we can defend this unless the Germans are going to be deep into it. The Germans have no desire to be in Louisville. All right, we can live with a Latvia under Russian control. Now, the risk in

many of the things that the world interprets as American weakness is what I call a growing selectivity in us foreign policy. One that was imposed on us by Dez, by the sandbox as we call it we have fought 18 years of Wars to no clear end or satisfactory purpose.

Okay. We have spent treasures on it. And in the end, why did we care if Saddam Hussein ran Iraq, but there were reasons for it, but it was enough of that. So you will see the United more and more refusing to engage in areas of the world. And the world will interpret this as the decline of the United States. And I'll weasel it here. It's called the maturation of the United States. The world said we don't want the United States to be policemen of the world. So Danny says, okay, we're not the policeman. And now the world will find the United States intervenes when it wishes to, and when it can win, hopefully it's a maturing of foreign policy.

Robert Kirkland:

Excellent. Alexander Foch, D you had your hand up, go ahead and unmute.

Alexander Falk:

Thank you. Oh, my, my, my question, my next question is, is going a little bit further out in the space, right? We, we briefly talked about luck, ranch points before, but they're, they're going to be strategically important points of, of gravitational really premium in the, both the, the earth moon system and also the, your sun system. What are the, the property rights associated with those? And I'm, I'm coming from this from more of a commercial perspective. If you think about asteroid mining as one of the most important commercial interests in space imagine a corporation parking, an asteroid low ground point, will they have competition with, with space based state entities for property rights and those look, branch points, sort of what, what's your perspective on the importance of those, those equilibrium points?

Jacek Bartosiak:

Yeah. Okay. I think these are critically important points. Maybe the most important points in this dual planetary system, especially two of them, which are most stable meaning that you don't need to expand energy to, to, to keep station station there, which means that you can put the production facilities. And I think there will be a competition. Of course, these are not small areas, so it's not like that, you know, there is one ship standing there and that's it, it's, it's, it's, it's an area to be discussed, you know, to be discussed how big, but for sure, I might, I'm saying for myself, I don't believe, and this and this wishful thinking idea that the humanity will agree on something about it and think that the power will decide who is in charge, just like with Malacca Strait and the brows and the world ocean, who is in charge of those strategic places in space. And this is why space force was I guess, a published. And I'm, I I'm afraid that the balance of power will decide. And of course there will be some rules based on the balance of power, but the palace of power will decide you need to have the military muscle space-based military muscle to do it.

George Friedman:

So I would add into this when Europe entered to the Western hemisphere was both under the control of the King and the wild West, and other words, you know, they came here, they did what they wanted,

and that was pretty much the view of the government of Spain. For example, let them do what they want so long as they give us a piece of it. We have had histories of exploration in this world and the Western hemisphere, European encounter tells us the most, which is if you really want to understand it, watch gun smoke, gun smoke. We understand how we share power. Who's the fastest draw. So this is a less sophisticated way to say, well, yeah, 6 cents, which is there will be worse.

Robert Kirkland:

Mike Lauren, SAS to follow up on that, George, yet he asks nuclear and pre nuclear Wars and that invariably harmed or civilian populations in different yet characters really unpleasant ways. How might space Wars impact or civilians and kind of future kind of conflicts we're talking about here?

George Friedman:

Well, the way to put it first is there has not been a nuclear war. It has been one set of nuclear attacks by the United States, and certainly both damaged severely Japan and perhaps save many lives. I don't know. So we've not had one. One of the things about nuclear weapons is they make war unlikely in space. We really have to take a look how much the world will come to demand depending on space. So the world has become to depend the great deal on the Western hemisphere. It matters what do we, what has done here, but Europe amazingly didn't depend on it at all before the 15th century, what will we have in space now with Jasick is talking about in the commercialization of space is the growth of a major dependency on it. And therefore, as with Wars, anywhere else, these will be hostages to the war at the time. Assets would have to be protected. So does the nature of war, but let's first understand what will be there. That's worth fighting over right now. What is there that really matters is not a financial asset. It is the ability of the enemy to see that is something that's refining for, blinding their satellites. What else is there? Well, we'll go on to it. We'll see. I don't think GPS has a refining over

Robert Kirkland:

And that sort of gets to a couple of questions about, you know, there's kind of economic co-dependence and I think you alluded to it earlier, George, about how China's, you know part of the global economic community and you know, what would a war like that mean? And what's the motivation today to have such Wars, a given economic interdependence.

George Friedman:

China is the world's largest exporter. United States is the world's largest importer of all those customers. United States is way up there, but interestingly, China is not the most important customer seller to the United States. Canada is, and Mexico is, they are much more trade. Therefore China has a greater dependency. Okay. There's always the customer's rights. Okay. And where are the customers? This is one of the things that the Chinese have to calculate there. And the United States has already shown them that we ever prepared to have a certain degree of a trade war with the, that we're not, not straight of it. United States has shown them that we are not moving out of the South China sea and the Chinese have to calculate the DUS is going to have some response to an action in Taiwan and the Chinese irrational. So the question is how do they calculate the costs of challenging the United States?

George Friedman:

The biggest one being they happened to lose because you could lose a war, but apart from all of that, this country like Japan, before it was obsessed with exporting it to built its economy and exporting its internal economy could not absorb all the things that produced a war would make that impossible. I'm not sure that would be the only criteria they would use, but certainly, you know, the strategy of the Chinese on this is to pretend it doesn't matter. And to publish statistics that show, it doesn't matter if they published statistics on all the time. It matters. So they have to be cautious. They really are not as robust that they can absorb that kind of pressure. Plus remember also the Chinese had economic problems with a bunch of other countries do Europeans. They're not happy with them, the Australians, or also a customer, not happy with them. The Japanese really does lighten. The Koreans will trade with anyone. So they're in a very difficult position. Their greatest success is pretending not to care. I like that. It's very good. If you've got to get beat up at the school yard act like it doesn't matter. All right. But it doesn't matter. And they know it and they have to be cautious.

Robert Kirkland:

George Frank buzzard has a question regarding non rational actors. It seems like we've been talking about the rational acting in space. And he says, what about a non rational actor, like a Kim Jong-il or he mentioned Hitler and others who may not be rational in their use of space or seeing war in space. Not from a rational standpoint.

George Friedman:

It hit, there was rational. He did exactly the same thing as [inaudible]. He was surrounded by the Russians in the East, the French in the West supported by the British. And if they attack simultaneously, you lose, he had to have a preemptive strike against one, taking them out of the war. you did with France, it's the, and fold or the war was ended differently. It wasn't irrational. You just didn't run it internal behavior. That's another story. I see nothing irrational in Kim Jong-un Kim Jong Neil's purpose is to preserve his regime. He's done it, he's done it. The entire family has done that. You know, I wouldn't think they could run a grocery store yet. They have managed to hold the United States, South Korea, China, Russia, all at Bay. So there are frequently people who appear or players who appeared to be irrational. And then you'd really, and you see what they're doing.

It's like a poker game. You want to be a stupid lunatic to everyone else. It's the most rational behavior you could possibly have. So I would argue that the process of governance is rarely one. Man Hitler was surrounded by a system and he had to serve that system in order to maintain his power. And that system impose certain logics on it, which is not the logic of one person, but the Mo logic was we have lost the reside treaty. It was an absolute, we were prepared to fight an other war if you do it. And if Hitler wanted to keep power, you have to come out of this. So to Kim, it is always striking to me and most interesting, which is that when you drill into the behavior of a nation, it doesn't look as crazy as when you look at it from the outside.

In the case of Kim, he had a strategy that I called being crazy ruthless incompetent, so appear to be ruthless and dangerous, appear to be incompetent. So you don't have to worry about him. Appearing make him appear to be crazy because by being crazy, you don't want to touch him. And by combining these traits, no one in all these years as challenged the Korean regime, since the call, the Korean war,

that's pretty cool. They had no business surviving, but they did. They are the hand at the table that you think is nuts yet always made in the pot.

Robert Kirkland:

Good. Well Jacek a question from the seal regarding European countries and militarization of space UK Germany, some other country what's your, what's your thoughts on that?

Jacek Bartosiak:

Of course, the Germany will, will move there. I think France has assets and some you know, important assets and transportation launch facility in French, Brianna, and the, the rockets and satellites. And this is why they were contesting us. Second Gulf war in terms of his political, you know, struggle to, you know, to, to blunt the invasion. And and the Germans recently announced that they want to build a launching facility in Germany, for whatever reason, given the, given the, you know, that you need to set the lies, objects up the appropriate places and European peninsula is not the perfect place to start, you know, to munch objects. And there are, you know, their ideas like Norway announced that it wants to two satellites objects using the the Virgin orbit plane. So satellites, orbits, Poland thinks about doing it the same way. I mean, satellite, our objects from the Virgin orbit, a Boeing seven 47 Angus platform.

George Friedman:

Is there anybody in Poland except you wanting to do that?

Jacek Bartosiak:

Let me, let's, let's, let's put the silence on, on, on the subject, but I, I think that it's a good idea. And by the way, in terms of the of this vulnerability of the launch facilities, I see two solutions for military users first that you need to have redundancy and resilience, and you make it by using really the platforms like Boeing seven 47 to satellite redundant satellites. Okay. Because it's very difficult to strike them in different locations when they are flying as opposed to Boca Chica, or can the space center that is static, so to speak. And another thing are the more time based platforms that floating platforms for launching space rockets that are mobile, so to speak, and the Chinese experiment with that you know the LOC intensively, we with George, we research the Chinese internet from insights, so to speak and they, they just do it, right.

I, they just, the Chinese internet in Chinese in some really shadowy corners of the Chinese internet which is enormous in size, by the way, for you to know if, if anybody's interested in space research I received a hint from space specialists that satellites objects worldwide, and they say that they want to find out something nice. They, you know, they use the Chinese guys to enter the Chinese internet and they have some, you know, spots there with information that is not reachable in the Western internet. Yes. So interesting things, you know that are not sort of a common wisdom yeah. So to speak. And so they, they exercise. So I think this, this is also a solution to sort of create multiple solutions to blunt this capability to kill the launching.

Anyway, so yeah, and the, and they really experiment with using the Marta and platforms like Elon Musk announced recently that his star ship will be launched also from the Mar time platforms off Texas coastline for you to know for those who are based in Texas, you can see the show because the pocket

Chica that will, in my opinion, come down in the history books, likes aggress came down aggress in Portugal, the place where Carvel was invented and where they learn the, the craft or the navigation.

Robert Kirkland:

That's that's my favorite essay from George Friedman is the, is that essay on Portugal also. So I know, you know, I think we're probably gonna wrap this up here. I think I got it. My apologies to any of the asking any questions who maybe I didn't summarize it well, and I know that Meredith will probably put that in the question or the answer box in the GPF forum, but I just want to wrap this up with George, just that any final thoughts from you regarding kind of our discussion, the last two hours. I know it's gonna be hard to summarize it, but just some final thoughts on your end.

George Friedman:

We are going into space. We don't know what that means anymore than we knew what it meant to go into the seas. Right. we went into seas and the world changed. So to with space, the most important part to remember is that commerce and war go together and not separate when may lead the other. And we have to understand commerce and war in space, and it will be book shortly that you might want to read, right? So I want to thank everybody here. This was a good session. And now I think it's time to go to China, us Wars, and to figure out how we're going to have a game here with the whole team and, you know, play the two sides or the seventh size of the 14 sides that are there to play. But now we get down to the interesting part so far not. Okay. Thank you,

Meredith Friedman:

George. And thank you, Rob, for a great, doing a great job moderating. I just want to thank Deepak for being on from Jakarta as well. And I really want to take my hat off to Diana Austin, the only woman on the attendee list, and she stuck out the whole two hours. Thank you, Diana, unless that's a fake name, glad you were here and glad to see you stayed on. I always enjoy these. These are fascinating. I really liked them.

Robert Kirkland:

Isn’t Diana, the goddess of war?

Diana Austin:

No, no, but I, I feel like I I also like there's a a podcast that's called when diplomacy fails. And it's, it's fascinating about to talk about how the the one I was listening to is the 30 years war and the effects of that, and how it changed the whole concept of warfare and how they look back to Hannibal and how Hannibal, you know, he conducted his battles to change to finally figuring out how to use the musket war.

Meredith Friedman:

So thanks everybody for staying on. And we really look forward to the the US China game coming up. We'll let you know the date for the March session on war. Thanks to our panelists for all your great comments and everybody's question of participation. Have a good day.