

**CENTER FOR  
STRATEGIC AND INTERNATIONAL STUDIES  
(CSIS)**

**HEALTH OF THE U.S. SPACE INDUSTRIAL BASE AND THE  
IMPACT OF EXPORT CONTROLS**

**SPEAKER:  
PIERRE CHAO,  
SENIOR ASSOCIATE, CSIS**

**TUESDAY, FEBRUARY 19, 2008**

*Transcript by  
Federal News Service  
Washington, D.C.*

PIERRE CHAO: Can we get going in order to stay on time?

As somebody mentioned in the back, at a slide a minute I barely have enough time to get through this. But trust me, I'm not going to go through every slide.

Good morning, everybody, and thanks for joining us. The intent is to brief the results of a study that began quite some time ago, actually, and it was born of the genesis of Ron Saiga (sp) and the Air Force, who had an interest in taking a look at the health of the space industrial base and what the impact of ITAR and the export control system was having on it. There was – as you all know, there has been sort of a mounting commentary and frustration and comments about what was going on, and the arrival and the marketing of ITAR-free products, for example, has first shown up in the space sector. And so that began the genesis of the study.

We've put together a working group, and I'll take you through it, of people that had a lot of deep expertise inside the space sector in terms of space policy, people who have actually been in the space sector; everybody from large companies to small entrepreneurial companies. We briefed the results to our sponsor now about three weeks ago, and this is sort of the first sort of, you know, public rolling out of it.

Let me put it also within the broader context of what's going on, to the extent that when we started this study we thought we were going to be one of the first export-control-related studies to be coming out. And since then, however, something has gotten in the water in Washington, D.C.; many of you heard me talk about this. There are now 18 export-control reform studies, efforts, workshops underway in town, everything from inside the government; inside, you know, State Department, Commerce, DOD as they look at their internal processes; NIAG, which is the NATO Industrial Advisory Group, just did something out in NATO; many of you here are from the MOU Group; there's work internal to here; industry has been pinged at this from multiple directions including the Grand Coalition, which had a response backed by the administration; Hudson Institute, Heritage Foundation.

There's a broad swath of efforts and so, from that perspective, people doing broad export-control work has been there. And I think the group as a whole, we decided to then focus, therefore, very much on what could be done within the space sector and let it reflect upon the larger export control effort, rather than make this a broad export control reform project in and of itself to the extent that it fits as one slice.

Now, I would say that I think that space has become, in some ways, the canary in the coalmine, to the extent that the ability to find evidence of impact has probably shown up first in the space sector, where you can do it in more stark contrast, for example, than in any other ones. And the other sort of preview comment that I would make was that I think the group as a whole would agree with this, you know, to the extent that everybody

was looking for big smoking guns. We didn't necessarily find a huge smoking gun but we found a whiff of gunpowder, is kind of the way that I sort of phrase it.

Can you go to the first slide?

One of the first things that we want to start with, in terms of putting the right context, and I think it's another thing that has shown up in almost all the export control reform efforts you have in town, is that we start with the premise and the beginnings and, I think, the basic philosophy of the study was to start looking at it from a national security perspective not an economic one; that, to the extent that there was an argument to be made about whether you should or should not have reform, that it should be done primarily because there's a national security issue rather than an economic one. And from that, we very much sort of embraced where the U.S. national space policy sort of began. Next slide.

The task force; again, we had a dual task: look at the health of the space industrial base as well as look at the impact of ITAR. Next slide. And this is the group. Tom Young, Bill Ballhaus were the co-chairs; for those of you who don't know them, two individuals with just deep, deep expertise and great reputations in terms of space policy. Lon Levin is with us here, he's from SkySeven Ventures, but he has a much more storied and interesting history than that in terms of his background; individuals such as, again, Tom Moorman, Bob Walker, Paul Kaminski. So we think we put together a very good, solid group. The one thing you should note that this report is a consensus document; in other words, the entire group has signed off on the findings and the recommendations, okay. And for any of you who have worked in sort of committee meetings, you know – (chuckles) – what that's like to sort of nuance every single word and get everybody to agree to them. But we thought that that was pretty important, to have that put into place. Next slide.

The methodology, fairly standard in terms of how we do these things in town: did a whole series of interviews, talked to a lot of experts. The one thing that is, I think, fundamentally different than a lot of these types of studies: Through the help of AFRL and the Department of Commerce, we did probably the most comprehensive survey of the space industry, I think, that has been done in five, 10 years, if not ever. It was a fairly long, detailed survey that asked lots of questions about the health of the industry; impact of ITAR, we picked up lots of data. We had the nice advantage that if you don't fill out one of these Department of Commerce surveys your CEO can go to jail for up to a year, and so everything was filled out and we had very, very good returns. It's a little nuance with Department of Commerce studies that I never knew about. And so we were able to put, I think, a lot of facts behind the analysis and the study that was in place.

The survey in that study has been released by AFRL, correct me if I'm – so you should be able to find it somewhere in cyberspace, to the extent that if you want to get deeper into the data and find that out. The one thing I would note is we did tweak the data somewhat differently, to the extent that they focused as much on the space services

market as well as the hardware market; we looked pretty primarily into the manufacturing base. Next slide.

We also wanted to start with a series of principles, again, to make sure that the whole group was grounded and that we had a commonality or at least an understanding in terms of where we're going. Some of these are motherhood-and-apple-pie, but it was important to sort of put them out there to make sure that, as we were sort of approaching it, we had a commonality of view: the fact that space is actually critical to national security; that leadership for the United States is an important thing; that there is a great interdependence between all the segments of the space community, and I think that's one of the fundamental things that underpins part of the argumentation; that there is an overlapping between the defense, intelligence, civil and commercial sectors of space; that damage in any one of those areas actually does damage more broadly; industrial base is important; that export-control policy and having an export-control system is an important thing; you know, that if you can make an argument for any sector where you do want to maintain controls over technology, that space you can clearly argue is one of those important things. However, you also need to have unimpeded access to global technology on the part of the United States in order to achieve all of these other sort of goals or principles. Next slide.

So if we can – I'm going to briefly go through the results and then we'll dive into the details. On the health of the industrial base, what we found was that the financial health of the top tier of the industry, after sort of having gone through a pretty horrific period in the sort of post-telecom bust, was good. But there were areas of concern within the broader healthy of the industry that had to do with human capital, that had to do with program execution and sort of systems engineering skills that had to be looked at. And, in particular, where there are vulnerabilities that are beginning to show up in the health of the space industrial base it was really in the second and third-tier of the industry, and I think that's a theme that you're going to see picked up throughout the study.

And that one of the other important findings is that the U.S. space industrial base – and for those of you that live in it, it may not be that much of a surprise but it's something that had to be brought out – is largely dependent on the U.S. defense national security budget. In other words, that the space industry looked a lot more the shipbuilding industry, for example, or others than some of the more broader commercial ones. And so the implication was – and one of the comments I think we delivered back to the government sponsor – was essentially you own this industry from that perspective and therefore, that takes you down a crossroads or a path of either you adopt a strategy that, for lack of a better term can be deemed, you know, an arsenal strategy. In other words, if you were responsible for the health of the industry there are sets of policies you need to pursue or you encourage it to participate in the broader global economy, allow it to diversity away, and broaden its economic base so you kind of get out of this.

This is not a new argument. We went down this argument in some ways with the high end of the computing industry; we've gone down this argument with lots of other sectors of the economy. But it is really one that has sort of shown up on the – frankly, on

the crossroads as it relates to the space industry. And if you're going to go down the path of I want to encourage or allow this industry to therefore participate in the global economy, then that takes you down the path of then I need to take a look at export controls and the ability to compete in that global economy. Next slide.

So on the landscape in terms of what does that global economy look like, clearly there are rapidly emerging foreign space capabilities and the U.S. does not control their proliferation. What's been amazing has been to see the amount of cooperation that's sort of going on outside of the U.S. or even the West's sort of purview, that U.S. preeminence in space is under-challenged in many areas. This was somewhat of a controversial, I think, finding. We had to debate what does that really mean, you know, have we lost preeminence? I think the conclusion of the group was no, you know, but there is an erosion from the bottom and certainly an assault in particular areas, and that in many places, the current U.S. export control policy has not prevented the rise of foreign space capabilities, and in certain cases, it has had the perverse result of encouraging it, in terms of building up capability.

We heard some interesting testimony where a certain individual came here with glee and said, you know, the U.S. ITAR has been the most fantastic thing for us. It has allowed me to go to my national government and ask for more resources for our industry, and we've been able to build it so you guys keep it up because it's fantastic for me, thank you very much. And that was, you know, somewhat of a stunning sort of set of comments. And so the grand strategic intent of the space-export controls, which if you look at what the congressional language read when they made the change, for example, they were very clear in what their strategic intent was, I think you can safely say that that grand strategic intent is not being met.

And in some cases, you can find where the export control policies are actually running counter to the national space policy. And in particular in one area of the national space policy it says that international cooperation is one of the fundamental underpinnings of it, and that the U.S. benefits from access to foreign innovation and human capital and that access, I think, we've been able to demonstrate with some of the data, is getting increasingly more difficult. Next slide.

That it is constricting U.S. engagement and partnership with the rest of the global space community and particularly, where in certain areas we're able to find – in niche areas, for example, in anomaly resolution where the inability to do real-time anomaly resolution without a license is causing, you know – is putting at risk operational issues. There's been lots of testimony by NASA, for example, in front of the Hill that's talked about this topic and it's one of those issues that has come up here. Next slide.

That when you look at it from – all of those looks have been looks from policy, from national security and sort of where it fits. If you begin to look at it from the perspective of now the industry – U.S. has been losing share in the international market. Study after study shows this with the greatest burden actually being borne by the second and third tier. So once again, here we pick up this theme that the real impact is showing

up on the second and third tier. That and you can make the argument and has long been made the argument is that second and third tier that we rely upon to provide a lot of the innovation and development.

What is stunning in the actual data is the large primes – and this has been corroborated in other areas – spend about 1.5 to 2 percent of their revenues on IRAD, internal research and development. You go down to the second and third tier, and you can see 5, 10, 15 percent of revenues being spent on internal research and development. And there were a couple who came in and talked to us about clearly, you know, if I cannot sell overseas or if I'm restricted, the loss of those revenues has a direct correlation in terms of how much money I have left over in order to put into that investment that I'm able to do. And so that is why we really, really sort of zoomed in there.

The goal is to bring the states' export-control policy in line with the national space policy and achieve its strategic intent without, you know – eliminating the negative consequences. I think, and Lon, tell me if you would agree that if the group felt that the strategic intent was being achieved, we probably would sit there and say, okay, maybe I can live with the economic consequences of it. So it's more the reverse, the fact that okay, if you're not achieving your strategic intent, then I should go after – you know, why pay the economic sort of burden of it. And frankly there was a unanimous agreement, and we have seen in other studies that we think you can sort of do enough reform to the system while still preserving national security in achieving the goals that you want to do. Next slide.

So the recommendations, I apologize for the eye chart. One of the biggest things is that there has been a disconnect between the administration and the Congress in terms of what they really want the strategic intent of the space control, export-control policies to be. We have now had this debate or it has been going on for eight or nine years. The notion of getting the two groups together and sort of reconciling that is probably something that – not probably, is something that should and frankly has to be done.

That the key here is to identify the critical space control – space technologies that you want to keep on the munitions list and then move the satellites, the overall satellites back off the munitions list onto a Commerce list. The fact is is that the munitions list is too much of a blunt instrument to achieve, again, the strategic goal that you want. If you want – the mere fact that the instant you put the overall satellite on the munitions list means that every component underneath it and everything that touches it underneath it becomes a munitions list item, which is the opposite, we think, of what you want to do. Identify the parts you want to control, if it's a particular solar cell, a battery, whatever, say, I don't want that or I don't want that particular category, and then move the overall. And that will eliminate, frankly, 80 to 90 percent of the weirdness that goes on in relation to that. So that is a key.

The notion of doing an annual review or a periodic review then of what is on the list has long been there. The new presidential directive, I think sort of encompasses kind of this philosophy that there should be periodic reviews. And actually if you read the

legislation very carefully that put satellites back on the munitions list, it's actually one of the items that says that should be done. It's actually one of the items in the legislation that we ought to have a periodic review.

Some of the – there is a default sort of set of recommendations to the extent that if you don't want to go down the path of using the comsats, commercial communication satellites back onto it, the mere fact that you have a piece of legislation that relates to this particular sector gives you the opportunity to then bring in other best practices under that legislation if you want to. And again, it matches in many ways what the presidential directives that were just released talked about in terms of set timelines, technology thresholds, de minimus rules, special licensing vehicles, for example, for international cooperation.

We think that the NASA administrator, Sec Def, as well as, you know, Sec State, who currently has it, should have the ability to, should have the authority to grant real-time, case-by-case, exemptions to the anomaly resolution problem. Frankly, it goes on today to the extent that everybody is so mission-oriented, if there was a problem going on real-time, you know, would people sort of talk to each other in order to get it done? Probably. Does it put somebody in jeopardy, you know, legally by doing that? Probably. That is no way to run a railroad. And so in some ways, the ability to have that authority, we think is pretty critical.

Picking up on a notion in other areas, a special program authority to permit engagement in multinational space programs. It picks up on this theme that you're seeing in lots of other export control reforms of trusted communities or special communities. We have had that notion that was built around the joint strike fighter. Many of you are engaged in that. You can sort of make an argument about whether it is working or not working. It picks up on the notion in many ways about what the U.S.-Australia, U.S.-U.K. Treaty are about, about creating trusted communities to the extent that there is multinational space projects that we want to do where there is a trusted community, the ability to have an exemption under that is there.

Increasing the dollar threshold for satellite exports, congressional notifications since it never been indexed to inflation, that is just a good housekeeping type of thing. And then as far as the industrial base is concerned, a periodic review of the industrial base with all the communities involved. Back to this notion that they are all interrelated, and they are linked, and therefore taking a look at it as a group is useful. There is a growing venue called the Space Industrial Base Council, for those of you who don't know that has a lot of the constituencies involved. That is a good place to be.

In many of the other areas where we have seen big movement in defense industrial relation between government and industry, it usually has been communities, frankly, that have gone through near death experiences like the ammunition community, for example, in the 1990s, where now they have these venues where you see industry and government getting together and hashing out these types of issues in an open format. And that is something that we can sort of only encourage.

So that is the quick sweep through it. Let's – we'll slow down the pace a little bit and sort of take you through our journey that we have gone through. Next slide.

And at the risk of – I'm willing to have this somewhat interactive to the extent, if you have got questions, pop your hand up, and we'll see if we can keep the pace going. (Chuckles.) Go ahead.

Q: Question. You mentioned the concept of sharpening the munitions – (off mike). Has anyone gone through the exercise of saying, okay, here is Department of Defense says here is the piece that we really need to protect and stay on the munitions list. Well, now let's run through the caseload and see how it affects the caseload going through State and through Defense. Can you really get substantial savings – (off mike).

MR. CHAO: So in relation to space that wasn't done – or I'm not aware that that is done. It's one of the recommendations and the space community has sort of said this is something we should do anyway. What you'll find with the caseload for related to space, it's not a big number, okay? But some of the most complex cases fall in the space sector. And so one of the things you'll see in the actual data – where things are really getting gummed up, for example, is in the TAAs, the technical assistance authorities because they are really, really complex and take the time. Where that kind of exercise has been done was in relation, for example, to the U.S.-U.K. U.S.-Australia Treaty where they found out that of the 70,000 licenses, 19,000 were related to the United Kingdom.

MR. : And 99.5 percent –

MR. CHAO: And 99.5 percent are passed, and so it goes back to this notion of, if I have scarce resources related to this, how do you get them to focus in on the really most complex difficult ones rather than that?

Q: Through the technologies that are manufactured by the U.S. second- and third tier-suppliers, were you able to speak to somebody at let's say, EuroConsult to corroborate that the loss of market share on the U.S. end is equated to a gaining of market share on the European end for those specific technology hearings?).

MR. CHAO: So as is typical for most of these studies in – we certainly were able to do that – to have clear evidence of that anecdotally where there was an American product that was deliberately designed out, which equated to flat-out loss of market share. Does it show up in the overall macro trend data? No, on the second and third tier because we didn't have that data. Yes, on the top tier to the extent of satellite market share, you can show that, okay? These are things that everybody is looking for, right? And that is why I say, you know, if you're looking for the blatant smoking gun with, you know, Mr. Pims laying next to it and the chalk outline, you know, it's not quite there. But there is gun powder in the room and there is enough that you can sit there and say – I'm confident I'm standing up here saying that there is an impact, okay.

So the first sets of findings related to the health of the industrial base. Next slide. The health of the industry, like I said, is good. Can you click on the topic chart? Let's see if modern technology works for us. We tried to do this in a clever fashion. No. Back up one. Just click on the red, it should go to the page. Oh, technology does work. The top tier of the primes – tier two is the light blue and the dark blue is component suppliers. There is two things that jump out at you related to space.

One again, is sort of this, you know, that's the bust – the stuff you can bust as well as the choking on some of the other, you know, big satellite projects and programs that are going on. The other thing that jumps out at you is that, you know, the average profit margins for this industry are actually structurally lower than you would find in the broader defense aerospace area. And so from a relative comparative perspective, that is sort of one of the other issues.

But it's also why, you know, with the bounce-back that is going on, and it extended into '07, the backlogs that are underway – the mere fact that we have probably, you know, one of the largest recapitalizations of every space asset that is out there in a national security space arena. Most of the people that came from the industry side said, well, it's going to be hard for us to really whine and complain about, you know, our financial outlook given the rebound that was there. The fragility is certainly there to the extent of it was not that long ago though that everyone was sort of on their backs. If you can click back to the – (off mike) – presentation. The next slide

. The areas where there were identified weaknesses in that second and third tier – and this is work that was done at the Space Industrial Base Council, aerospace. In terms of identification of particular areas where there was either – you are down to one supplier; you're down to one supplier who is financially weak; you are down to a set of suppliers who are financially weak. There are particular areas that were identified in terms of specific sectors.

The other thing as well, and we're not going to dwell much time on it unless you guys want to – there have been lots and lots and lots of studies that have been done that have looked at the whole space-related workforce. The fact that it is aging, you know. You have the whole Apollo generation that had sort of grown up and – that is going through, for lack of a better word, block obsolescence, as they go there. And the particular gap where it's beginning to show up is exactly in that cadre of people that you would need to be graduating or being promoted into program manager, program director, you know, those levels. And the fact that there have been – that there has been a slower pace of development means that the ability to generate the skills for that industrial base is less, right? And so there is a linkage back into this topic to the extent of if lots of program experience is what makes a good systems engineer, a good program manager, and you're working on fewer programs, less things to learn on – learn your lessons on. That is a bad thing to the extent that you can work on international programs, other programs, but sort of keep that pace going. That is a good thing. And so there is a linkage between sort of this arsenal hothouse version of the industry versus one that is globally engaged. Next slide.

The issue, again, in terms of the program management and systems engineering skills – you don't have to click on that – has been sort of well identified. Mormon has done some, the Young study that is out there. We wanted to acknowledge them as a group, sort of pay homage to them, sort of say that it has been recognized. There are initiatives in place that begin to address this in terms of trying to rebuild that cadre of people. Frankly, our comment back is it's going to take you almost a decade to rebuild this cadre of people. And so it will continue to be a looming issue as far as the industrial base is concerned. Next slide.

And in terms of the, you know, what part of the industry is sort of dominated by defense when you, again, take a look at, you know, percentage of sales on a manufacturing side. You get a very different picture if you include services because there you have global players – 50, 60 percent of this industry is fed by, supported by, works for, you know, the national security space community. And that is why the message back to that community was, you know, you really sort of dominate the landscape. This again, these types of percentages look more like what you would find if I were talking about the naval shipbuilding side, than, for example, if I were talking about aerospace, which has a better balance between commercial and military, or if I were to go to any of the electronics sort of sides of the industry. Next slide.

Q: Pierre, domestic non-defense – (off mike).

MR. CHAO: Excuse me?

Q: Domestic non-defense – (cross talk).

MR. CHAO: Domestic non-defense would be what we people would call civil, you know, civil space, right.

Q: That's to protect the market and commercial market, which is not –

MR. CHAO: Right.

Q: You're more of a arsenal state than even –

MR. CHAO: That's correct, to the extent that if you were to fold into NASA and all that, it would show an even bigger government sort of – now, take this back 20 years and it would be all red, right. I mean, so there is evolution of the industry underway clearly. So that was the message. And I think the, you know, the message was certainly absorbed by the sponsors and they are working their way through in terms of, you know, what do they want to do about that. Next slide.

On the export controls. Next slide. Next slide.

For anybody who is in the space community as you guys are, you will know this, right? Where we were once part of a very exclusive club, the number of nations that are active in space have continuously grown. We have got triple the number that have their own, you know, navigation systems, double the number of countries with their own reconnaissance, you know. You have got a dozen countries that are now able to launch their own satellites – Israel just launched a satellite on an Indian launcher not that long ago, for example – 38 countries had operational control over their own comsats. I mean, you go stat after stat after stat. Take any timeframe and one that particularly – pick 1999, as one of those sort of timeframes, there has been a continued proliferation of technology. Even more critical, the simplification of that capability continues to increase.

So in terms of commercial imaging satellites at a meter of resolution or less, when before that was the magic number that everybody wanted to get to, there are lots of other countries that are there. Civil radar imaging, which is an extremely sophisticated technology, is there. And so this proliferation of that, of sophistication also continues. Next slide.

And where once upon a time, the U.S. had a technical and qualitative lead over the competition in terms of commercial communication satellites, that gap has closed. If you want to click on the table. And you have got the detail table back on page 47. But we took a look, again, we used 1999, as sort of one of the demarcation points because that is where the technology changed. It's an eye chart; you have got it in the back of your books.

But whether it's the number of transponders, lifespan, payload, weight, in many areas where the United States a decade ago simply had an advantage, that gap is now closed. And everyone one else is offering, you know, equivalent capabilities. It doesn't mean that the U.S. isn't trying to develop better ones. It doesn't mean – frankly, the Europeans also aren't trying to develop better ones. But, again, where there was that gap, it has changed. Go back to the main screen, please.

And so, you know, the message back to the broader world and in many ways the message back to, you know, to the Hill on this topic is as much as the U.S. would like to control this spreading of capability, there is international cooperation that continues, you know, without us. And in many cases, it's the Russians who sort of are engaging around the world in terms of this proliferation of this technology. Next slide.

And these other space-faring nations are continuing to make strides, whether they have access to U.S. technology or not. I mean, the most striking one is the pace of evolution of what the Chinese space industry has been able to achieve in the last eight or nine years. We can debate endlessly whether it could have been faster, slower, you know – frankly, I'm not going to engage in that debate because I don't have enough data and it becomes sort of counterfactual analysis. I just stick to the very simple point that if there was certainly a strategic intent articulated in that legislation, that intent is not being met to the extent that the proliferation continues. Period, full stop. Next slide.

And in some cases as we indicated, it has, you know, begun to encourage it. And so there you pick up the evidence whether it is the Indian space program, whether it was deliberate spending of funds to develop capabilities in Europe where the push to develop sort of the ITAR-free satellite is there. There, I think, is where you, again, you're going to find the very specific and targeted pieces of data and evidence. And it brought us to this conclusion that the grand strategic intent of the space export-control policy is just not being achieved. Period, full stop. Next slide. Go ahead.

Q: Pierre – (inaudible) – Space News. If you look at this, can you boil this down and say the legislation did not do what it intended? It had the opposite effect.

MR. CHAO: I'll go all the way with you on the first half of the sentence. It did not do what it intended, comma, in some cases it had the opposite effect. I'd just modify that.

Q: Do we have statistics?

MR. CHAO: Well, I think we have statistics from the perspective of – I would call the ITAR-free movement as having the opposite effect, right? So I have confidence in standing up and saying that.

MR. : If others can build satellites, that's the evidence.

MR. CHAO: Right, okay.

MR. : The club is growing. That is the evidence. Not in all cases, as Pierre says.

MR. CHAO: I see the headline. I'm just trying to make sure they were all on the same page. (Chuckles.)

Q: It will be even bigger.

MR. CHAO: (Chuckles.) Yeah, that's what I figure. Next slide.

This is a non-uncontroversial scenario, right? Next slide.

One of the key elements that when we started looking back in terms of, you know, the ability about sort of the overall engagement, and one of the notions we wanted to get across because I think in some ways the history of the technology development gets muddied a lot of times. And particularly, the view of where U.S. preeminence in any of these technological sectors comes from is sometimes – we forget the history. And the fact that the U.S.'s strength is that we have played this model of being the world's, you know, vacuum cleaner of technology in terms of raw technology, raw science, and bringing it in. And what the U.S. has actually been very good at is the ability to take that

raw technology, using that Yankee ingenuity, and actually turning it into products, whether it's defense products or other products.

There is lots of sort of allies around and friends around the table. I'm sure a lot of them would nod about, yeah, that's right. That was our technology. And you can go down the list. We were looking for modern examples as well as historic ones because if I keep going back to Werner von Braun, it starts to get a little tired. Okay, that was 50 years ago, you know. Show me where we are today. The most modern version of that is actually the RD-180, you know, engine to the extent that, you know, the U.S. has not been investing in that kind of technology for almost 10, 15 years, and the Russians were. And we have had to go there and leverage it.

You really see it when you start to go beneath down into that second and third tiers in terms of the basic underlying technologies that are going on that underpin solar-cell technology, that underpin some of the other basic technologies. Not to mention the fact that, you know, we have also been the world's vacuum cleaner of people that are interested in coming to the United States and studying engineering and science and historically keeping them, right? As Friedman and the flat world argument and all that, some of them these days are going back or they're coming back. Next slide.

And what the other part of the unintended consequence is or where the friction in the system because of the system begin to show up is that the collaboration is starting to get harder and harder with the changes or the differences in interpretation relating to deemed export rules, related to a lot of the other ones. There have been other studies that have focused in on this topic. We didn't want to spend a lot of time on it. But again, we wanted to pay homage to them and note them because I think it has an implication in this sector to the extent of that mounting friction. So National Academies has done multiple studies on this. And I guess we're trying to remember the name of the Augustine study, Falling Off the Map or Falling Off the Cliff?

Q: Rising above – (inaudible).

MR. CHAO: Yeah, and then there was a subsequent one.

Q: “Is America Falling Off the Flat Earth?”

MR. CHAO: It was that one. Right, “Is America Falling Off the Flat Earth?” Right, that sort of really gets at a lot of these issues. It clearly has an impact, I think, on the space effort. Next slide.

The one area where it is really beginning to constrain the engagement – we found that more in this area than we did on the licensing side, frankly – is in the TAAs, where the average time it has taken to approve has doubled. In other cases, you have seen actually an improvement in licensing of hardware times as everybody as been trying to tweak the system and improve it. And the biggest thing about this is that it is disconnecting itself from the pace of business, right? And so – and you can make an

argument on the national security side, right, that there is a particular pace of operations and there is a pace of business. And the system is getting – the export control system is getting disconnected from that pace of business. And so one of the biggest things we kept hearing is, you know, I'm usually asked to respond within 60 days for an RFP. And the mere fact that it is taking 100 days or longer – I'm just getting fundamentally out of whack in terms of my ability to go from here to there.

Q: Quick question for this and several of the other recent points. Does corporate ownership make a difference? You know, you've seen some of its acquisition of a Canadian or potentially U.K. department – does corporate ownership help either, you know, with some of the process, running a business on these timelines, alleviating – (inaudible) – integration, or there's some test cases up right now, and you kind of wonder –

MR. CHAO: Yeah, I don't –

Q: Again, I think – (inaudible) – help?

MR. CHAO: I don't think – we certainly didn't look at that topic in this study. But in other work that we've done, I don't think you can sort of draw any correlation. The only thing that it does is clearly any American entity owned by a foreign player is just that much more sensitive to export controls and ITAR and that much more aware of what it means. I mean, one of the biggest things that the second and third tier sort of came back with is we don't even know if we're violating these rules because a lot of times we just never deal with it. And so from that perspective there's certainly much more of an awareness.

I'll make one other comment. I think one of the reasons why industry has become that much more focused on export controls in the last two or three years and has been pounding the table is also been in the reverse. For before for most of the industry, it was somewhat of a theoretical topic; it was me cooperating with another person. Now that the industry has become much more globalized and it's becoming an internal issue, I can't talk to my U.K. subsidiary or my European subsidiary or my Singaporean subsidiary – it's become that much more of a visceral and real thing as opposed to, okay, it's friction in the system; we can live with it. And so, from that perspective, I do think that these changes of ownership have made it that much more of a pointed topic.

Q: But Pierre, just a comment and question. I think we're doing ourselves a disservice if not even being a bit misleading when we talk about the TAAs if you just focus on applying for TAA approval. For those of you who have gone through the process, like myself, unfortunately getting approval of TAA is just the beginning of a much longer process. If I was done in 106 days with the TAA, I'd be sitting at home in the office having coffee and a donut right now. What happens is I get the TAA, then I spend another month, two months correcting the provisos in that TAA. Then, I have to implement the TTCP, which takes another two months. Then, I've got to go to space – (inaudible) – to actually be able to submit the information. So really, the process is six

months, seven months after the TAA approval. And I wonder if CSIS looked at all the time required, not just the TAA approval but to actually be able to communicate the information.

MR. CHAO: Yeah, so there were two things as we were briefing that we were asked to go back and look. And one was, okay, how many of the licenses and/or TAAs are getting passed without provisos? I couldn't get comprehensive statistical data. The anecdotal information says, 99 percent are getting slapped with provisos – or I shouldn't even say that. Let me rephrase that – a huge percentage if not almost all of them have provisos put into it.

We did get a very specific one. And I hate to go to anecdotal because we very much resisted wanting to go there because I can always find the horrific anecdote. But this one was kind of interesting enough where it was a TAA for anomaly resolution that was approved but had a proviso that said you can't do anomaly resolution, right? (Laughter.) So you can find those all day long, okay? We didn't want to go down the path of just listing little anecdotes because frankly, the answer comes back of well, that was just one. So we're looking for more statistical. It is safe to say that almost everything comes through with some sort of sets of provisos. The retort back is, hey, that's what got you your license; be happy; I could have said no. So now you've got your license but with provisos; we can debate that endlessly whether that's better or worse.

The issue about the timeline, you're right. It is worse to the extent that – and one of the things that we just frankly didn't get around to but wanted to do was do the long sort of horrific Pachinko machine chart of what does it take to go from one end to the other? And you're right to the extent that you need the approval to do the marketing; once you start the conversation, you need another approval. And there, we did get people giving us evidence or testimony that if not really one, usually for any marketing campaign, I've got to go through this five or six times to go all the way through the end from beginning to end. So your point is valid.

Q: Yes, I'd just like to add to that, the timelines also – this timeline – in addition to not including the time that's been signified by the work that's previously referred to. Of course, it doesn't refer to congressional notification either. And the threshold has become an issue – possibly becoming an issue. The other thing that I would just mention is that it's not exclusively the timeline, which is something that the government continually focuses on to let everybody know that they're improving and so on and so forth. It's really the volume. Particularly in these international cooperative efforts with very, very complex, huge investment on the part of the U.S. government from a policy standpoint as well as from the dollar standpoint, and the multiplicity of licensing TAAs and so on really impedes in a way almost more than the extended timelines. And I think that that's an important factor that really needs to be identified here.

MR. CHAO: So two elements related to that. One – oh, I'm sorry; I forgot the first one. The element about the volume – oh, yeah, I'm sorry – to the first point. We very much – we came I think with a philosophy of, if I can make the case with as much

good hard data and the minimum amount of data and it makes the case, stick to that. And if it's even worse than that, well, then that just reinforces the point and we'll let everybody else sort of weigh their hands and set the bridge on fire, right? And so from our standpoint, this was bad enough; let alone the further reality. And there are plenty of other people willing to talk about the further reality.

The second element is on that point about the number of licenses – so to be fair on this case, I think we found that – and in other work that we've done, there's two sides to that story. It's as much things that are generating lots of volume. It's also as much that the industry is putting in that many more licenses out of a paranoia and fear about, boy, I better put one in just in case.

Q: But Pierre, that is business practices that are caused by – (inaudible) – policies. They say that they're doing this out of paranoia. Well, you know, after you've been picked on a few times, that's not paranoia.

MR. CHAO: I realize it is a controversial statement, what I just tossed out there. I would just say to be fair and balanced that there is as much of that that came out there as well.

Q: The only point I want to add – I've spent a lot of years with this – I've always been concerned that you spend too much time focusing on the measured time because if there is an inverse correlation between the shorter it is, the more provisos or RWAs you get because that allows the guy to get the stuff out of his in basket. And so you've got to be careful what you ask for. You can shorten the time by 20 days and discover – which you won't get hard data on – the number of provisos is about 20 percent and the number of RWAs, which takes no time at all, has gone up 20-30 percent. And so, careful with that.

MR. CHAO: Fair enough.

Q: And so, you can measure that but that may not be what you want to measure.

MR. CHAO: Fair enough.

Q: I'm just curious as to whether you looked at the – (inaudible) – of 2007 in the data?

MR. CHAO: We had the data up through April, I think. And the trend line continued.

Q: You mentioned – (inaudible) – I wonder if you had any quantifying – (inaudible).

MR. CHAO: Hold on that. So let me keep moving on. Anomaly resolution in this area came up a lot as one of those areas that's not related to time. It's one of those

things where there is a considerable amount of concern that this was an issue waiting to happen. And in a couple of cases, it has occurred where there was an anomaly in a real-time situation. You had to be able to talk to – it was either a foreign component on an American satellite or an American component on a foreign satellite. And the inability to sort of real-time right away start talking to each other about something in order to get something fixed did pop up. Ultimately, it did it. But it's a topic that has continued.

And this was specifically written into legislation in terms of the laws and what you had to do. And so, that is a fix that you had to get to. Next slide.

This is an eye-chart, but I'll let you sort of peruse through it. If you take a look at the U.S. national space policy, it makes some very explicit statements about international cooperation and what you want to do and what you want to deal with. And from that perspective, the fact that the friction that is being generated in the system sort of runs counter to that is where we can sit here with comfort and sort of sit there and say that there is a disconnect between the national space policy and actually in some ways where we've headed up in terms of how it's actually – how on the export control side it's being actually executed. Next slide.

In terms of the markets and in terms of the shared and the evidence from that perspective – next slide – can you click on the red – study after study, and I don't care which study you pick, shows this erosion in the market share. Next slide. This is one done by – who switched red and blue, you guys can again peruse. Next slide, and go back to the main.

These are a little bit of a Rohrshach test. People sit there, will then sit there and point, oh, hey, it's kicking back up at this last one or it's this or that. I come at it from just a very fairly simplistic fashion. You stand back and take a look at that; market share has eroded. People come back and say, well, maybe it was other effects. Maybe it was this; maybe it was that. But in the end, there was a stark point in time that occurred. And subsequent to that, U.S. market share has eroded, period, full-stop.

There have been flat-out comments by customers that previously fought U.S. equipment, that said we're not going to buy from the U.S., period, full-stop. That's as blatant as I think you can get from there and from that perspective. There's one customer. And as anybody who is in the space industry knows, every customer is precious. And in other areas where we're able to specifically identify U.S. components being designed out, and/or capability being built, whether it's the apogee motor, thruster control valves, star tracker, the basic bus, et cetera.

And this is anecdotal; we haven't been able to track it down. Maybe somebody from AIA or another place can find it. There are RFPs beginning to come out with the phrases in there, ITAR-free actually in the RFP. So I think that's where – and you had hints of it; two or three years ago, I don't think you could have said that. Today, I think you can point to a specific thing. Next slide.

Now getting into the surveys where you're beginning to – it's clearly showing up. That's a restriction in the industry. Whether it's I don't understand the requirement – half of the industry was sort of saying I don't even understand the requirements, let alone what they are. The big thing about the – I think the other element to the time where I do focus in on the time is also the unpredictability element because from the ability to sort of plan, do strategic planning, run a program where it begins to have an impact on strategic decision making. Next slide.

And what really, really shows up in this – and now it links back to our original strategic point about do you want an industry that is able to engage globally or not – while the industry was extremely confident about being able to participate and compete in the U.S. marketplace, 98 percent sort of can I compete in the U.S. marketplace. Yes, I am. I'm very comfortable. Almost half the industry sat there in terms of just a lack of confidence about being able to engage in the global commercial marketplace. And that is – we would go back to making the statement – a strategic issue. And in some cases, we're able to actually make the correlation between people who have abandoned the international marketplace who have said I'm just not even going to bother competing. Next slide.

Q: Pierre, was that looked at in terms of the peer as often –

MR. CHAO: Yes. And I can get you that data. If I remember right, it got worse lower down the tiers as you probably would expect.

When you ask what's your number-one barrier to foreign markets by industry – click on that, page three. Yeah, U.S. export controls becomes the sort of bugaboo. About a quarter though talked about internal preference, which is not to be dismissed. And I think there's somewhat of a correlation back and forth between these two in terms of what's being used as an excuse for the other in some cases. Next slide, go back.

Be careful with this finding, okay. We put it out there because it's there; we were able to get it. We asked the industry to identify programs where they had applied for a license but lost the work either because of the time it took – they sort of missed it – or for some reason, related it to the export control system. They can attribute a loss of business. When you sum that up, it turned out to be about \$600 million per year.

That caveat that I say about that is because we asked each individual company what we weren't able to identify is five people may have been bidding on the same thing, and so there might be double-counting in that number. The flip-side what it doesn't capture is work that they didn't even bother bidding on because they had sort of lost hope, right. So between the two of them, maybe you're threatened, but it sort of give you an order of magnitude of a number that at least some people can put it there. And the real thing where it shows up again is in that second and third tier of the industry where if you look down in that third tier, they are spending 8 percent of revenues for export control compliance. That's a huge number. If every percentage point of that was put into IRAD, that's where it really shows up.

At the top tiers, it's sort of absorbable, which is why we make the comment that the real impact, the real burden is actually being borne on the second and third tier of the industry. And in some cases, for some players, the ability to wind their way through the export control system and know it really well is a competitive advantage, frankly. Next slide.

That's the issue. The instant you put the com-sats and satellites onto the munitions list, you inadvertently – whether you intended to or not – and again, there's evidence when you talk to the staffers and the people that were involved in that process that they really never intended to go down into that second and third tier. So again, if you want to go to what the intent was, the impact has been the exact opposite, that it captures and swept under all those second and third tier players into this system. They're the part of the industry we look for in terms of for innovation. And so therefore, we have this negative feedback loop that is underway.

Q: That's right. The law says and related components, so even if it weren't for the ITARs, by law everything on that satellite is – (inaudible).

MR. CHAO: But the subsequent sentence defines and related components, okay, into a very limited list. It's the mere fact that it moved to the munitions list and the munitions list specifies that everything that's inside it is what trips it up. I don't disagree you wouldn't need to deal with both; but I think in moving one over, you would have a huge – it would go a long, long way because that other and related components was very specific. And it does go back into interpretation and others, right. Now, we're getting into the nuance.

Q: Does the Commerce Department study ask the second- and third-tier players whether they have been told by overseas customers we're not going to use you anymore? Did they focus on that because that's something that I assume would also play into not asking for a license – not only that they decide themselves not to bother but that former customers from overseas came to them and said, we don't need you guys anymore.

MR. CHAO: We asked specifically where you had lost sales related to export controls. And so to the extent that they answered it that way and picked it up, I don't know if you remembered the specific questions or results, whether it showed up that way or not. There was a very specific question I asked: can you identify areas where you had lost sales related to export controls and so to the extent that somebody came along and said that, it would have been captures in that set. I don't think we specifically asked, have you ever been told go away because we're not going to use you.

MR. : We had anecdotal evidence.

MR. CHAO: We had anecdotal evidence, again, in the testimony of people coming in saying that that was the case.

Q: Just to follow up on that, you frequently mentioned anecdotal evidence. At some point, anecdotes become data.

MR. CHAO: I don't disagree.

Q: I guess it's that point that has been – (inaudible).

MR. CHAO: Yeah, look, there's lots of studies out there that – there's plenty of anecdotal evidence out there. And this collective group, I'm sure, if we spent the next hour – everybody tell me your horror stories – we'd come up with a nice long list. Philosophically, we definitely wanted to come with an approach though that the more you can put as much statistically significant hard data that you could rely on, let's go there because there are plenty of other people that can serve up good hard personal experiences of what they are going through.

And what we really wanted to avoid was the – and we actually had this in our testimony with a very prominent member of Congress. We gave him the anecdote. Well, give me another example. Okay, well, that's just two; how about give me three? We gave him three. And you can keep going until you run out of examples and then the instant you run out, they say, ah-ha, see? It's not structural. You've only given me 32 and there are 70,000 licenses. So what the heck are you bitching and moaning about? And so, this issue of the more –

MR. : But then you make a point where a group got together, you can imagine us all whining about the situation and we spend some time with that until we said, well, we can spend all of four days doing that or how about we get down to some hard data and really look at the situation on a statistical basis. And that's what the result of this is, not the anecdotes.

MR. CHAO: And I don't think we would have gotten to this nuance of a first and second, third tier actually if we hadn't done that, frankly. I think we all kind of came in with a particular view and it was the data that sort of got us, I think, to where we ended up in terms of, you know what, it's really the second and third tier that's getting wet.

Q: Pierre, getting back to costs for a second, has anyone looked at the direct costs that were paying DTSA (sp) and DTC? I don't know about everyone else, but we get these just bills that say, you owe –

MR. CHAO: You should say who you are.

Q: Yeah, Mike Gold, Bigelow Aerospace. And we're just asking for the bill breakdown in terms of what the money is spent for. We then go back to DTSA, ask questions, and to the best of our knowledge, we're paying about \$130 per hour per person plus travel plus expenses for our monitoring. We paid on our Genesis One campaign over \$160,000 just on the straight export control, much less my salary. And I'm wondering if anyone has done analysis of that, where that money is going towards? As I

say to my Russian counterparts, they may be spied on by the KGB, but the KGB has the good courtesy not to charge them. (Laughter.)

And having said that, again Pierre, compliments to you. Since I asked for – at the conferences, as you recall, I had some relatively harsh comments last week at the panel that I was on with you. If I were paranoid, one week later, I got a bill from DTSA for another \$9,000 for work conducted in 2005. And while we at Bigelow Aerospace aren't going to go broke on \$9,000 or even \$160,000, I'm very curious where this money is going towards and if anyone ever seems to break down to the how it was done, where we came up with, and kind of what those statistics are. And if you have –

MR. CHAO: In terms of the burden, the AFRL, Department of Commerce study, that was one of the things we specifically asked for. What is your economic burden? That's where we got the \$50 million number for the second and third tier. We have a first-tier number. You'll find it in the broad – in that study you can get to the actual hard numbers and we can get you those numbers as well. Next slide.

Policy. Next slide. The group definitely started from a standpoint of we are not advocating popping the whole world open. We are not advocating letting this technology out again. If you put it within the context of the broad export control system, if you look at everything from berets to space technology, any logical person would certainly put space technology at the upper end of things that you would want to sort of watch and control. And we start from that premise that this is not about popping the world open; this is about focusing and doing it appropriately. And we really sort of zoomed in on this capability significantly better type of concept, which actually, once again, is embedded in national space policy. National space policy actually, frankly, gets us to where we want to be, I think, philosophically. Next slide.

There are, as I've noted, a whole bunch of export-control reform efforts underway. I think where you can pull some of those threads and pull them into this issue, this debate, this community, whether it's what the coalition for security and competitiveness argued for, in terms of how do I get streamlining, better visibility, better transparency, these notions of trusted communities that's beginning to bubble up, if you look at the broader export-control reform efforts. Everything from the way that the Department of Commerce is trying to take a look at verified end-users in China, U.S.-U.K. treaty that embodies this notion of trusted communities. There ought to be the same thing in the space sector, for example, in terms of there are trusted communities that we have participated with for a very long time. How do you pick up on those notions?

Reviews of lists have been called for, for 30 years. Probably ever since lists have existed, people have said you should review the list. There was an NSPD related to a review of a list. And in the end, it frankly boils down to the responsible entities and agencies with the willingness to go down and actually go and do that review. But the identification of what is sort of critical technologies, capabilities that you want to keep is, I think, certainly embodied in what we're talking about. Next slide.

The State Department had their own study that was done a little bit – a couple of months ago – where they came to fairly similar conclusions about the ITAR list is too broad; there's too much technology. Add in this phrase about delay and uncertainty so the State Department has heard about it from their own advisory groups. Next slide.

And that takes us to, again, back to our list of recommendations. If you want to go one more slide. And so the basic philosophy, just to encapsulate the heart and the meat of what we're talking about because there is controversy related to this, clearly. To the extent that we have gone through an evolution and we have seen sort of where we've gone in the last eight or nine years, we've linked very much two and three together. The extent that you're going to go down a path of putting the overall satellite back onto a Commerce list, you have to run that parallel effort of identifying the critical technologies on board that are the ones that you want to control. Therefore, it sends a very clear signal to industry about what is allowable versus what is not. And I think that gets you back to what the original strategic intent was as well in terms of where you go from here to there.

Q: Given number three, how do you rewrite the law without opening even more worms?

MR. CHAO: The interesting thing about the law is you can amend the law without having to touch ITAR.

Q: Yes, except for the commercial satellite components.

MR. CHAO: Well, that's where you get to the nuance of ITAR. The instant that it moves back onto the Commerce list, the Commerce list – the other side of it does not have that phrase that sits there and says that the instant the item is put on, all subcomponents or anything within it is also a munitions item. And so, the moving back to that, I think, pops you out of it, which is also why our protection – because you can see the natural reaction back of, oh my god, if you do that, there may be a special doodad that I want to control and you idiots, you've just popped this whole world open, which is why we've very much said go to the responsible agencies and in particular DOD, which is charged with national security.

And have DOD come down and run through that list and identify for me. I actually don't want solar sub-panels above this capability. I don't want this; I don't want that; I don't want this; and I don't want that. And those are the things I care about rather than the blunt instrument of don't put the satellite under there. Three quarters of that satellite you may not care about – the hydrazine tank that's about to drop on our heads.

MR. : Which is a commercial tank.

MR. CHAO: Which is a commercial tank. (Laughter.) A very well-made commercial tank if it's going to survive all the way down and drop on my head.

Q: I wanted to go back to chart seven, which I think you have later on in the discussion. And in particular, the inclusion here about the national security community owning the U.S. space manufacturing industry, that certainly no question – but then the sense here seems to put the onus on the national security community therefore to either provide for the fellows in the industry or to encourage and enable it. And my question is whether it makes sense for the onus to be on the national security community given – and your recommendations reflect this – given the multitude of elements in the federal government as well as the Congress that really have to play into this and really have to accept the possibility, step up to the responsibility to doing, in fact, both of those things, not an either/or. And so, I mean, it has to come from the top. It has to come from the White House and it has to come from the Congress, and not that I'm any great defender of the national security community per se, but it just seems like, you know, it's just they're inappropriate there.

MR. CHAO: Let me give a quick response, and Lana, if you want to respond as well. Think of – remember where we started, this premise that we start this with, frankly, with a national security lens in terms of how we look at it. And from that perspective, we think that if the national security community doesn't step up to it that it is a necessary, but – maybe not necessary, but not sufficient condition – but it's certainly a necessary condition that the national security community, one, has to buy off and one, in terms of the healthy industrial base, and also as well as this. The national security community says, no, you guys are wrong. We don't believe any of this. I don't care about what anybody else says; none of this is going to happen.

And so we consider very much of at least an unnecessary part of it and I think that's the flavor that you pick up because of that. If the national security community were to step up 100 percent of the plate and do everything that we asked, would it still get us all the way there? No, because there are other components and elements that are there, but at the very least, I think you have to start there.

MR. : And just to reinforce what Peter said, we start with the notion this is about national security. This entire discussion is about national security. There are entities in our government who are responsible for national security. You may have issues with their abilities on all that, but they are who they are and they are identified. And we were trying to hold them accountable for these decisions.

This is an entire part of our economy that's critical to our security and we want them to be accountable for these decisions. So if the structure presently needs to be looked at, at least that there are certain things that they don't want to be exported, then identify them; don't have an umbrella approach which may be politically expedient. Step up and say these are the things we do not want exported, for whatever reason. So it's really an issue of accountability for the people who have been empowered to protect us.

MR. CHAO: The other thing I would note is that we, I think, found a good commonality of view actually on the executive branch side between all the relevant agencies: DOD, Commerce, State. So unlike in the broader export control reform debate,

there are – there's more differences. Actually we found a surprising amount of kind of common view and here the disconnect, I think, is more between the executive branch and the Congress in terms of, again, differences of view about what's the intent of this and where do we want to go. And even there, there's movement, I think, on the Hill side, which is why of all the things that we're working on, I actually have a great deal of hope that there was going to be some movement on this topic. I think the timing is right for that, that there's been enough movement and enough sensitivity to this topic.

Q: You know, moving concept says that sort of – (inaudible) – made sense. Have you looked at all at what the impact of the national – (inaudible) – licensing ties provides us with? You're going to have bits of review, you're going to have on it and if you look at that at all as to whether there's a change licensing time was when a change anything about over-provising, death by proviso, all those things.

MR. CHAO: So the Commerce has fixed timelines. It moves you there. I know you can stop the clock on the Commerce side. The issue, the neatness of it, and I think the biggest impact. I think if you're a major satellite – that's a good question. There are experts around the table that could probably tell you better than I could the answer to that.

Q: But in terms of congressional review and that support?

MR. CHAO: I suspect that if you're on the satellite side, I don't know how much is going to change in the beginning. I think it's going to make a big difference if you're on the second and third tier because in some cases your item, you know, may not even be licensable at that point, all right?

And again, which is why from a protection standpoint because you can see where the counterargument will be back, which is why we wanted national security to sit there and say, on the things you do want mandatory referrals to DTSA because we care about that doodad or not to get that list so that way everybody will now that you either don't put them into the satellites or you know that you're going to go through that. And frankly if you have those on, then you're right, then that timeline will be the same as it was before, but now at least there is a clear view of, okay, if I want to avoid that then just don't put that in there.

Q: I ask because it's kind of a monitor and a lot of people think that you cannot see it, but the fact that – (inaudible). I think, then, it's kind of what you're saying, it's a first step.

MR. CHAO: It's a first step.

Q: There's still a lot of work to be done.

MR. CHAO: It's a first step, and frankly though, it's – so if you put this now back in the context of the broad work that's trying to be done in looking at the export

control system. It's a first step that philosophically, though, fits into, I think, the overall notion of that what you really care about is who it's going to, right, in some ways? So there are those elements as well as can you strategically plot out or figure out what you really want to spend your scarce resources tracking, watching, monitoring, controlling, versus the commodity items?

Now, space is such a small sub-segment that you're not going to find your, ah, 30,000 licenses go away. But it's a small sub-segment of that, but philosophically fits inside that overall view, which again, if you go back to what's at the basis of the U.S.-U.K. treaty and the U.S.-Australia, if you've got 19,000 licenses out of 70,000 going to the U.K. and almost all of them are approved and a good chunk of them is a piece of an Apache that I've been selling to them for 10 years, I'd rather have that person spending time tracking down who exactly is that company and, you know, well I'm China whatever, and I'll say really somebody that ought to be getting a piece of equipment. That's where you want the resources at.

Q: One thing about the Commerce and the State Department is that the parts component under Commerce would be assuming a military identity as a part –

MR. CHAO: Right, there is a de minimis, right.

Q: So as long as the recipient – (inaudible) – licensing issue – (inaudible) – converter when it comes – (inaudible) – commercial side, and you can get a license for the satellite and not the converter.

MR. CHAO: Right, right, so I know it sounds like a magical panacea, but I think we learned a couple of lessons last time around that that shift was made. I think the recommendations encompass parts of those lessons learned. It is a step forward – I think it would be a big step forward, but there is more to go, right? There would clearly be more to go.

Q: One of the things I think the data Commerce versus State or really DOD, I've been in this for a long time and I was in the 2001 major policy paper that was produced at this table, and during those days, frankly, this intense interest and didn't even know about Commerce, didn't want know about Commerce, there was a completely different view – (inaudible) – philosophically difference in the world. And I think that was completely shortsighted. Commerce had it extremely tough in border control. People go to jail and stay there for a long, long time.

So I think it's very important for the Defense ITAR hopes to accept that Commerce has a significant role and significant institutional resources. And unlike State and unlike DOD, they have a requirement to balance the economic interests versus the security interests. They have cops, they have badges, they have guns, they have jails, but they also take into account the institution and I think that's a really critical factor and you're addressing it here, but I think it's very useful for people around this table who are DOD or may well be DOD or DOS oriented to realize that's over there, just one minor

little point. If you want to have composites for the design of super advanced civil aircraft, that, under Commerce, it is however heavily, heavily influenced by the Defense Department. So the DOD gets its piece of the action; it's in it for sure. But it comes out of Commerce in a – (inaudible) – and I think we really ought to give – (inaudible).

Q: Just to follow up on that, if – (inaudible) – lights off on this, you've still got the issue of the design for modify for DNA problem, which is to say you have to be as mature – (inaudible) – issue you had in civil aircraft. You're going to have to go back and find out what was the origin of an actual component that's now used on a commercial satellite? Was it developed originally with DOD money in 1975? And if it was, you're still on the munitions list until State comes to grips with the design form, modify form, versus a policy language, and I hate use the number of 120.3, and in ITAR we said, it's got commercial applications, you've got to look at it.

At State, unlike Commerce, has a simple way out. If it has any DNA that's military, it's military and I don't have to ask how many MCOPs does it have, how fast is it? How advanced is it? I don't ask you anything, so a dome light that was developed for a military helicopter is a munitions item, period. So you're asking – the only point I'm making is that space can't go it alone until State is willing to do that fundamental policy issue of every single – not every single, I think it's eight out of the categories have a design for modifying language – so that you won't find actuators or thrusters on a munitions list. The question is whether they designed or modified for a military product or did they have design money or the money from the Defense Department at any time, then you have a problem.

So the only point I'm making – this is one that you're going to – is a generic policy issue or the munitions list and the ITAR as to how you handle it for everything. It requires decision making and thought on your model.

MR. CHAO: So we have a different venue for the broader support of the 18; CSIS is working on, visibly working on three and we've got our fingers in lots of the other ones. That's a broad effort for a different date, different topic. That being said, as well though, I think the – one of the other elements that is part of this sort of proliferation to capability in flat world is – and unlike 10, 15 years ago, you have, and as sort of make a little factor I can tell you, you have a true commercial industry that is developing things commercially without that DNA. And so to the extent that you have the movement off of that, I think, again, I think it is a step forward.

This is not the clouds will part, the sun will shine, and the angels will sing; life has been solved, right? You've got – many of you who have been in the room have been in the export control reform business far longer than I have and taught me that we take our victories one step at a time. I think we take victories where we can and we make those movements. I think everybody's kind of become so cynical that movements are pooh-poohed as opposed to that are celebrated. I mean, I will take those presidential directives as a victory. That was a good movement, and everybody around here has been like, eh, you know? That was a good, positive step and I will take every step forward.

I'll take that as a huge step. And so we keep chipping away at it because I think if anybody's hoping for a flat-out burn it to the ground and rebuild it and all life will be better, we'll be at this for another 50 years.

Q: Can I just ask sort of a follow-up on that? Do you then try to pursue, especially in number three, separately from larger changes?

MR. CHAO: Yes, yes, partly because I think it begins to solve a specific issue relative to a specific industry that has a busier problem and frankly, again, I would call it a sort of a canary in a coal mine to the extent that this industry, more than almost any others, I can begin to build that data and the evidence and you can make the argument. I also think there is enough – it's one of the few areas where there is the beginning as a commonality of view on the executive branch. There is movement up on the Hill in terms of evolution of thinking related to this, and so if you think of sort of the pacing of items to sit there and prove, again, we've got the administration. Yeah, the administration has made a statement with those presidential directives.

We have two very important other events underway with the U.S.-U.K., U.S.-Australia treaty, that again, are pretty fundamental in terms of the evolution of a way of thinking about things. The verified end user sort of movement in terms of conduct – that's a pretty fundamentally different view. I kind of plug this in as one more sort of stepping stone that gets us to, okay, I'm getting more and more comfortable with what this new world looks like. So I would argue, yes, you do.

We have – we actually, in some ways we kind of cheated a little bit with recommendation five and said that if this is too politically difficult, they're – ironically enough because you have this piece of legislation related to space, I can tinker with this without changing the whole thing. I can start to bring in some of these Commerce – I knew I shouldn't have said that because that's going to kill it – you can bring in some best practices thinking from other institutions in terms of timelines, de minimis rules, technology thresholds. You can try to bring that into this community.

And then down here, there were some very specific tweaks that I think you can pursue that would mean a lot to the space industry, particularly like the anomaly resolution, which I think is a critical one. And this one, seven, you can also frankly pursue without the broad reform because this says, let me find islands of tolerance where you can accept, just like we've done with the U.S.-U.K. treaty, U.S.-Australia treaty, the JSF sort of program exemption license that we're trying to create where I can find a pocket. Fine, we've all agreed that we want to build the International Space Station together. If I'm trusting with the lives of my astronauts with the things, I ought to be able to trust you with the equipment, giving you the equipment that can do it. It's a little bit of that philosophy.

Q: Do we think Chairman Berman is going to make a difference?

MR. CHAO: That's a good –

Q: Are you willing to answer that?

MR. CHAO: That's a good question. I don't know that landscape well enough.

Q: Just remember, he co-sponsored with Rohrbacher an amendment that takes – (inaudible).

MR. CHAO: Fair statement. No, that's true. That's true.

Q: But that was then.

MR. CHAO: The cynics come back – (chuckles). Yeah?

Q: Was NASA very much involved in this at all? So what was their attitude because I would think they would want to see a decline in exporting on satellite capabilities?

MR. CHAO: All of the relevant entities were involved, so NASA was – gave quiet a bit of input and was actively involved. They – the international cooperation issues, the issue again related to the anomaly resolution was a big issue for them and their ability to do international cooperation was a huge issue. The fact that – and this is not a NASA issue, it came from other places – the fact that companies are asking – there's double loops going on where companies are asking, were asking foreign government officials to sign agreements related to ITAR and export control even though there was already a government agreement, but the companies are trying to sort of cover themselves as well. It's causing weird kinds of loops, so they were very much involved, along with all the other members of the community. I mean, we had NRO, DOD, State, Commerce, you name it; they were all sort of providing input into this.

Q: Pierre, is there anyone from – (inaudible) – Defense Training Controls in the room today?

MR. CHAO: I don't think so, not today.

Q: And you see, that's – to keep the cynical.

(Laughter.)

MR. CHAO: Hold on, whoa, whoa, whoa. Wait a minute. So you guys – to be very fair. Three weeks ago when we briefed this to our sponsors, they were very much in the room. We had DOD, NRO, State, Commerce, the intel community, NASA, DARPA, I mean everybody that you could ever conceive of having a say in this from the government side, executive branch government side, was in that room sitting. They each had a seat around a table equivalent to this and I took them through all of this. So they're not here today, but they were there when we talked about this.

Q: Yeah, and I appreciate that, but I kind of wondered who they are because I come to a conference like this and you sit in a room and I hear what –

MR. CHAO: The director – let's put it this way: everybody was at the director level, okay? This was done at the director level. I guess I can talk about who was – can I talk about who was –

MR. : They're as high as you would need them to be.

MR. CHAO: They were as high – believe me, these were – what's the euphemism – at the highest levels.

Q: Yeah, but see, that's exactly my problem. I've got friends in low places.

(Laughter.)

MR. CHAO: I knew you were going to go there.

Q: And my problem with this is that, you can talk at director level and then come to a conference like this, I am going to go back to the office and deal with Department of State officials at the lower level, this is not – the trickle-down economics is not working. I mean, I literally have had, let me say, I don't want put any names on it, but I have had government officials telling me they would rather our program fail than succeed because of our collaboration. And it's completely counter to what I hear today. And I guess I'll accept that I see the Department of Defense here and I think that's great. DOD comes out and actually listens and participates in these conferences.

But let's say the reform doesn't happen and let's say it didn't switch to Commerce. You mentioned this is definitely that process and that may be that it may not happen. I think it would be – (inaudible) – useful for DTC, not just at the director level but at the front line for people writing provisos or monitoring launch campaigns, for them to hear this and hear the recommendations and see what's in this report. This is an excellent report and I believe it would have an impact on people on the ground if they were exposed to some of this. And thus far, I do not think it's being communicated down from the upper levels of the DTC to the people that we work with on a daily basis.

And I would encourage you, you know, we have been in aerospace, we're – (inaudible) – project sector guys. We want to see change soon that actually impacts us. And I think one of the ways that can happen is the writing of provisos. This is what I discussed. If DTC would just take a more central approach tying to provisos, that would certainly solve 90 percent of our problems and to the extent that you folks can arrange to meet DTC and make that recommendation. I think it would be hugely helpful and this is a wonderful report with which to do this.

MR. CHAO: So we are now – and all the members of the working group have sort of raised their hands and are willing to begin to proselytize the report. And we're willing to take it – wherever there's an audience, we will take it, okay? The electronic version of this report will be up tonight, feel free to send it wherever you want, okay? This is – that's part of the thing.

And the other thing is that our sponsors who have absorbed this are working on absorbing it and coming up with reactions and comments and I think you'll see something in the next couple of months as well. So to the extent that we can act as a catalyst to get this debate reenergized and going again, I'm more than happy to do that. We had, again, a lot of congressional interest and this; we'll be taking it up to those people up on the Hill. At the CSIS thing last week, you heard the congresswoman sort of say, you know, I wish there was an export control study that would look at the impact. And so I want to say, interestingly enough we just happened to do one, you know? How's that for responsiveness? And so, again, we'll take it wherever it needs to be taken.

Q: A few brief comments on the drafts. Finding number one talks about weakness in the second and third tier, eventually big suppliers, but the supporting graph shows an increasing profit margin year to year for two and three. The study might be compared to someone going a-ha – (inaudible) – break down –

MR. CHAO: So because we have the survey results we can go into literally company by company, although I think the way the rights are written, we cannot specifically identify. But it's why we, again, identified in the subsequent slide specific sector where we can point to really targeted areas where that weakness is showing up specifically.

Q: And to follow up on someone asked for a second, third tier graph on finding number 10. I think on finding number three, it would be good to have a two-to-three graph.

MR. CHAO: Finding number is?

Q: You've got one for tier one and tier two on finding number three, but what about tier three and the national competitiveness and globalization? You've got a two-to-three graph right there, but – (inaudible).

MR. CHAO: Oh yeah, we've – and actually as you would expect – well, so number three is interesting and not – that these charts are sort of dense enough and I didn't show. Three shows up actually pretty close to this, which is really counter-intuitive because as most of you know, if you go to almost any other sector, it's tier three where you really expect to see the big sort of conglomerates because there you're doing component tree, right?

And that was one other element – that was part of the other underpinning of you really, you own this industry more than a of others because if you're down on that third tier and it's that dependent on Defense and very few other places, again I keep harping back to shipbuilding, but shipbuilding is one of the only other few areas I can think of where you have tier three suppliers that are that dependent. If you were to go into C4-ISR or aerospace, you know, that's where you truly hit the big conglomerate of the – what was I going to say – the Rockwell, the Honeywell level, but it's even below that where there are others that were doing – (inaudible) – we have that data. We can – if you want to see it, we can certainly send you something.

And I think the – certainly the FRL study – the Department of Commerce version of the study brings that all – we were just talking about, that their data, the way they – but we have the data. Comments? Discussion?

Q: Just to touch on the point that I raised in the beginning again and expand a little bit, I'm a little skeptical about the increase in the specificity of the USML as a tool for – (inaudible). It sounds good in principle but I think in practice it would be difficult for a couple reasons that come to mind. One, if you look at the pace in technology, it's not clear to me that – (inaudible) – you brought up the solar cells as an example. If you were to specify that a certain quality solar cell is on the USML but lower quality is not, how quickly would that be updated? So how often would you have to update that at this point?

And the second, as I brought up earlier, once you got the exception list from DOD and others, it might be that you have lots of specific things that are exceptions that have to stay in the USML but the aggregate impact of that is still a process in the same number of PAAs, same number of licenses. You get the same number of proviso thereabout, so in practice, you haven't really made much impact. So not to plug CSIS for another – (inaudible) – innocent, so we'll take this on, but I think it would be worth – (inaudible) – proposed changes to USML before they'll adopt it to see, do they have the – (inaudible)?

MR. CHAO: That was very much in the back of our heads as we were sort of debating the – are we going to create a war system or not? The issue of the list constantly getting out of date, I think, is always a structural one and again, to take us into a different venue in the broader export control reform work that we're working on, that's one of the issues that we're looking at deeply because the natural reaction for 30 years has been review the list. And you keep coming back to the same thing and yet the other answers of, well, are there ways that you can sort of prevent things or whatever, then I can't make it GS-13 – it's back to friends in low places. Those friends in low places actually have to execute and you pop out and give them free reign to do everything and I'm not sure that that ends up being a better answer or not.

Now, the one element that gives me a certain amount of optimism about this area is I think you've got the national security community related to space that's at least willing to step up to the plate to begin that exercise of what would that list look? So I think the beginnings of that exercise, that there's a potential to do that. If somebody has

a much better way of figuring out how to deal with the list problem, I would love to hear it, short of – we keep drifting towards this notion of, is it really back to a resource problem? Do you create a group that that is their job, a center of technical expertise that does it, that at least provides a technical expertise? The policy decision is a different one because technically you sit there and you can still have a policy concern that says no.

Q: Yeah, it's a tough, tough question. And like you say, you need a system, the GS-12 or GS-13 that's going to be able to say yes to and not here – (inaudible) – that's whoever's – (inaudible) – dealing with it. And just a general comment in reference to the list, and I don't know how this would work – (inaudible) – CSIS to follow up, but if the technology or the system is widely commercially available, you can show that – (inaudible) – Europeans, that that should not be on the USML, should not be under IFR, so maybe not a list, but a statement that you can show that you can purchase as good if not better technology from elsewhere that should not be considered USML.

MR. CHAO: And the concept is certainly embedded in the – it's embedded in the rules and regs. The problem is, again, it's back to technical resources to sit there and prove that or get there and how do you keep up with a rapidly changing pace in technology and proliferation. But I think that's going down the right – it's a – now, there is also an element that my friends at State remind me, which is the thumbscrews, the dictators issue, right, that it may be widely available but certain things we just don't want use to sell it. I don't want it to be an American thumbscrew even though I can get thumbscrews everywhere and that's a legitimate point of view, which is also why again in some of the broader efforts, and frankly it came through in this effort, we think that there are three legitimate points of view that should have equal viewpoints: a national security sort of DOD one, a foreign policy State one, and a economic Commerce one.

The trick is how do you minimize the friction of having those three points and there's goodness in having those three points of view. By having three points of view, you're going to get inherent friction, and so the trick is how do you minimize the friction while sustaining those, getting those three points of view? Uh-oh.

(Laughter.)

Q: That's a tremendously wrong fundamental assumption vis-à-vis Commerce. Commerce had the intense devotion to the national security and it has to balance it internally. It doesn't just say we'll sell it to whoever, we don't care –

MR. CHAO: Fair enough.

Q: – State and Defense have the –

MR. CHAO: Well, fair enough and DOD –

Q: – get beyond that.

MR. CHAO: Fair enough, and DOD has a commercial viewpoint as well in terms of exports sales lowers the unit price and State has a national security as they would constantly. So there – let's put it this way, there are three points of view; having all those three points of view at the table is a useful thing is more or less.

Q: But the issue of resources conveniently means that there is this fallback position. If you look at all an increasing resources at the – (inaudible).

MR. CHAO: So this study was not focused on that topic, although – this study was not focused on that topic although you will see some, I think, there was recognition inside the national security space community that resources is an issue in doing that. It is very much something that the grand coalition for competitiveness addressed in that and in the broader work that we came to, that we're doing, a clear recognition of that.

And in fact if you look at it, philosophically this town is divided into two camps, right, that if you just put the right resources and the right business practices in place, then actually when you really read the laws, it actually gives you quite a bit of flexibility and plenty of room to maneuver that if you put the right resources and business practices, you can get this thing to work and if the timeline's dropped to two days everybody would just shut up and life would go on. There's another philosophical camp that sits there and says it will never get the resources, you can't get, and so therefore I need to structurally change how I'm doing that to compensate for that. And that's really where you hear the two sides of the reformist camps come from.

Q: That's what I was wondering, is that in the new study, whether that came up and whether you reported on it or not. I guess you missed a question. Or I would hope that came up.

MR. CHAO: Space is a volume – it's back here with space as a volume doesn't kick high enough that we didn't go down that path because you can't make that broader argument on what's going on on the space one. There if more – continue to put the right people in there to think through the complexity of the issues more so than a sheer volume – at no point would the State Department be able to sit there and say, oh my god, I'm overwhelmed with space licenses. It's more that they're overwhelmed with small munitions licenses than some are. That doesn't mean that that's not a valid path; it's just not what this study's about. It's an extremely valid point on the writ larger effort.

Q: Yeah, it's not on the study, but I have to push back against the fallacy of resources. Trust me, the answer is never more bureaucrats. That's not going to solve anything here, folks. It's – (inaudible) – plenty of resources; what's wrong is they're wasting their time on technologies that don't matter. I mean, I have been on a campaign confidentially at a – (inaudible) – it's a longer statement.

We're wasting time. These are technologies that people have. There's plenty of resources; the solution is, get DTSA and DTC to focus on technologies that are actually

militarily sensitive and allow them to stop wasting their time on items that can be purchased at Radio Shack.

Q: Well that's just why I say – (inaudible) – that was my – (inaudible) – if you get nothing more, if you get more resources, then I'm not – it's that in the bureaucrats that we're getting, there are a number of them that are very dedicated, but they're overworked and they don't have a very good system. And if they had more resources, if that's all we can get, then we can get – (inaudible) – that would be improved.

Q: Yeah, I would have to – my problem is not the 60 days. My problem is that I, A, have to go through the process, and B, after those 60 days I've got to do this repeat the space claim, et cetera. The answer is not to get more people to be – it's not more bureaucrats; it's more freedom. Give the – (inaudible) – more freedom to make choices, give DTC more freedom to make choices, and frankly empower and protect – (inaudible). I think that's the solution to the resource issue, not simply adding more people because then we'll just be back here in two years.

MR. CHAO: And for this particular topic, not the writ large one, I go back to recommendation one, right? Just from the perspective of, again, we did not spend a lot – we wanted to make sure we had a fairly cogent national security argument long before we go to the economic one because the Congress was pretty – in fact it was very blatant in its stance about that. Actually, if you can go to the appendix one, they were really blatant about it, which they essentially said U.S. businesses must not be placed above national security interest. They couldn't care less, couldn't care less, couldn't care less. And so that's why we really, it's in black and white.

And so from that perspective, it's got to be more are you achieving your strategic intent or not; if you're not, okay, then let's change it for that reason and if it has the benefit of making all that, great, because I think if we lead with economic arguments, it's going to fall on deaf ears. And that's why we spent so much time making sure that we had a cogent, logical argument on the national security front, which is why it reads so national security heavy. And I read your point but I think that's where it's got to start because if we cannot make that argument, I don't care how much whining there is, it's just – they're like I couldn't care less.

Different on the export control writ large, right? But on this area in particular – although I would argue not so different on the – but really for this area, it's got to start from the, are you achieving your strategic intent or not?

Q: I'm just going to offer a quick note. You brought up the fact that even for technologies that are perhaps available overseas, there's cases where the United States doesn't want to sell it – (inaudible) – it's probably worth noting that this is not the only tool in the tool kit for export rules, right?

MR. CHAO: Yes, right, very much so.

Q: I mean, there are other ways to achieve that goal and we need that today.

MR. CHAO: Right, and again, to pop up at the broader level, what that keeps telling you is that what you really care about is not what you're selling but who you're selling, right? And I think that's where it really starts to take you down this path of we are beginning to build the philosophical foundation work for what you can kind of see what the future system looks like. And I keep harkening back to, for example, the verified end user stuff and the U.S.-U.K. treaties. Really, at its heart, it's as much the who as it is anything because once I trust the who, I kind of sit there and say, I don't care what I send to you.

If I trust you, it could be – and in the U.K.'s case, I trust them with nuclear technology and I trust them with my most sensitive intel. Clearly, I can do it for the proverbial eight-inch rubber hose, which you've made infamous – (laughter) – on down. And I think there is an element on the space side. I mean, there are certain countries that we have that kind of a relationship with in space; there are others we don't. And that is in some ways more the determining factor than the what. And that might be the beginnings of your way out of the box.

Q: Where are the MTCR bits?

MR. CHAO: (Chuckles) – Chris?

Q: Sorry I didn't hear the question.

MR. CHAO: Where does MTCR fit in?

Q: I'm probably not going to answer. (Laughter.)

Q: Where does MTCR fit into this?

Q: Well, MTCR establishes certain guidelines that both munitions and Commerce still use. And some of the relaxations that some people might be looking for aren't going to come on the Commerce side when they're MTCR-controlled items.

MR. CHAO: Which is why we started with satellites rather than going to launchers because as we sat there and stared at launchers, we were sort of like, there's – as we start from a national security standpoint, you understand why there are those things in place. But it's back to – let's start with logical steps. As time progresses, you're going to meet more and more of this issue of, okay, universally available blah, blah, blah. The fact though that a thing that goes like this goes like that based on physics sort of puts launchers in a very particular regime.

Q: Just a point of having listened and having to review, I mean, it is worth noting that that's exactly what Commerce has to do. And one reason that that's good news is that there's pressing for that. The Export Control Act, which of course, is debunked for

10 years or so, but unlike the Arms Export Control Act, those differentiate between foreign policy and security in a way that the Arms Export Control Act doesn't, which is one reason it's so murky as to what's State's role and what's Defense's role. You would think Defense would be security and State would be more policy, but take that.

Final point: the bad news of course is the reason that Commerce has so many more licensing laws per licenses is of course what they're looking at is stuff that they seem to control, by and large, and so their decisions are much more difficult. They don't have 7,000 Smith and Weston licenses a year, which one guy can handle.

MR. CHAO: Well, look, again philosophically, if you go down this path, what it says is that you, if the system has the bulk of the focus and the effort in the middle of the actual license, it says you want to be at the other ends. The front end in terms of thinking through what and really identifying who, right, so it places a bigger burden on sort of the intel side and the who is that I'm sending to and thinking through the what.

And on the back end, on the enforcement side, right, because to the extent that I'm going to get it out of there, that means that if you violate it, boy, there's going to have to be a couple of public square shootings to remind everybody that that was a no-no. We would posit in the end that's a better system with the focus on both ends than try to get it really what you're trying to get at through the middle.

Q: Sir, in addition to looking at past possible losses like the – (inaudible) – losses, ITAR versus Commerce, as a bit of forward-looking projection and how markets will actually expand or with satellites not being subject to an arms embargo?

MR. CHAO: Great question. And that was sort of – and actually that was one of the key questions on the part of our sponsors, which was, okay, so let's assume this happens. Will it actually help? Will it actually expand the market? Will it actually grow? And that piece of analytical work has been left as a let's go do that and take a look at it, not us, but I think they're going to use some other people to look at that because it's an extremely legitimate question, right, of does it change the landscape at all from that perspective.

Q: Who is looking at that?

MR. CHAO: I don't know specifically.

Q: Oh, okay. And then along with it, how do we justify that the economics of selling to countries with whom we have an arms embargo will help national security?

MR. CHAO: Oh, we're not saying that.

Q: Oh, okay.

MR. CHAO: Nowhere in here did we say that, okay? Nowhere in here did we say that because now you're still back to the who, okay. Just by moving it back to Commerce does not mean, and in fact, the fact that you do have an embargo does not mean that that stuff can go to those guys at all, okay?

Q: Back to the reasons for control.

MR. CHAO: Back to – right. At no point did we go down that path, all right?

Q: Space programs that even – (inaudible) – having your own – (inaudible) – communications data is often a matter of national property. Did you look at this in terms of saying that it didn't matter how you got them, that there are a lot of countries – (inaudible) – process as a matter of national pride? Or don't you want to have these space programs and increasing coordination and development issues?

MR. CHAO: Well, it was part – we did. We spent some time on that and it was part of the unintended consequence because it – ITAR became the foil to justify further resources within their internal sets of politics. In fact, we had a couple, I'd rather not specifically say who, but were very blatant that sat there and said, it has probably accelerated our program because we were able to make an argument that, okay, if I can't get – this is perfect justification for why we need our own indigenous. And oh, by the way, it's something that we want to do to make us sort of prouder, blah, blah, blah, blah, blah.

So it – you cannot pin it. This is not a smoking gun. You can't sit there and say ITAR caused it, but you can sit there and say that it was certainly used as a foil and certainly used as an excuse and certainly used as a, in some cases, as an encouragement.

Q: Well, that tends to be my view, but I wonder, some people argue that whether we had the ITAR or not, that countries just to become more prosperous are going to want to start having these space programs?

MR. CHAO: Right, and that's back to, again, we're back at that logic argument that if you had a strategic intent by doing ITAR and it's not achieving that strategic goal and it's causing this economic friction, now it gives me the justification to talk about the economic friction. You have to vie on that first premise of it.

Q: Yeah, but again, that's probably a tier issue also. I mean –

MR. CHAO: It is also a tier issue.

Q: – European hubris, whose thrusters are on those satellites? Probably they're going to be different if it weren't for the ITAR.

MR. CHAO: And in many cases we had plenty of global players, European players, who sat there and said, frankly we would rather have used the American

component because it's better, cheaper because you have more volume, but – yeah, and legacy, which as anybody knows in this industry, is absolutely critical, right? And yet, I can't take the risk on my program because of the uncertainty. And so there you had a difference between what's sort of the overseas industry set versus the overseas customers. The overseas customers are sort of saying, we would have loved to use that component but I can't take the risk on my program, so therefore I kind of felt myself compelled to go down this other path. And that really came out.

Well, one last comment and then I –

Q: Well, I didn't want it to be the last comment.

MR. CHAO: That's okay. (Chuckles.)

Q: I really appreciate that report, but is it safe to say that Defense basically is very much paralleling your findings in this report?

MR. CHAO: The broader Defense?

Q: Yes, and the second point is, do you have any information of reciprocity situation whereas foreign nations go and want to export to the United States because of your policies? And third and last, this gentleman said over there, I could also have donut and coffee, my TAAs only work – (inaudible) – I never had a TAA, I don't know where your averages are coming from, but that's just a fact of life. You have to say if it has hands and feet – (inaudible) – that's more in line with the – (inaudible) – national input – (inaudible).

MR. CHAO: Yeah, so let me go backwards. The 106 days came, that was a direct result of the survey, so we asked the companies how much time was it taking per TAA? It's the tyranny of averages whether you're using mean or median, you know, and it's back to the anecdotes everybody lives and screams about the tail. I suspect the tail is fatter than a normal distribution so it's not going to reflect the average, but that is the average, and whatever the – it really bitches and moans about what's above it, so I don't doubt that there are lots of – let's put it this way, when they call you, they're probably already half way down the slope and they're not calling you to help with the easy stuff that's going by fast. So you're probably – that's part of the skewing of the data. That is the average; it doesn't mean that that's where, I mean, I'm sure that there is more that lives on that upper end.

In terms of evidence of people not sending equipment here, I don't think we found any in space. I know for a fact it exists in the broader Defense where there have been clear-cut examples of companies and/or allies saying, I am not going to contribute that technology into this because it's going to get stuck in ITAR and I can't get it back out. And in particular, where we've really seen it is in the commercial world, commercial software, commercial IT where some people are saying I just will not deal with DOD or Defense even though it may be an interesting marketplace because I don't

want an ITAR taint to my product. So that I can point to and frankly that is a set of stuff that DOD doesn't even see it or know or that's where the national security community doesn't even see it or know it because it's going on outside their peripheral view because there are people saying I just don't want to deal with you.

As far as the first question, can we find similar evidence sort of written large in the broader Defense world? I don't know. We spent so much time getting real, hard data with the survey and all that that I can't sit there and say, yes, I can find it. One of the reasons why we wanted to take on this study was very much the sense that, again, space was the early harbinger or the canary in the coal mine vis-à-vis lots of other sectors. I think – and actually I think in some of the other defense sectors you will see more of an impact on the first tier than you would on this space, for example.

Thank you for your time.

(Applause.)

(END)