U.S. Senator Maria Cantwell

Full Committee Hearing on Developing Next Generation Technology for Innovation

Witnesses: Pat Gelsinger, Chief Executive Officer, Intel Corporation; Sanjay Mehrota, Chief Executive Officer, Micron; Tim Archer, President and Chief Executive Officer, Lam Research; Preston Feight, Chief Executive Officer, PACCAR Inc.
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Senator Cantwell Opening Remarks

[VIDEO]

Cantwell: The semiconductor industry is definitely a uniquely American story. It has shown the importance of inventing in the United States and building in the United States.

The first transistor was demonstrated in New Jersey in 1947. In 1958, Jack Kilby – a Missourian working at Texas Instruments who attended college on the GI bill – would demonstrate the first integrated circuit.

The semiconductor industry – with the benefit of Federal purchasing power and Federal R&D – helped to get us to the Moon, build our security leadership, and launch our information age economy.

I'm pleased that the United States has played such a leadership role. But when it comes to manufacturing leadership today here in the United States, we're falling behind.

Semiconductors underpin nearly every aspect of our national and economic security. And yet we are short on the amount of advanced logic chips building at scale here in the United States of America.

In fact, over 90% of the most advanced chips come from one island in the Pacific Ocean, Taiwan.

I believe in global trade. But I also believe that chip security is as important as food security. That is why we need to continue to demonstrate leadership and make investments in R&D as the USICA bill that this committee worked so hard to get out last year showed.

Our over-reliance on vulnerable global supply chains – without having a U.S. alternative ready to go – is an economic and national security risk, a lesson we all have already learned and need to change directions.

Within the automotive sector, thousands of American workers endured layoffs due to the shortage.

The global automotive industry suffered over $200 billion in losses and Ford was forced to halt or cut production at least 8 plants as recently as last month.

The cost of used cars has gone up 41% and new cars 12%. A lot of this is due to the semiconductor shortage. Let me repeat that, the cost of a used car has gone up 41%. Now why would that by? Used cars already have the electronics. It's because if you want to buy a new car right now you're probably going to have to wait because the car companies don't have enough semiconductors. People who can easily afford a new car and need one can't get one due to the shortage and are instead buying the used car. And that's driving up the price. So anyone knows the people who can afford to wait the extra six months for the new car probably aren't the people who are really feeling the pain. It's the person who's radiator last week and just needs anything on four wheels to get them to their job. And that's a basic used car that's gone up $5,000 in costs, an additional 41%. And an extra $2,000 taking that to $7,000 is just a trip the family doesn't get to take or maybe next month rent that can't get paid. So the impacts of this are really impacting American consumers.

On the national security front, EUROPOL just reported this month that counterfeiters are trying to exploit the semiconductor shortage by introducing fake chips into the market, raising the chances that critical infrastructure and defense systems could be compromised.

The shortage is also setting back our efforts to remove foreign telecommunications electronics that could be compromised by backdoors from other governments. According to the telecommunications industry, wait times for some networking equipment is now at 50 weeks.

The cost of some networking equipment has risen by up to 12%, and price gougers are selling chips for 100 times their regular price. That's no way to build out access to broadband.

In addition, we know that relying heavily on one country – and largely one company – creates a target for hackers.

Eighteen months ago, security researchers found a hacking campaign that compromised at least seven Taiwanese chip manufacturers, to steal semiconductor chip designs.

All of these are reasons why we need to get USICA done and make sure that we get to conference with our colleagues. These bills have $2 billion investments specifically for the Defense Department to secure the microelectronics supply chains required for our national security missions.

The shortages that we have today, if we don't address them are going to continue well into the future. That is because the world needed 1 trillion chips per year in 2018. In 2021, it was nearly 1.2 trillion. In 2031, it could be 2 trillion chips per year.

Our current foundries are already working overtime. So building new foundries has to be part of the long-term solution and we have to send that price signal today. If we do nothing, these shortages are just a sample of what is to come. I know we're going to hear from PACCAR who's going to tell us about how every aspect of freight is being affected, even if it's not a high-tech product. If you don't have trucks to move the products in our supply chain because you don't have enough trucks then we are affecting every aspect of the supply chain. So clearly we're

here to talk about the next generation of chips and how the United States keeps its leadership in advanced manufacturing. That's why Mr. Archer obviously going to hear from you as well, on lithography and how important it is for the U.S. to stay ahead.

But we're so happy to be joined by the witnesses today.

It's already been 288 days since this Senate passed USICA. It's now time for us to not wait another day, but to get this done and keeps America's leadership going in the right direction.

Question and Answer with the Witness

[VIDEO] [AUDIO]

Cantwell: Thank you, senator Wicker, and I'm going to take my round. Now I know we have other members who are waiting, and hopefully we will get to them and then if people want a second round, we'll be here as long as, as long as people want to be, I would like to. Well, first, I'd like to say, you know, we had the same debate when we were talking about what happened with COVID in the airlines and we're about to issue a report showing that the investment the government made and made quickly, actually is going to pay the government back into the investment. So it was a COVID pandemic, and we had to make decisions about whether to keep a workforce and keep them running and the US approach to that worked.

So here, it's kind of all of you have touched on this in so many different ways. It is about future investment. That's why this hearing is about the advancement of next generation ships. It is about how does the United States keep its leadership in that and as you all have noted, we've gone from 36% down to 12. And the question remains, if we do nothing right now, where are we going to go? So I definitely believe in ecosystems, I believe in the manufacturing supply chain that exists for automotives and for aviation. And I certainly want a manufacturing supply chain and ecosystem to exist on something as essential as Chip technology, given the information age it is, you could say it's the ultimate supply chain, if you will.

So the question on this graph here, you can see that the amount of US leadership has continued to fall off as we go to those next generation chips. So this isn't just about how many chips you can produce, or whether you can produce chips that were the last generation of chips. This is about producing the next generation of chips with the higher intelligence. That's why I don't know I, Mr. Gelsinger, I really liked your detailed testimony about all the advancements that Intel is making. You know, the ribbon fed the power via the E. U. V, that's a partnership with the European company ASML. And obviously, Mr. Archer is talking about this as well as it relates to plasma. So this really envisioned, you are kind of like the ultimate story of translational science that we're trying to capture in the R&D bill. We're trying to tell our friends here and people in America that we've done a lot of basic research, we've done a lot of advanced research. But China's spending 80% of their dollars on commercialization. So this is about whether we take the next generation of technology and get it deployed faster and remain on the leading edge. If we don't, then all that manufacturing is going to go somewhere else, not in the United States and as we can see from what's just happened, I think Americans like woke up and understand

intuitively what supply chain is all about. Now, they know exactly what that means. That means they don't get their product and now if you tell them that the ultimate product of the supply chain chips is all now leading edge in a country, I mean, in the island Taiwan, then you basically are sitting here with a big vulnerability of the United States. And I think the last events of several weeks make that even more poignant. So the question is, what is it that we need to keep doing to keep on the leading edge of this technology? So you gave us this? You gave us the all these advancements in these chips, which I wish I could drill down on but basically, you're talking about IP boost, you're talking about better conductivity, you're talking about more translation of so from the first chip to today? What is the difference as far as what it means? And maybe I'll ask Mr. Feight, what it means to him when it comes to the product that he's trying to deliver today, but could you just give us Mr. Gelsinger or Mr. Mehrota. What are we talking about as far as advancements of chip capability? I mean, I believe in Moore's law, but help people understand here the first chip did x and now here, here's where we are with this level of advancement.

Gelsinger: Yeah, thank you. And, you know, on my lapel here, I was the chief architect and designer of the 84-46. Chip, for Intel introduced the 1989. And this chip had 1.2 million transistors on it. Right, the most advanced server chip that I just put into your hands here as samples is on Intel seven, which is your chart is now out of date. We're in production on our seven nanometer products. You know, this is 25 billion transistors, right, which you know, just is mind boggling the progress that's been made. And as we think about application usages, like In autonomous vehicles, the most advanced AI applications, right vision detection and being predictive management of driving the most advanced mRNA sequencing capabilities, speech recognition capabilities of the AI applications across numerous industries are 5 and 6G conductivity. All of these depend on the most advanced technologies available, they need the highest performance computing at the lowest power capabilities to process these most advanced algorithms. We predict that by the end of the decade, we will have our first trillion transistor chip. Right. And those kinds of capabilities are for many of the immersive experiences of the future that will define the future competitiveness of industries globally.

Cantwell: Mr. Feight what do you need Mr. Feight from them? What do you need them to keep doing that is it relates to next generation technology for your trucks and efficiencies?

Feight: Sure, Mr. Gelsinger also your spoke well, on the high technology end of some of the some of the needs we have for vehicles that are fully electric or zero emissions using hydrogen fuel cells or in autonomy, where visual graphics are so important in machine learning, so important, we need high end chips, but we also as the industry, the agricultural, the automotive the truck, many other industries need some kind of, I'll call it more standard chips that keep affordability at the right level and performance at the right level to make all the cars trucks tractors that we need in this country. And so they shouldn't be left behind in that thinking it can't have a life cycle of two to three years otherwise, the cost of products will go up incredibly if we're forced to redesign cars, trucks and tractors, medical equipment that quickly so it's kind of a both-and Senator Cantwell.

Cantwell: Thank you so much. My time is expired. But I think If Mr. Thune is, Senator Thune isn't available that I think its Senator Moran. Senator Moran.

Senator Cantwell Closing Remarks

[AUDIO] [VIDEO]

SCOTT: If they invade Taiwan, I think that's wrong.

CANTWELL: Senator Scott, I don't think that is what Mr. Gelsinger said, I do want to say, for the record, there is an analysis that was done by a Boston Consulting Group on the impact over six years, they project that a $50 billion manufacturing incentive would generate $147 billion to GDP and 1.1 million jobs.

So I do think that there are some analysis out there, every dollar from the federal government put towards the semiconductor research delivers 1652 GDP as $1 to investment ratio. So there are some analysis out there, I do think that they're important to take a look at this. I also think that these issues of are very challenging to us in a global economy, I'm a person who supports trade, I actually think trade changes culture, I think that doesn't mean that we don't have bright lines. And I think we have a lot of bright lines in the United States. And one of them is about our national security, and basically saying that we don't want to have communication products that have government backdoors to them, and we want, anybody can be in the global supply chain. But if your government doesn't honor this aspect of making sure architectures are protected, and secure, then we we don't, we don't want to do business. So but this bill is really going to be about us creating a framework in which the United States gets that next generation, like my charts, are the next generation supply chain here.

I want to thank all our witnesses. I, Mr. Feight, thank you for hanging in there from Europe, you didn't get as many questions as the other people. But I want you to know every time you talk to Mr. Gelsinger wrote down what you said. And the reason I'm pointing that out is because I think that is symbolic about the ecosystem that we're trying to create.

If this all exists here in the United States, and you have those closer relationships, and the whole supply chain is talking to each other. And they're talking about what their needs are, and they're talking about the next generation. I guarantee you, the United States will do the right things to help catch up on this shortage and lead the way in next generation technology.

You heard from many of my colleagues who had various takes on this issue, you heard from Senator Rosen about her interest in the in the broadband system, I too, have a very keen interest in in our grid and electrification and what we're going to do to, you know, we're not going to make any of the transformation without our grid, providing more of the communication system. And so there's just so many opportunities before us.

So I also want to thank you, particularly you Mr. Gelsinger, but obviously, our other witnesses. Look this is, we want to see these companies driven by good engineering, it's called the information age for reason that that means that they're the opportunities are there, but we need the engineers. So I actually applaud some of the financial decisions you've been making,

because it's being based on good engineering. And I guarantee you in the end, that is what is going to be rewarded by American investment is solid, good engineering. We've led in this area in the past, we want to lead again, we appreciate what that'll do for us for innovation and for jobs in the United States of America. So thank you all very much for being here.