National Institute for Deterrence Studies & Peter Huessy Seminar

Strategic Perspective on Nuclear Modernization with Dave Hoagland

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National Institute for Deterrence Studies. "Strategic Perspective on Nuclear Modernization with Dave Hoagland" Webinar presented by David Hoagland, hosted by Peter Huessy, December 19, 2025. https://youtu.be/FedV11v52b0

Abstract

This seminar, hosted by the National Institute for Deterrence Studies (NIDS), features Acting Deputy Administrator for Defense Programs David Hoagland, who provides a comprehensive overview of U.S. nuclear deterrence strategy amid escalating global threats. Hoagland examines Russia's and China's rapid nuclear modernization, North Korea's ambitions, and Iran's enrichment activities, framing the strategic challenge as a "three-body problem" in geopolitics. He details the U.S. response: accelerating warhead modernization, revitalizing aging infrastructure, and leveraging advanced science and technology—including high-performance computing and fusion research—to maintain a credible deterrent. The discussion highlights rapid capability development, hard and deeply buried target defeat initiatives, and supply chain resilience, while addressing workforce challenges and strategic partnerships. This session underscores the urgency of sustaining technological superiority and agility to deter multiple nuclear-armed adversaries in an era of great power competition.

Executive Summary

The National Institute for Deterrence Studies (NIDS) hosted a seminar featuring David Hoagland, Acting Deputy Administrator for Defense Programs at the National Nuclear Security Administration (NNSA). Hoagland delivered a strategic briefing on the evolving nuclear security landscape and the U.S. response to emerging threats from Russia, China, North Korea, and Iran.

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Key Themes and Insights:

- **Global Threat Environment:**
  Russia maintains the world's largest and most diverse nuclear arsenal, including new strategic systems like Poseidon and Skyfall, while China is on track to field over 1,000 nuclear weapons by 2030. North Korea and Iran continue to pursue nuclear capabilities, complicating global stability.
- **Modernization Imperative:**
  The U.S. is executing a sweeping modernization of its nuclear deterrent, encompassing warheads, delivery systems, and supporting infrastructure. Seven major warhead programs are in production or design, with recent milestones including early delivery of the B61-13 and W84 components.
- **Rapid Capability Development:**
  Initiatives such as the Nuclear Deterrence Rapid Capabilities Team aim to accelerate design and deployment of new systems, including the sea-launched cruise missile (SLCM-N) and hard and deeply buried target defeat capabilities.
- **Infrastructure Revitalization:**
  NNSA is addressing aging facilities and ramping up production of critical materials like tritium, uranium, and plutonium pits, while leveraging partnerships with industry to ensure supply chain resilience.
- **Technological Superiority:**
  Advances in high-performance computing (El Capitan) and fusion research position the U.S. to maintain a decisive edge in nuclear science and engineering, reinforcing deterrence credibility.
- **Strategic Outlook:**
  Hoagland emphasized that deterrence is not about matching adversaries weapon-for-weapon but ensuring quality, reliability, and agility. The U.S. must sustain modernization momentum and prepare for potential arms race dynamics while preserving global stability.

Conclusion:
This seminar underscored the urgency of modernizing the U.S. nuclear enterprise to deter multiple adversaries simultaneously. Hoagland's remarks highlighted the interplay of technology, infrastructure, and policy in shaping a credible deterrent for the 21st century.

Unabridged Transcript

(Note: there will invariably be some word errors in this AI Generated transcript.)

00:00:12:02 - 00:00:42:01
Kimberly Cherington

Good morning. I'm Kimberly Cherington, and on behalf of the National Institute for Deterrence Studies, or NIDS, it's my pleasure to welcome each of you to today's seminar. I want to call your attention to another event that we have coming up, January 30th. One will welcome Stephen Blank and Mark Schneider for an in-depth analysis of Russia's current and projected nuclear posture and strategic forces, where they'll examine Moscow's long-term modernization and expansion plans.

00:00:42:02 - 00:01:08:14
Kimberly Cherington
If you'd like to explore more of our work here at NIDS, including upcoming events, publications, reports, podcasts, please visit our US at Think deterrence.com. We're constantly adding new speakers and events, so be sure to check back often and follow us on social media to stay informed. If you or your colleagues would like to receive future invitations directly to your email.

00:01:09:02 - 00:01:42:07
Kimberly Cherington
You can email me at KCherington@thinkdeerremce.com and we will get you on our invite list. Throughout today's presentation, we encourage you to submit your questions in the chat or the Q&A button at the top of your screen, and we'll address those during the dedicated Q&A portion of the seminar. Now, I'm delighted to introduce our host for today's discussion, Mr. Peter Huessy, President and Senior Director of Strategic Deterrence Studies at Geo Strategic Analysis and a senior fellow here at NIDS.

00:01:42:08 - 00:01:45:06
Kimberly Cherington
Peter, the floor is all yours.

00:01:45:07 - 00:02:11:06
Peter Huessy
Thank you, Kimberly, very much. I'd like to welcome our president, James Petrosky, who is here today as well as our over 100, guests that have signed on already. We had about 250 people that had signed up. We're honored today to have Dave Hoagland, who is, and then say he's acting deputy administrator for defense programs. He maintains the safety, security and reliability of the US nuclear weapons stockpile.

00:02:11:07 - 00:02:41:13
Peter Huessy
And prior to his current position, he served as the executive principal deputy assistant deputy administrator for defense programs. He coordinated efforts across 11 program offices and eight field sites to modernize the nuclear weapons enterprise. For those of you interested in the subject, of course, you can go on our website and find Don Cook's recent remarks, as well as, I think we have Stacey Huser's, presentation when she had, David's position.

00:02:41:14 - 00:03:10:02
Peter Huessy
She is now head of 20th Air Force out in Cheyenne, Wyoming. But her, assessment, her slide show is wonderfully done. And we are honored to have, David here today. We want to thank you, sir, for coming over to see us and share with us the good news story that NNSA has to say, which is a change from where we were about 20 years ago or even 15 years ago.

00:03:10:03 - 00:03:20:06
Peter Huessy
So, David, thank you. On behalf of NIDS, I want to thank you for coming over to talk to us in short. The floor is yours, sir.

00:03:20:07 - 00:03:46:06
Dave Hoagland
Well good morning. Thank you, Peter, thanks very much for having me. And thank everyone for joining. We were talking right before this started, and I have to say, Peter, he's he has done as much as anyone alive, I think, to raise Washington's collective IQ about nuclear weapons and nuclear deterrence. It's an honor to be invited here to offer some thoughts on those subjects.

00:03:46:07 - 00:04:13:13
Dave Hoagland
As introduced, I'm David Hoagland. For the last year, I have been serving as NNSA's acting deputy administrator for defense programs. I am very happy to announce that last night, the Senate voted to confirm Mr. Dave Beck for this position I'm currently in and I will continue to be the deputy in defense programs. The organization we lead is responsible for designing, building and maintaining the nation's nuclear weapons stockpile.

00:04:14:00 - 00:04:36:11
Dave Hoagland
I think of it, more in historic terms. The men and women I work alongside are very much the intellectual descendants of the scientists and engineers who built the first atomic bombs for the nation. And in that context, I do believe the work we do is every bit as essential to the United States, as the Manhattan Project was then.

00:04:36:11 - 00:05:07:00
Dave Hoagland
A little over a decade ago, about the time Russia seized Crimea, we started hearing in national security channels, started hearing about a pivot away from counterterrorism and countering weapons of mass destruction, return to an era of great power, competition. Now, one was suggesting that terrorism goes away. We know what happens when terror, when we ignore terrorism.

00:05:07:01 - 00:05:34:13
Dave Hoagland
But truly, there was a change in emphasis to rebuilding our strategic capabilities and deterring aggression, specifically from Russia and China. I'll make a personal note that this evolution in national security, mirrors my own career path. First, combating terrorism and focusing on countering WMD terrorism. At the time, what I judged were the greatest threats to national security.

00:05:34:15 - 00:06:02:08
Dave Hoagland
I did that, and NNSA and at National Security Council. And now my current position by choice has me focused on what I believe is the greatest threat to the United States national security. And I work in the

strategic domain. Working very hard to modernize the nuclear stockpile. The modernization program we currently undertake being driven by global developments.

00:06:02:08 - 00:06:29:12
Dave Hoagland
This is well known to this audience. Russia, China, North Korea aggressively expanding and modernizing their capabilities. I'd like to just unbox this, a little bit, because it's the geometry of the problem that we're facing. First, Russia very quickly. Russia has the largest and most diverse nuclear arsenal, including the largest stockpile of non-strategic nuclear weapons.

00:06:29:13 - 00:07:00:02
Dave Hoagland
This is the differentiator with us otherwise in parity under New START limits. The Kremlin is also developing several new classes of strategic weapons. Things that have been publicized, described in media. Long range underwater drone called Poseidon. Nuclear powered cruise missile, nuclear armed, nuclear powered cruise missile known as Skyfall Space based platforms to carry nuclear weapons.

00:07:00:04 - 00:07:40:09
Dave Hoagland
Since Russia's full-scale invasion of Ukraine, Moscow has also issued alarming nuclear rhetoric and positioned nuclear weapons outside Russia's borders. Early in the conflict, it was hard. It was easy to maybe disregard, Vladimir Putin in the first days of the invasion, issued an unusual, level of special alert for its nuclear forces. This was hard to decipher in strategic terms, but more recently, they have and more officially changed, Russia's use doctrine in a way that can be interpreted as lowering the threshold for nuclear use.

00:07:40:10 - 00:08:07:03
Dave Hoagland
China. It was switched to China a little bit on track to build over a thousand operational nuclear weapons by 2030. We made news this year, by beating their projections and hitting 600 weapons. They're likely have a stockpile of 1500 by 2035. So that's important. It's parody under what we currently observe by New START. And currently the, roughly the levels of strategic weapons we have fielded.

00:08:07:04 - 00:08:45:02
Dave Hoagland
Beijing also flight tested hypersonic fractional orbital bombardment system. They're developing also a much more diverse nuclear force, including theater relevant capabilities that have our attention. North Korea, North Korea's leader, has talked about growing his nuclear arsenal exponentially, to include tactical munitions and higher yield systems. This tells us two things about North Korea. One, It's stockpile will grow, and two, Kim Jong Un doesn't understand the word exponential.

00:08:45:03 - 00:09:20:01
Dave Hoagland
If you bear with me, NNSA is a technical agency. So, last Iran, and at least until the U.S. and, Israeli military strikes in June, it runs uranium enrichment was increasing to higher levels. And capacity is very concerning to western to the Western world. And of course, it remains to be seen whether clerics in Tehran will

attempt to reconstitute a nuclear program, after that, after it was degraded in those strikes, but still very much in play put together.

00:09:20:02 - 00:09:52:14
Dave Hoagland
The point is, as has been covered exhaustively, Russia, China and North Korea have all signaled that they expect nuclear weapons to remain at the very center of their military postures for decades to come. I want to make this point. **They have done that despite good faith gestures by U.S. presidents from both parties, Congress, executive branch agencies over the last 30 years to attempt to de-emphasize nuclear weapons and global security.**

00:09:52:15 - 00:10:25:14
Dave Hoagland
They declined the opportunity. And they brought us to the place we are now. So, for that reason, the United States has no choice but to maintain a strategic deterrent that outlasts their paranoia. Nuclear weapons are in a class by themselves. These capabilities are the central core of strategic deterrence today, deterring multiple adversaries, two of whom will be peers in the future.

00:10:25:15 - 00:10:47:03
Dave Hoagland
And doing so simultaneously presents a challenge that is fundamentally different from the paradigm of the Cold War. It is the geostrategic version of the three-body problem. And if we have any math nerds, in the audience, it turns out geopolitics is more complicated than math. And I don't believe we've quite solved it yet.

00:10:47:04 - 00:11:33:07
Dave Hoagland
Deterrence. It's not sort of magically achieved, by reaching, arbitrarily set threshold of number of weapons. Numbers are important. But deterrence is a condition that we painstakingly attain, and preserve by fielding the right number of weapons, with the right capabilities, in the right places, at the right time. And I'm happy to say that this is what we are doing right now in policy space, in the Nuclear Weapons Council, in partnership with Department of War, the services, we continually assess the specific capabilities we need to deter our adversaries today and in the future.

00:11:33:08 - 00:12:04:01
Dave Hoagland
And part of this is modernizing the nation's legacy nuclear deterrent on a time frame that is relevant to our enemy's calculation about the use of military force to achieve to achieve their objectives. We build a certain number of new modernized weapons and introduced them into the stockpile. But to maintain, to achieve and maintain the total numbers we need, we have to simultaneously invest in extending the lifetimes and maintaining the reliability of the legacy stockpile.

00:12:04:04 - 00:12:29:09
Dave Hoagland
Both our demands on our production and design capabilities. So, I do want to spend a few minutes and give you an update in this area on our nuclear modernization programs and the current state of play. It is

truly a sweeping modernization effort. It includes not just the nuclear warheads, but also submarines, aircraft, ballistic missiles that deliver them.

00:12:29:10 - 00:12:59:15
Dave Hoagland
Each one of those is a partnership between NNSA owning the warhead and the service that owns the platform. But the modernization also includes the infrastructure communications capabilities that undergird the deterrent. So, and then I say piece of this, we're responsible for the design, manufacture, and maintenance of the nuclear weapons themselves. But also the use controls, use authorization, permissive action links, and warheads and bombs themselves.

00:13:00:00 - 00:13:20:14
Dave Hoagland
We're charged every year with certifying the weapons, that they meet stringent requirements for safety, security, performance and reliability. Before we deliver them to the warfighters, we're wrapping up the annual assessment. This, this year's annual assessment. It's, annually done at the end of the year and results in a letter from both secretaries to the president, normally in January.

00:13:20:15 - 00:13:29:15
Dave Hoagland
We'll publish our reliability report early in 2026. Both are very good.

00:13:30:00 - 00:13:54:07
Dave Hoagland
However, most of the weapons in the legacy are in the enduring stockpile that were built in the 1970s and 80s, and we acknowledge we're not designed to start to serve and stockpile indefinitely. Jared, statistic with you, the average duration of a current warhead, since it was manufactured or refurbished is roughly 28 years. That number is going down.

00:13:54:07 - 00:14:20:10
Dave Hoagland
We track this. We've got a we've got a board, in a briefing room downstairs. And whenever VIPs or partners come in, we track over roughly 80 years of, nuclear weapons history and show the trend in age of warheads. And by modernizing sufficient numbers of warheads, every year, we're bringing down the average age of in-service units.

00:14:20:11 - 00:14:51:10
Dave Hoagland
To do that, we've got seven entire classes of systems that are now being comprehensively modernized. Two warhead types are being manufactured and delivered as we speak. Actually, two wrapping up. The other five will begin production later in the 2020s. And in the 2030s. NNSA's record of timely warhead delivery. We've made 100% on-time delivery of all our weapons for over five years.

00:14:51:12 - 00:15:18:06
Dave Hoagland
Nevertheless, it's becoming clear that the planned timelines they're probably not going to cut it for the

future. The speed at which the global security environment is deteriorating suggests that we also need to accelerate our program record significantly and add to it. And I'll talk about that in a moment. The process is well underway already. I want to share a few examples.

00:15:18:07 - 00:15:48:12
Dave Hoagland
Many of you will be familiar with 2019, NNSA developed and produced a low yield variant. The W 76 is called the W 76-2 submarine launch warhead. We did that within six months. Since 2021. And NNSA has produced the W 88 all 370 warhead and the B61 12 gravity bomb, both ahead of schedule and achieve 100% on-time delivery.

00:15:48:14 - 00:16:19:04
Dave Hoagland
Last week we had a celebration for what we call the last production unit LPU of the W88 all 370. We entered this year, 2025 with the celebration of delivery of the B61 12, gravity bomb. Inn 2023, I just want to give a give a picture here of the pace at which we're modernizing. So, the last time we released unclassified numbers was in 2023 of total, modernized weapons delivered.

00:16:19:05 - 00:16:48:14
Dave Hoagland
We delivered well, more than 200 modernized weapons to the Department of War in that one year alone. That was the most since the Cold War. Things are different. We're not disclosing total numbers since then. But I can tell you it's not. It's not very different, year to year. And if you... simple math, look at, China's, ramp up, they're adding roughly 100 a year to their stockpile.

00:16:48:14 - 00:17:15:01
Dave Hoagland
Now, that's additive. And ours are essentially replacing and modernizing capability, ramping up in 2025. We've had a very good year. We completed the first, first production unit of the B61-13 variant, and that was done nearly one full year early. Last month, although it wouldn't make any headlines I'm going to say completed the first Can subassembly.

00:17:15:03 - 00:17:47:05
Dave Hoagland
There's a secondary stage of a thermonuclear weapon. We did that for the W80-4. This is the warhead that would be paired with Air Force's long range standoff missile. We achieved that milestone 18 months ahead of schedule. So, things are really, really accelerating here. I want to comment on LRSO. It replaces the ALCM Air launch cruise missile. ALCM designed in the 1970s, produced in the 1980s.

00:17:47:06 - 00:18:17:05
Dave Hoagland
You know, talk about a step change in capability. We will fully replace that warhead in the coming years. Much more capable missile, more reliable systems. And can be integrated into air carried platforms. And in my view, making the air leg whole again, really, really significant. And serves as a priority for me in defense programs when we have to make trades and prioritization decisions, we've consistently been articulating the W80-4 as the highest priority.

00:18:17:07 - 00:18:52:05
Dave Hoagland
And I totally when the rest of government shut down, we used and stretch dollars to keep production going, actually, on all on all warhead programs. But this one as a key priority. So, I'll wrap up on modernization. Just to note, while we have seven in some stage of production or design, all the current warhead modernization programs are on or ahead of schedule.

00:18:52:06 - 00:19:20:03
Dave Hoagland
So, extending the streak and accelerating program record is going to require, new approaches, novel approaches, warhead development and delivery. Some are technological. Others will be process oriented. On the tech front, we're going to place greater reliance on proven technologies. So, moving into the future as we make those design versus delivery trades. Greater reliance on proven technologies for insertion into the stockpile and into the production floor.

00:19:20:03 - 00:19:50:05
Dave Hoagland
That means earlier tech development work or going with a proven system. In some cases, moving into the future, we will tailor requirements, and can move towards minimum viable products. And we will accelerate cycles of learning and design development. There's a team, at a new facility we've procured going through cycles of design, production, assembly and then spiraling.

00:19:50:06 - 00:20:23:02
Dave Hoagland
Multiple times for a quarter through design, production, the whole cycle. So, I'll focus on three areas in particular. Might be front of mind for some of the folks in the audience. First, the SLCM-N nuclear armed sea launch cruise missile. So, this weapon is already in the program record. Authorized by Congress. We have appropriations, showed up in H.R.1, and obviously, stamp of approval from the Nuclear Weapons Council.

00:20:23:03 - 00:20:51:03
Dave Hoagland
It's intended to provide the Navy with new options to deter, in particular, China and in the Indo-Pacific has multiple mission roles. But the timeline here is crucial. If you look at appropriations, Congress has mandated that SLCM-N be delivered by 2034. However, look at China's rhetoric. So, China's leaders have been remarkably blunt in signaling their timetable in preparations for war.

00:20:51:03 - 00:21:19:09
Dave Hoagland
XI Jinping instructed the People's Liberation Army to be prepared to take Taiwan by force by 2027, and to complete full military modernization by 2035. They're not making this a secret, in my judgment, that's cutting it to close. And so, if we want to introduce a new system into theater in time to influence XI Jinping's calculations, we've got a deliver SLCM-N Faster.

00:21:19:11 - 00:21:58:05

Dave Hoagland
And I'm pleased to say that NNSA has already compressed the warhead design and development process. We're working very closely with the Navy to deliver this capability considerably earlier. Next, HBTV Hardened deeply buried target defeat key priority for the nuclear community. And there's bipartisan consensus in Congress and executive branch agencies, certainly, and NNSA and DoD that the program of record is necessary but insufficient.

00:21:58:06 - 00:22:26:04
Dave Hoagland
And a combination of more, better, different is needed HDBT, hard and deeply buried target defeat, is an excellent example of this. Well, not yet part of the officially part of the program record. We are doing, very aggressive studies and development efforts on this, and the demand is clear. The recent strikes against Iran, really, they underscored this point.

00:22:26:06 - 00:23:01:00
Dave Hoagland
Adversaries are increasingly reliant on burying their key infrastructure, key nodes, and fortifying those facilities. And it poses a significant challenge to the United States and our allies to hold them at risk, improving that ability is on a similar, I think, scale of replacing ALCM with LRSO. So really represents a potential step change in our capability.

00:23:01:01 - 00:23:28:02
Dave Hoagland
So, everyone, I think, calibrated or indexed to the strikes against Iran as a, as a point on this, just if I could take an aside. I read something fascinating in media after those strikes, I, I think it was in the Washington Post. And I want to get it. I want to get it right. But it was about the combined, tonnage of ordnance used.

00:23:28:03 - 00:24:08:12
Dave Hoagland
So in The Washington Post, you know, sowe use 14 GBU 257 massive ordnance penetrators, mops in the strikes against two targets and other conventional munitions. What I read in the post is really interesting. Fascinating. Did you know that, I'll quote it here. '420,000 pounds of ordnance was used in that strike, about 28 times the power of the atomic bomb dropped on Hiroshima, and more than one third the strength of the most powerful weapon currently in the US nuclear arsenal.'

00:24:08:13 - 00:24:47:10
Dave Hoagland
It's fascinating. It's incredible. It's literally incredible because it's patently false. It is wildly wrong. What I think that journalists didn't understand is we measure yield in kilotons, not in pounds. The fact is that the ordnance used on Isfahan and...was a fraction of the power of even Little Boy. And smaller fraction of modern thermonuclear weapons.

00:24:47:10 - 00:25:10:02
Dave Hoagland
I mean, nuclear weapons truly are in a class on their own. They're not well understood and. Well, Peter, I gave you credit for raising the nuclear IQ in Washington. I'll offer that there's still some work to be done. At

least, at least with the media. So let me get back to hard and deeply buried targets.

00:25:10:03 - 00:25:39:09
Dave Hoagland
So we are working with DoD on, a few, of course, of course, of action, options to develop, and even strengthen our HDBT defeat capability. There are options that look at using off the shelf warhead and platform components to very rapidly deploy and HDBT capability. And, of course, that's subject to approval by the Nuclear Weapons Council, subject to appropriations.

00:25:39:09 - 00:26:13:07
Dave Hoagland
But, I'm comfortable sharing that. And NNSA is postured very well to accelerate testing, acquisition, and production activities for, a new HDBT capability. Last, rapid capability. So, we're talking about adding new things to the program record, adding new capabilities to the nuclear deterrent. I was very proud this year, this summer, to sign in charter NNSA's, it's called the Nuclear Deterrence Rapid Capabilities Team.

00:26:13:09 - 00:26:38:07
Dave Hoagland
For those familiar with DoD's RCOs. This is a little different. But in large sense, the same. This is a team that's task organized to rapidly develop new warhead options and prototypes much more quickly than we have in the past. You'll, I think you'll understand, and forgive me if I don't talk about the details of what we will develop.

00:26:38:08 - 00:27:15:02
Dave Hoagland
But I will say that this team works, at a at a facility, has production capability, has design, machines, computers at their disposal and is going through the spiral cycle I described a few moments ago very, very quickly developing and spiraling, new weapons concepts, and capabilities for DOW consideration. So, to deliver on the program of record and field novel systems, we're really taking a wholesale revitalization.

00:27:15:03 - 00:27:43:00
Dave Hoagland
I talked about the design and the warhead programs, but it's also in the facilities and the infrastructure that support the stockpile. Some of these date to the 1940s, truly, 60% of NNSA's facilities are more than 40 years old and nearly 40% are in poor condition. By our own judgment. So what? I'd like to talk about infrastructure just a little bit.

00:27:43:01 - 00:28:18:12
Dave Hoagland
The effort of revitalizing the whole complex, and includes restoring infrastructure required for manufacturing a wide range of components and strategic materials. You know that, well, tritium, lithium, high explosives, uranium, both enriched and depleted uranium enrichment itself. And of course, plutonium pits. A few words. I won't be exhaustive about this.

00:28:18:14 - 00:28:45:06
Dave Hoagland

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But representative of the same type of change we see in warhead modernization, the infrastructure monetization is yielding dividends on tritium. It never makes that error time. And I don't want to make news today, but the United States and NNSA, may be poised to set record levels and production of tritium in the coming year. While that's not an announcement. I urge you to look for that later in 2026.

00:28:45:07 - 00:29:26:12
Dave Hoagland
Real innovations going on in tritium production, collection, extraction, collection. And that supports a wide range of, of COAs for DoW and the president. We awarded contracts for reliable supply of high purity depleted uranium and uranium enrichment. Recently in 2025. Both equal to or greater than $1 billion value. For those contracts. You're going to see us partner more with industry, on these and other material streams like lithium production and plutonium pits.

00:29:26:13 - 00:30:07:13
Dave Hoagland
He made announcement October 2024 about first production unit. So sort of the first pit that was diamond stamped, for the 87 one. After that, we shifted the priority, the emphasis inside that facility onto equipment, installations and equipment removals. That so that we can get to rate production as fast as possible. So as a result of that at Los Alamos for pit production, for the project that installs and removes those, complex 12 boxes and production machines.

00:30:07:14 - 00:30:35:15
Dave Hoagland
Productivity in that area has jumped 300% this year over the average from the last three years. 300% step change in installations and removals. We're at our deterministic schedule for those project managers and in the audience, that's the schedule. That's sort of a dream where nothing goes wrong. We then we're within a week of that, deterministic schedule, the same time we are still producing pits.

00:30:36:00 - 00:31:09:15
Dave Hoagland
We don't release numbers on pit quantity. But we're production. But I'm comfortable saying that we're producing pits faster than we did last year. Roughly twice. Twice the rate. Finally, we have to sustain our science based capabilities to design, certify, and assess them and modernize the stockpile. We do use, and I say, some of the most advanced experimental facilities, high performance computer modeling and simulation, in the world to confirm reliability of our weapons.

00:31:10:01 - 00:31:33:13
Dave Hoagland
It's really hard to overstate how Central America's technological superiority will be in great power competition with Russia and China. It's one of our differentiators. You know, for all the characterization of these countries as peers or near peers. I got to tell you, they simply cannot compete with the United States in the realm of advanced science and technology.

00:31:33:13 - 00:32:10:05
Dave Hoagland
A few examples. In 2022, National Ignition Facility became the world's first facility to reach fusion ignition.

We did communicate that it was well known. I'll share with you. And so fusion ignition is where you yield more energy out of the experiment than you put into it. We're doing that through the last through the last year and since 2022, on a more regular basis, we've repeated that many times, and achieved greater and greater fusion yields this year.

00:32:10:06 - 00:32:40:07
Dave Hoagland
What I'll share is, we hit new record yield. Fusion yield. 8.6 Megajoules of fusion yield. That's a gain of four. Really significant. And our adversaries really just wish they could match it. Nowhere else in the world did scientists come so close to recreating the conditions that occur inside a functioning nuclear weapon? We're also pioneering high performance computing technologies.

00:32:40:11 - 00:33:09:06
Dave Hoagland
These simulate the nuclear weapons phenomenon. The multi material, multi physics, dynamics of a functioning nuclear weapon. We deployed El Capitan, did a ribbon cutting January of 2025. We got classified models running on it later in the year. El Capitan, can run at wo exaFLOPS of speed. That is that is really difficult to get your head around.

00:33:09:07 - 00:33:37:01
Dave Hoagland
But benchmarked. It is the fastest computing system in the world. And our designers are using that routinely now. And even our most seasoned designers are stunned by what they can do on this machine. So, we'll use it to model advanced high energy density physics, inertial confinement fusion, complex dynamics of ballistic reentry. Of course, nuclear weapons design itself for material behavior.

00:33:37:02 - 00:34:14:09
Dave Hoagland
But it'll also support new AI based workflows. And these can help us address emerging challenges. Material discovery, design optimization, advanced manufacturing, digital twins, intelligent AI, assistance. So, the contrast with our adversaries. It couldn't be more stark. I like to think of Russia in this domain. Obviously, the war Russia chose to engage in against Ukraine exposed the apathetic state of their conventional military.

00:34:14:10 - 00:34:45:02
Dave Hoagland
The corruption that led to failure, failures of systems. And Putin might reasonably conclude that corruption and incompetence extends to his nuclear forces as well. Look at the, the failure rate of Russian missiles, some of which are dual use conventional and nuclear. Failure rate in Ukraine has been embarrassing for Russia. Tests of some of its nuclear systems, like Skyfall, have ended in mishaps.

00:34:45:03 - 00:35:18:11
Dave Hoagland
This was 2019. Our team from... after a test of Skyfall, encountered an accident, and it killed seven technicians and scientists from Vinia. That'd be like us losing some seven people from Los Alamos. And perhaps my favorite is in 2018, because we're talking about high performance computing. Russian

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scientists at a nuclear weapons laboratory were arrested for using the facility supercomputers to mine Bitcoin.

00:35:18:13 - 00:35:41:15
Dave Hoagland
So, look, I mean, technological dominance, the quality of our weapons and the integrity of our system broadly, including our political system, are the preeminent advantages that we bring to strategic competition, for this century. And I think it's these strengths that will allow us to engage in the inevitable discussions around a buildup of forces.

00:35:41:15 - 00:36:08:00
Dave Hoagland
That's going to be a real discussion. I'll say I don't think it needs to be an axiom. The United States needs a stockpile number, a quantity that is equal to the sum of Russia and China. That's not a necessary formula. The competition with our adversaries, I think, will be decided by technological superiority. The quality of our systems, especially, and our agility.

00:36:08:00 - 00:36:37:12
Dave Hoagland
Nevertheless, we do have to consider, deterrence failure. And so, even as we work to strengthen our deterrence and extend the 80-year period of peace between great powers, we have to recognize and understand that deterrence could fail. In this scenario, you might think of it is a first use or a limited use of non-strategic nuclear weapons.

00:36:37:12 - 00:37:15:13
Dave Hoagland
So you could think about that in the context of Ukraine. And I want to talk a little, little bit outside my current lane, just about NNSA's technical competencies that can be brought to bear. In a scenario like that, I want to share what an NNSA did in the context of Ukraine. So early in that conflict, given the nuclear dimensions, the risk to nuclear facilities like operating power reactors, but also increasing cadence and drumbeat of Russia's threats of use of non-strategic nuclear weapons.

00:37:15:15 - 00:37:47:07
Dave Hoagland
And NNSA, blanketed Ukraine in the region with detectors, multiple types of detectors, including radiation detectors and other sensors that would immediately detect a nuclear incident, including a Russian, including Russian nuclear use. We modeled over 200 battlefield use scenarios to understand the effects and the limitations of Russian weapons. If they use them against Ukrainian military formations.

00:37:47:09 - 00:38:21:01
Dave Hoagland
By the way, prevailing winds are such that, six more than 60% of the time fallout travels towards Russia or Russian occupied territories, should they use, nuclear weapons. I found that very interesting. And then based on all that we provided a raft of training to Ukrainian military. Special, special units and emergency response personnel that would allow them to fight through such conditions.

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00:38:21:03 - 00:39:06:09
Dave Hoagland
There are a lot of lessons from what was done in Ukraine and contemplated in, in Ukraine. Nuclear weapons were all my bluster before about their power. Battlefield nuclear use can be a tractable problem. Forces can survive it. They can continue to fight. And we should internalize those lessons here. So, I know a lot of discussion occurs in public for, about, the potential for Russian first use or even Chinese, first use.

00:39:06:10 - 00:39:34:15
Dave Hoagland
But we cannot be paralyzed by an adversary's limited use of nuclear weapons. And I think as an extension of that observation, our public rhetoric should not go about suggesting that there's a, quote, deterrence gap that adversaries can exploit by conducting low yield theater strikes. The suggestion is that we lack reciprocal capabilities. It's not true. It is not true.

00:39:35:00 - 00:40:01:11
Dave Hoagland
We have low yield options and I talked about the W 70 6-2. That's one example. There are more. And we're developing even more capabilities now then in a, in a more deterrence, in a more strategic sense. I'm not certain that deterrence is served, by signaling to our enemies that that's an Achilles heel, that we are unable to respond to limited nuclear strikes with a proportional response.

00:40:01:12 - 00:40:24:11
Dave Hoagland
Second, and I was talking about this. We need to increase knowledge of nuclear weapons effects across DoD. It can be survived. Look at. And this is an area and NNSA, DITRA has done work on this too. But NNSA has unique, capabilities and is uniquely positioned to assist there. I have two books. One has a lot of books in my office.

00:40:24:13 - 00:40:58:05
Dave Hoagland
Two. Relevant here. The *Tactical use of Atomic Weapons* published by the Department of Army March of 1955 and the *Effects of Nuclear Weapons*, published in 1957. That second one, by the way, was, there's a foreword, cosigned by the secretary of defense at the time and the chairman of the Atomic Energy Commission, illustrating the type of partnership, that we still require today to understand, deal with, accommodate plan for, nuclear weapons use.

00:40:58:06 - 00:41:33:00
Dave Hoagland
And, you know, in my thinking, this is, to a great extent, a matter of relearning lessons from the earliest years of the Cold War. I feel like I've. I've talked for too long already. Let me just try to wrap up. So even as we're adapting to technological and programmatic geostrategic change, our, our mission in NNSA tomorrow will be the same as it as it always has been, ensuring the reliability military effectiveness of our nuclear arsenal.

00:41:33:02 - 00:41:57:02
Dave Hoagland

The credibility of the stockpile will remain the bedrock of our national security for the foreseeable future. Its quality is the ultimate source of the president's confidence and the deterrence and our adversaries perception of his potency. This now, today, the next five and ten years is arguably the most important time for a global stability in decades.

00:41:57:04 - 00:42:05:08
Dave Hoagland
Potentially in our lifetimes. And, and it's a privilege to be part of this community. I'm looking forward to the discussion. Over to you, Peter.

00:42:05:09 - 00:42:30:12
Peter Huessy
Thank you so much, David. Those were extraordinary remarks. And thank you for your comments about my work. It's deeply appreciated. We have a lot of questions. Let me get to one that came in from Anna. Think from the Carnegie Endowment, she says. “To what extent is rapid capabilities development hamstrung by production and the execution of the current program of record?”

00:42:30:14 - 00:42:55:11
Dave Hoagland
Thank you very much. So the current program record is a priority. And it is front of our mind. That anything new, not to injury to the current plans. And be routinely prioritized. And this is something that that we do and nuclear weapons Council space. Every new idea should be prioritized against the program of record.

00:42:55:12 - 00:43:32:12
Dave Hoagland
And every other new idea within NNSA’s production capacity. We have a good understanding of where choke points are and where opportunities are. There are there are areas of still some unused capacity across time and across geography. The eight different sites and mapping those more precisely is one of our, actually program initiatives here so that we can, we can visualize and plan where production work can happen.

00:43:32:13 - 00:44:00:00
Dave Hoagland
Then you have the varsity level of which production works, you know, do you have an opportunity to do is in uranium work for secondaries or primaries, high explosives airframes, … And so, we have, latent unused capability, at different points. And so, it's a sort of complex mapping between what it will take to develop and produce a new system and what's available.

00:44:00:01 - 00:44:10:08
Dave Hoagland
So high level sort of math. It's not quite yet math. It's still intuition and a lot of collaboration between leaders at labs, plans and sites.

00:44:10:10 - 00:44:37:08
Peter Huessy
Thank you. David. Brenda Brown, as you know, as a question, when this has come up at every Triad

symposium I've hosted and that is recruiting, retraining, retaining and training specialized scientific and engineering talent. What are you doing to achieve that? Because I know across the board, that's the biggest issue I see out there, is people saying it's the difficulty of getting such people.

00:44:37:09 - 00:45:05:01
Dave Hoagland
Yeah. So, there's good news in this regard. All three and NNSA laboratories at the laboratory director level have reported this year that attrition has stabilized. And recruiting efforts over the past three years have been successful. I won't forget the numbers, but it's in the thousands of added personnel to each laboratory. And crucially, attrition is back to pre-COVID levels that we're retaining them.

00:45:05:02 - 00:45:40:06
Dave Hoagland
That's the good news. The downside of that is you've had a turnover in that expertise. And so now the average, experience level of a laboratory employee is lower than it would have been ten years ago. That's okay. But it brings different challenges as knowledge preservation and knowledge transfer. And the optimist in me likes to also think about it, where the new generation is going to be very inclined towards capitalizing on new tools like generative, AI tools, machine learning.

00:45:40:07 - 00:46:07:14
Dave Hoagland
And so there's it's a very, vibrant environment at each of the labs. The plants I have less, less visibility on. But we talk, to the plant, the president, CEOs, of each of the plants and, routinely forecast the work demand. And I'm not aware of any problems where, they're not able to get staff or craft to the worksite to do the jobs that we need done.

00:46:07:15 - 00:46:40:00
Peter Huessy
Thank you. David. I want to make sure you... I don't want to take you off in a lane where you shouldn't be, but in the House Armed Services Committee, over the last number of years, there's been a debate on why do we have an 80 pit production goal and when can we get there? And that's one question, because, to be honest with you, the debate within the committee has been relatively, relatively brief and not totally not greatly informed.

00:46:40:00 - 00:47:07:04
Peter Huessy
But leave that aside. The second question is being on time and under budget. What were the factors that led you to get there from where we were a number of years ago, because I know Madelyn Creedon and General Klotz, as well as others, did an extraordinary job of putting this, I think, in the right direction. But I think there's one thing that would be very interesting is how did you get there?

00:47:07:05 - 00:47:11:11
Peter Huessy
So those two questions, David, why don't you go ahead, take them.

00:47:11:12 - 00:47:49:05

Dave Hoagland
Yeah. So, for pit production in numbers this is going to continue to be a controversial topic. And motives on multiple sides of the debate are not always clear. The budget demands in Congress is always a factor. What is clear to me is that much of the public discourse, Bulletin of Concerned Scientists, type, type, concerns, I have a recent letter from Congress members.

00:47:49:05 - 00:48:19:04
Dave Hoagland
Congress is that it's a complex issue, some of which is classified. And it takes a long time to understand and make judgments about. I will say that NNSA has, better and better very good understanding of plutonium aging. That's a that's, at least a decade long, scientific process. We have an understanding of the reliable lifetimes of these pits.

00:48:19:05 - 00:48:56:05
Dave Hoagland
And if you look at the last unclassified number of stockpile. So, a stockpile number at various levels of readiness is 3748. That's a year or so old now. But if you look at it's actually not it can be simplified down. It's not complicated math to say you don't want pits greater than an age of X, pick 60 or 70 years, 80 years and that you assume you have a stockpile the same size that we have today.

00:48:56:06 - 00:49:20:03
Dave Hoagland
The annual replacement rate to prevent the number of pits or prevent pits from exceeding, say, 80 years old, get you to numbers on the order. And maybe, depending on what knob you how you turn the knobs and what age you pick them off at, could be greater than 80. It's not going to be less than 80.

00:49:20:07 - 00:49:46:01
Dave Hoagland
And so, it's that type of simple math. And back to our discussion about communicating these issues to Congress and...and the American public. That's the simplest way I can describe it. You can. You don't need A.I. to do this. Look at the annual replacement rate and the size of our stockpile as they age. And we're going to need, volume of production on that order that that you described.

00:49:46:01 - 00:49:47:11
Dave Hoagland
And I hope that helps.

00:49:47:12 - 00:50:12:10
Peter Huessy
It does. One of our, attendees, Doug and Linda Bruder, asked the following question, and I was going to ask something like, it is, do you see, any need for any change in the strategic partnership between NNSA and the Department of War?

00:50:12:11 - 00:50:17:01
Dave Hoagland
Well, I wouldn't pick a different partner, if that's what you're asking. And then.

00:50:18:12 - 00:50:19:08
Peter Huessy
How would you improve?

00:50:19:09 - 00:50:43:00
Dave Hoagland
Sorry, Peter. Oh, sorry. I'm, making light of other question. No, no, no, I there's all there's always opportunity to improve relationships. But look, we have common cause, and an essay once new, reliable, effective weapons in the field just as much as every. And when you say Department of War, that's not a that's not a monolith.

00:50:43:02 - 00:51:13:13
Dave Hoagland
Right. The real difficulty is that there's, I wouldn't say factions, but it's at least fraction needed. And so, what we need and, this would come as no surprise to my partners, in the Pentagon. What we need is, is focus, unanimous consensus, across Department of War. That is a challenge because, services, Joint Staff, OSD policy may have different.

00:51:13:13 - 00:51:34:13
Dave Hoagland
They do have different perspectives on the problem. STRATCOM, and so the council can and does, bring people together to focus. What we need right now is focus to chase three or 4 or 5, named capabilities systems and go after it together.

00:51:34:14 - 00:51:47:04
Peter Huessy
I want to follow up that what you just said is that the question was specifically referring to nuclear weapons effects. I don't know if that changes. Okay. How you want to answer that?

00:51:47:05 - 00:52:14:08
Dave Hoagland
Sure. I'd make that an included case in overall capabilities. Sure. It's all important. You know, general, so the way you generate the forces is that visible and invisible delivery, reliability, military capabilities would include effects, yield, etc.. So, to me, that's, that's one element of the MCs that we will be deciding on, and assigning to each project.

00:52:14:08 - 00:52:22:14
Dave Hoagland
And then again marching out together with the service, to create another capability.

00:52:22:15 - 00:52:48:09
Peter Huessy
This is a question that I want to get you in trouble, but we have there's often a confusion in the media between the total number of warheads we have and those that are usable and those that are deployed. Even though my dear friend Mark Schneider always is telling me that we haven't defined what deployed

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means necessarily. But.

00:52:48:10 - 00:53:11:00
Peter Huessy
When you do the numbers and you say, well, what would the current force be able to deploy if we wanted to, you get around 3100, depending on what we do in the theater, which is and people like, you know, Frank Miller and Mr. Edelman have said we don't need to match Russia and China one for one, depending on what you think they're going to have.

00:53:11:01 - 00:53:47:13
Peter Huessy
But, some of the numbers we're talking about, of where we're going were done before we were clear about what China's growth was going to be. And now we we're guessing again. But the numbers are anywhere from 1520, 35 to Jim Howe and others have got it up around multiple thousands. So. What is what's the thinking in terms of, of should we expand our production goals or stay where we are, or am I asking you to answer a question?

00:53:47:13 - 00:53:52:13
Peter Huessy
You that that is not knowable right now?

00:53:52:14 - 00:54:21:04
Dave Hoagland
I mean. We as a nation should and owe it to ourselves to bound the stockpile number, because that cascades... I deal with requirements every day, requirements for the weapon systems I described, but also that flows down to the production capabilities that we build over the next 10 to 15 years. This is also part of the race, right?

00:54:21:04 - 00:54:43:10
Dave Hoagland
This is part of the competition with China. It's not the number. It's not just the number of weapons we're putting out. It's the rate at which we're building capacity to do more. Because if you look into the 2030s or 2040s, if you assume they reached parity with our new star levels, and as you suggest, they may go beyond that.

00:54:43:12 - 00:55:11:08
Dave Hoagland
Your base capability gives you an advantage. And actually, if we don't build a capability to match or a capacity to match China, that becomes an incentive for them to arms race. It's less attractive if we can we have the capability to build those weapons because they know they can outpaces the result of an arms race is already known.

00:55:11:08 - 00:55:40:07
Dave Hoagland
It's predictable at that point. But if we are still struggling in decrepit facilities that are falling down, there's an incentive to China. So, the way you do that, from Department of War to Congress, the president signs

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out is to say, yes, slow down these requirements such that the nuclear security enterprise, the nuclear weapons enterprise, including DoD, has the capacity to be able to do X.

00:55:40:07 - 00:56:03:05
Dave Hoagland
That doesn't mean you have to do it. That's a very interesting discussion. We have not yet pinned that down. I think it's fairly well known. The requirements document that governs this process is the requirement planning document RPD. And it gets translated into several other things. And it looks out 25 years. That helps with some slow down.

00:56:03:06 - 00:56:17:08
Dave Hoagland
But it's a discrete plan. If, if you understand, there aren't boundaries on it. So, it's a very interesting idea. I'd be happy to bring that back to the council.

00:56:17:09 - 00:56:49:14
Peter Huessy
Okay. Two final questions. We have four minutes. The first one is given our dependency on microelectronics for a lot of the work we're doing, our dependance on China is worrisome to both Congress and the administration, I'm sure. Can you address that? And then the second question is, given your past work in the proliferation business, we have a question here about how does the India and Pakistan conflict or adversary position between the two?

00:56:49:14 - 00:57:01:02
Peter Huessy
How is that impact, the pace of your, work, given the how it makes the global environment much more complex?

00:57:01:03 - 00:57:35:08
Dave Hoagland
It does so first on supply chain and in China. Look, we're in competition in every dimension of national power. One of China's strengths is control over the top 10 to 20 critical strategic minerals and materials, many of which apply to military applications and microelectronics, is just no question, right. I have two groups within defense programs and a lot of help from the white House, to establish robust supply and domestic base supply chains for these critical materials.

00:57:35:10 - 00:58:09:02
Dave Hoagland
They have been ahead of, Chinese export controls, meaning they have positioned us before China applied export controls, or and use, monitoring or controls, such that we were rebuilding supply chains. It's going to be part of the dynamic. It's going to be part of the job. I have some very, very good people, that work hard every day looking to establish those domestic supplies.

00:58:09:02 - 00:58:32:15
Dave Hoagland
We know what they are because we know what China controls. It's a pretty obvious play by them. And so.

Well, I, you know, I wouldn't think of claiming victory about it. We haven't been surprised. Yeah. Then on counter proliferation in South Asia. You know, it's one when you get invested in these topics. As I was very much.

00:58:33:00 - 00:59:02:11
Dave Hoagland
It's hard to shake them. This is why I spent time on Ukraine has very invested in the early years that the first year that that conflict similarly in South Asia. And it's deeply concerning to nuclear armed countries that go to guns on a fairly routine basis. I think it complicates the environment. So, nobody wants nuclear use. Miscalculation is, I think, one of the biggest factors there or, unintended escalation or unintended, like accident, accidental use or accidents. So there's a whole raft of concerns in South Asia. Very few options, available. I think you know, look, I mean, I'm not normally the person to say this, but I think diplomacy is the answer there.

00:59:34:03 - 00:59:51:07
Dave Hoagland
And the United States, whether we like it or not, as entree with both parties and is uniquely positioned, during these periods of heightened conflict to be a mediator. And then because the stakes are so, so high in South Asia.

00:59:51:08 - 01:00:14:08
Peter Huessy
I agree with that. I do want to put in a plug for a friend of mine, Ned Mamula is head of the U.S. Geological Survey, and he has been basically, he's got two executive orders. He has to implement where he says we have to map mine and mill and his map, all the minerals that we have in our own country, and then mine them and then get them milled or processed.

01:00:14:08 - 01:00:36:07
Peter Huessy
And, he's written two books on this subject that are extraordinary. And, he has a heck of a mission, to go. So, he's on the same page, David. And, I'll put you two together now because he is an old friend that I've gotten to know over the last year or so. So, it's really quite a what a task he has in front of him.

01:00:36:08 - 01:01:06:07
Peter Huessy
I do want to turn it over to Kimberly. And so she can close out. David, that was a, wonderful presentation from A to Z. I think it's exactly what we had, almost 150 people who, were in attendance out of the 250 that had signed up. But we will Kimberly will have this posted and both the transcript and the video on behalf of Jim Petrosky, our president, and, Curtis McGiffin, who is our vice president.

01:01:06:07 - 01:01:18:03
Peter Huessy
And I want to thank you. Wonderful job. I really appreciate it. Exactly what we wanted. And again, Merry Christmas to you and your family and to everybody at NNSA. And it it's a over to Kimberly.

01:01:18:05 - 01:01:20:10

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Dave Hoagland
Thank you, sir. It was a pleasure.

01:01:20:11 - 01:01:50:00
Kimberly Cherington
Well, I just want to extend, as Peter said, our sincere appreciation to you, Mr. Hoagland, for sharing your important insights with us today. And thank you for your good work. If you're new to NIDS, we are A 501c3 nonprofit dedicated to advancing peace and promoting stability through a strong national security and nuclear deterrent. We do this by offering a wide range of deterrence education, from live and virtual events like this to podcast, publications, workshops and courses.

01:01:50:00 - 01:02:17:02
Kimberly Cherington
Through our NIDS Academy, we have a full lineup of events and speakers on Friday mornings. Be sure you and your colleagues are on our invitation list and thank you for being part of our growing community. Be sure to follow us on LinkedIn and share our content with your network to help us spread the word. We hope you have a wonderful, peaceful holiday season and we will see you back here in 2026.

01:02:17:04 - 01:02:19:11
Kimberly Cherington
Thank you for coming.

01:02:19:12 - 01:02:22:06
Peter Huessy
Thank you everybody. Have a great day.

01:02:22:07 - 01:02:23:04
Dave Hoagland
Thank you everyone.

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