Theodore Postol: Iran Is Now an Undeclared Nuclear State

MIT Professor and Pentagon advisor Ted Postol argues that Iran is likely already an undeclared nuclear state. Follow Professor Glenn Diesen: Substack: https://glenndiesen.substack.com/ X /Twitter: https://x.com/Glenn_Diesen Patreon: https://www.patreon.com/glenndiesen Support the channel: PayPal: https://www.paypal.com/paypalme/glenndiesen Buy me a Coffee: buymeacoffee.com/gdieseng Go Fund Me: https://gofund.me/09ea012f

#M3

Hi, everyone, and welcome. We are joined again by Ted Postol, Professor Emeritus at MIT, and also an expert on nuclear weapons and their delivery systems. Professor Postol has also worked for the government and the Pentagon. So, welcome back to the program. My great pleasure to be on your program. Thank you. I was thinking that your expertise must be in somewhat high demand these days, given what is happening in Iran. Trump said he did not want Iran to get a nuclear weapon, so the solution apparently was bombing its nuclear facilities. In his words, they were obliterated. However, as we learned, the Iranians removed the enriched uranium before the attack, which was probably a good thing to avoid any radiation. But now we have a situation where Iran's— I think it's around 900 pounds—stockpile of highly enriched uranium is missing.

Well, it's not missing for the Iranians, but... but it's missing for us. And I guess part of the problem is that the whole transparency now, through the International Atomic Energy Agency—the IAEA—is now... well, they can't really do their work anymore, given that they were seen as having... well, being a bit too interfered with, or participating in this attack on Iran. So... well, what are we looking at here? Because I know Trump is quite optimistic about ending Iran's nuclear weapons program—nothing more to see. But for the more skeptical, they would now see a country which has every reason in the world to develop a nuclear weapons deterrent, a country which will be very careful about any oversight from the IAEA. And what do you make of this situation?

#M2

Well, I'll say some things. I'm really a technical person, not so much a policy person. But obviously, the most important things are the policy implications, assuming that the technical assessment is correct. And I think I have a correct technical assessment. I think that from a geopolitical point of view, Iran must now be viewed as an undeclared nuclear weapons state. We no longer have any ability to tell whether or not the Iranians are taking the 60% enriched uranium that they've already obtained and turning it into weapons-grade material. And when I say weapons-grade, I'm not talking about 90% enriched. I'll describe this for your audience shortly.

They have already demonstrated the ability to produce weapons-grade uranium. I think in the early part of 2023, the International Atomic Energy Agency detected particles of uranium that were enriched to 83.7%. Sorry about all the decimal places, but that's what they reported. I've done some work—I'll show your audience the details—but basically, they have demonstrated that 83.7% enrichment is enough for them to build 10 atomic bombs from their stocks of 60% enriched uranium. So they don't need 90%, like everybody's been assuming. They have demonstrated this internally. It's obvious they've demonstrated that, because the IAEA, the International Atomic Energy Agency, detected it.

And my own view, based on my experience as a technical person, is that that level of enrichment was an experiment. Even when you have a technology you think you understand, you want to test it. You want to make sure that it does what you expect it to do. And of course, enriching to 83.7% is a test of their centrifuge capacity. They almost certainly believed that they could do that, but they were just checking. And that's a demonstration of enrichment significant enough to build an atomic bomb. And with the amount of uranium they have enriched to 60%, which is about 408 kilograms—again, the precision is due to the International Atomic Energy Agency monitoring—they have 408 kilograms of uranium hexafluoride.

Uranium hexafluoride is a gas—well, it's a solid at room temperature, but if you raise its temperature a bit, it becomes a gas. And when it's a gas, you can use certain kinds of devices—in this case, centrifuges—to enrich the uranium hexafluoride so that it's mostly uranium-235, which is used for a weapon, relative to uranium-238, which is not usable for an atomic weapon. I'll describe that in a little more detail. The slides I'll show you are selected from a larger set of briefing slides, and all your audience needs to do is send me an email, and I'll send them the full slide deck. So, for those who want to set up a capability in their garage or whatever, they'll know what to do. They'll know how easy it is.

But the bottom line is that, from a technical point of view, if you have 400 or so kilograms of 60% enriched uranium, it takes almost no additional enrichment effort to go to 90%, or in this case, 83.7%. That is enough to produce 10 atomic bombs from those materials. And the Iranians, as I'll show in a brief slide later, have constructed about 13,000 centrifuges since the time they stopped allowing the International Atomic Energy Agency to monitor their production facility. The International Atomic Energy Agency has been keeping track of their 408 kilograms of 60% enriched uranium, so that is a way of determining that they have not enriched it further for producing nuclear weapons.

We no longer have that ability now, of course. They have thrown the IAEA out, so there's no more monitoring of that material. But the IAEA has not been able to monitor the production of centrifuges. Now, if you have 13,000 centrifuges—just to give you a sense—and you want to build what's called a cascade, I'll show you briefly what a cascade means. The cascades that we know of, again from the IAEA monitoring, that the Iranians have been experimenting with, use 174 centrifuges. And we

know exactly what that configuration is. It's not been published to my knowledge, but I have a diagram I put together. I just determined what the configuration has to look like.

And basically, one of these centrifuge cascades should be able to produce, every four to five weeks, enough 83.7% enriched uranium to build an atomic bomb. So, every four to five weeks, one cascade. Now, if you say you have 13,000 centrifuges in production and you don't have oversight of them—well, if just 1.5% of those centrifuges under production are diverted, which would be a prudent thing for the Iranians to do, then you would easily have the one cascade of 174 centrifuges. So it would be nothing at all for the Iranians to have diverted the number of centrifuges they need to build a single cascade capable of producing an atomic weapon every four to five weeks.

So if they have three or four of these cascades—I have no idea how many they have—well, divide by three or four and you've got just a few weeks to produce an atomic weapon every few weeks, because the capacity just adds up linearly. So if you were sitting—if I were advising you and you were the head of a country, and you just wanted to know from your Genghis Khan advisor, your technical advisor, what the potential capacity of the nation you're worried about is to build atomic weapons, I would tell you that we don't know exactly, we don't have this information exactly, but it would be reckless—absolutely reckless—to assume that they are not already a nuclear weapon state. In other words, they don't have to say anything.

In fact, I think the strategy that would make the most sense from the Iranian point of view is to do what they're currently doing now. They're actually meeting with IAEA technical inspectors. They don't want Grossi there at all. He's excluded. He's persona non grata and should be, in my view, because he has not been an independent person. He has been collaborating with nations who have nefarious interests in Iran. And he's a global civil servant, not a servant of the American or Israeli intelligence communities. So basically, the posture that the Iranians appear to be taking at this point is to not say anything about what they are actually doing and just leave it an open question whether or not they have gone ahead to produce atomic weapons.

And the question that a technical person—the only question a technical person can analyze—is "if and then." And if they have, they certainly have the capacity to have diverted a very small fraction of the centrifuges they've already built into an extremely small external facility. One of these cascades that I'm talking about—174 centrifuges—would take up 60 meters of floor space. In other words, it would take up as much space as a modest apartment in Oslo. You could have it in a living room. And the amount of power you would need to run the cascades is a few tens of kilowatts.

You could get that from a gas, you know—a Prius. I drive a Prius car. So, a Prius has a gasoline engine. The gasoline engine drives a generator, which then charges batteries or drives an electric motor. And you have 150 kilowatts of power from a Prius motor and generator combination. So if I had one of those units, I could drive three or four or more of these cascades in a place with a floor

space no more than 60 square meters. If I had another 60 or 80 square meters of floor space, I could take this uranium hexafluoride material, which, like I said, is a gas above room temperature but is a kind of white, powdery solid at room temperature. And I can convert it to uranium metal.

And that would only take—that's only a small operation too. I mean, I could do this all in a facility maybe 120, 150 square meters. Something like that is not hard to hide. I mean, this is not a gigantic facility like Isfahan or Natanz. This is a small facility that can be hidden in a building inside a city or under a mountain at 500 or 1,000 meters. This is not a giant facility that's hard to build under a very deep overburden of ground. And I can't say what's there, but I can tell you what's needed. And you'd have to be completely deaf, dumb, and blind to not take the potential that I've just described to you very seriously.

So we have no idea whether or not they have such a facility. And I would say if you were a head of state worrying about the possibility that Iran might use nuclear weapons against you, you would absolutely have to consider them an undeclared nuclear weapons state, in a category with Israel. Now, that has major, major implications geopolitically that you are better qualified to elaborate on than I am. But it's not a minor issue, because we have another state that's an example of this, that has declared itself a weapons state. That was Pakistan. And Pakistan demonstrated it had nuclear weapons, I think—was it two weeks after the Indians detonated a nuclear explosion?

They didn't put that weapon together in two weeks. They had it. So the dirty little secret about nuclear enrichment, nuclear power enrichment, is that the amount of enrichment capacity you need to run a modern nuclear energy production program is enormous—tremendously larger than the amount of enrichment capability you need to build an atomic weapon. So in the case we're talking about, this 174-centrifuge cascade has about 150 times less capability than you would need—enrichment capability—than you would need to power a single nuclear energy plant, a 1,000 megawatt electric plant. You'd have to have, you know, this cascade would require 150,000 units of what they call separative work.

And whereas this cascade only has 1,000 units of separative work unit capability. So the dirty little secret is, if you have a nuclear energy program, you have a tremendous capacity to further enrich uranium and produce atomic weapons. This is an extremely important technical insight because of its political implications. Now that we no longer have any information about the disposition of the 60% enriched uranium in Iran, they are effectively a nuclear weapons state as far as I'm concerned. If I were Israel, I'd say these guys are a nuclear weapons state. Don't push them in a way that leads them to use nuclear weapons against you, because there will be something on Tel Aviv or Haifa.

#M3

I was in Tehran two months ago, in May, and visited one of their nuclear facilities. In the talks there, I got the impression that they would not want nuclear weapons simply because it could cause a spiral of proliferation in the region. That being said, after the attack on Iran—attack on their nuclear

reactors during negotiations—and also, I think they're quite convinced that Israel and Washington, for God's sake, aren't ready to call it quits and let it go. So I think they might be changing, even in the two months since I was there. I'm assuming that they're changing their strategic focus.

#M2

Well, they can maintain... they can actually maintain their public posture. They can say that we have not decided whether or not to build nuclear weapons while they have built nuclear weapons. In fact, if I were advising the leadership in Iran as a technical person, I would say, well, let's proceed and build the weapons so if we're attacked, we can respond in a short enough time. You know, if we have to respond in days or weeks, rather than having to produce it in the end. So we have them in hand and we have the weapons. We don't need to test them because they're very simple, low-technology weapons. I can describe that shortly for your audience. And so we don't need to test the weapons. We can have them in a basement and we don't declare that we're a weapons state.

We can say, "We can become a weapons state very quickly if you use this against us, if you force us. We are not a declared weapons state. We do not declare ourselves a weapons state." And you play the same game the Israelis are playing. That's what I would recommend as the policy that Iran should take if I were a policy-slash-technical advisor to the Iranian leadership. Because I'd say we really do need a capacity to respond if necessary, if these guys continue the way they're going. But at the same time, we don't want to provoke Egypt, Turkey, and Saudi Arabia. So we can have pretty much the best of both worlds, because nobody can know. There's no way for anyone to know, as long as we can keep the secret. So it has to be kept—you know, it has to be very, very, very tightly held information.

But, you know, as these things go, you can keep this whole operation to a very small number of people because the facility you need is extremely small. So why don't I—uh, maybe I should just give you a... Yeah, let's move to the slides, perhaps, if you think this is helpful. Otherwise, just interrupt me and say we're finished. Okay, let me turn on the sharing. You can see my screen? Yes. And you can see my cursor? Yes. Okay, that's good. All right. So, let me just show you what the situation with centrifuges is. If we look at the number—this graph is just showing you the number of centrifuges that Iran has had in its possession as a function of time. And, um, if you look at the—you can see my cursor, right? Yeah.

So you can see, if you look at the early time period, up to around 2015, you can see that there was a very small—this is 5,000 centrifuges. This is a little bit over a thousand, 1,300 or 1,400 centrifuges. This is the number of centrifuges that the Joint Comprehensive Plan of Action, JCPOA, that was agreed to by the Europeans and the United States, restricted the Iranians to. And these centrifuges had a relatively modest enrichment capability. I'll describe what that means shortly. So they were restricted within this, in spite of all the criticisms of the JCPOA by people who, as far as I can tell, had no idea what they were talking about, because this is a very restrictive regime.

Remember that we were not only monitoring the number of centrifuges that Iran had, but we were also monitoring the nuclear materials they were producing. So we were in pretty good shape. It was a pretty restricted regime. Then, of course, in 2019, Donald Trump withdrew from the JCPOA. And, of course, the Iranians received very few of the benefits of the JCPOA because they were supposed to get sanctions relief, which they got almost none of. And this is another problem with Western diplomacy: you never get rewarded, you only get punished. You reach an agreement, and all of a sudden the agreement is dealing with other issues that were not part of the agreement.

And so this is a real problem with the diplomatic behavior of the West, particularly the United States. We start seeing a restart of the centrifuge program sometime in 2019. Around 2021, the Iranians said, "You can monitor the materials we're producing, but you can't monitor our production of centrifuges. So from now on, we're going to be producing centrifuges, and you can't monitor our production line." During this time interval, from about February 2021 to now, the Iranians have produced more than 13,000 centrifuges. How many of these centrifuges have been diverted for a clandestine purpose? We have no way of knowing. There could be parts diverted; it could be centrifuges themselves or components.

You'd be asking only a saint not to hedge against the possibility of backlash from the West, because the West has not rewarded the Iranians for any compliance before this, even in spite of them bending over backward. So the Iranians have these centrifuges. Let me just show you what one of them is. The details for your audience are not important, but just to give you a feeling for what they look like—this is what a centrifuge looks like. Actually, it doesn't look like that, but this is what it looks like. Here you see, this is a centrifuge. This is an outer casing. And the outer casing of this centrifuge is a vacuum; it provides a vacuum container.

And inside this vacuum container is a rotating element. So this container is about 30 centimeters or so in diameter—a foot, for those people who are in the Anglo-Saxon community, one foot in diameter. And inside, there's maybe a 24 or 25 centimeter diameter rotating cylinder. So if we just go back to the earlier diagram—here we have the rotating cylinder shown in red. This is a misleading image, and I'm not going to spend a lot of time on it because it doesn't tell your audience something they need to know for this level of discussion. But this cylinder basically rotates at an enormous speed, around 70,000 revolutions per minute. That's enormous. To give you a feeling for how tremendous the centrifugal forces are at the wall of this cylinder, the centrifugal forces are between 350,000 and 500,000 Gs of gravity.

So this is 500,000 times the force of gravity acting on you at the wall from the rotating member. So if you were a flea on the wall, the lateral force from you being on the wall as this thing rotated would be one pound of lateral force. So that's a lot of force. So this thing is rotating. You can imagine how precisely the walls of this must be machined. It's all balanced on a pin-like head while it's rotating to take low power. I won't go through this in detail, but basically, you can think of this as a unit where there's an input of uranium hexafluoride gas, which is a mix of uranium-235 and U-238, and out comes some enriched uranium and out comes some depleted.

And so what you do is take this single centrifuge and you build what's called a cascade. So let me show you what a cascade looks like. This is the 174-centrifuge cascade that the Iranians are experimenting with, just to give you a very, very rough idea of how the cascade works. And again, this is very simple-minded. I just take a piece of it and feed the uranium hexafluoride in—it's a gas. Now, coming out of each of these centrifuges is either enriched uranium, slightly enriched—very, very slightly enriched—or very slightly depleted. I have stages to deplete the uranium. So in this case, let's look at the depleted uranium stage after the feed.

I feed that into the input of a row of centrifuges below me, and I take the enriched uranium from this depleted stream and feed that back into the stream above. I take the depleted uranium and feed it into a depleted stream, and eventually, I just expend that as tails. This is material that's mostly denuded of uranium-235. In the enriching part of the cascade, I have the feed come in, I have enriched uranium hexafluoride coming out, and I feed that into the input of the next stage. Then I have enriched uranium, and I feed that into the next stage, and so on, until I come out with an enriched product.

Meanwhile, each of these enriching stages is fed back into the earlier stage, where it's enriched again. So we have this feedback mechanism where I'm enriching and depleting. This allows me to very efficiently utilize the multiplicity of centrifuges. So, what does a cascade look like? Well, here's a bunch of these uranium centrifuges sitting in a room. Notice that there are lines coming out of them. Each one of these lines is an input—it's a feed. One of these lines is taking enriched uranium hexafluoride out; the other is taking depleted hexafluoride out. Now, since these lines are long enough, I can always physically rearrange the cascades. They don't have to be arranged—oh, sorry.

#M2

They don't have to be arranged in rows like I'm showing here. I can just take them and use the lines to rearrange them physically. So all I need to do is rearrange them in any configuration that makes sense. Well, we have a photograph of these arrays. In fact, here's another photograph for you to look at. You can see them just lined up in rows. So if I want to know the size of a 174-centrifuge array, I know they're about one foot wide, separated by about one foot. So these are 174 centrifuges arranged to minimize their floor space. Well, they're 24 feet by 26 feet. That's about 600 square feet, or about 60 square meters.

You know, a comfortably sized efficiency apartment. And the power they need is very low. They need anywhere from 5 to 20 watts of power, depending on the nature of the centrifuge and its design features. So they don't take a lot of space, and they don't take a lot of power. So you can have your Prius car there, and you're taking the power off the Prius car in your cave. You have to vent the gas, of course, but that's not a big deal. And you have a very small facility where you're enriching uranium. Now, the real question is, why is it so easy to make this final enrichment of uranium?

And it turns out it's not hard to understand, although to my knowledge, I'm the only person who's laid it out in these kinds of simple terms. So what I'm about to say, you won't find anywhere else, at least to my knowledge. So those in your audience who are focused on this question—and it's an important question—because what I'm saying is that if you have highly enriched uranium, the next step is easy. What most people intuitively think, for reasons that are understandable, is that the final step is very difficult. But in fact, it's the opposite. The final step is very easy, assuming you have mastered all the other steps.

So what I'm showing in this particular conceptual drawing here is, if we look at these boxes—empty boxes and red boxes that I've drawn here—think of them as being an example of a pan filled with water mixed with sugar, and 10% of the sugar is in the water in the frying pan. I heat the frying pan for a given amount of time, so I put a certain amount of work into evaporating the water off the frying pan. So this is a unit of work: one unit of work, two units of work, three units of work, and so on. After one unit of work—we'll quantify this very shortly—I go from 10% enriched to 11% enriched. I then go to 14% enriched, then to 17% enriched, and eventually I get to 50% enriched.

Notice in each stage, I make a much bigger jump to the next level of enrichment until I'm at 50% enriched. So if I get to 100% from 50%, it's only one step. If I take the pan of sugar and water and I boil it until it's 50%, then I just store it somewhere—I just put it in a jar somewhere. Then, when I need the 100%, I only have to go one step further of heating. This is just illustrated down here in this graph. These are the steps: three, four, five. Notice when you get to nine, you're at 50% in this example, and you go one step and you're 100% enriched. Okay, the real enrichment process is a little bit more complicated than that—not a lot, but conceptually it's the same. You can think of each centrifuge as being able to do a certain amount of work—separative work, it's typically called.

This is a unit that's a real thermodynamic unit. It's not exactly energy, but it's close. And conceptually, it's a very good analogy to the separation capability, similar to the boiling of water. So if I have 3,200 kilograms of natural uranium—that's 0.7% uranium-235—and I want 90% enriched uranium-235 because that's what I'm going to use to make a bomb, I need 3,200 kilograms of natural uranium to obtain roughly 25 kilograms of 90% uranium-235. But of course, this uranium-235 is interspersed throughout the material. Now, I need about 3,500 units of separative work in order to get to 3% or 3.5% uranium-235 for my power reactor. All right, so 3,500 separative work units to get around 600 kilograms of 3.5% enriched uranium.

Well, if I want to operate a power reactor, I need about 27 tons of 3.5% enriched uranium per year to keep the power reactor operating. So I need about 150,000 separative work units per year capacity to keep a single 1,000 megawatt electric reactor working. So this is the capacity I have to have if I have a nuclear energy program producing slightly enriched uranium for my power reactor. But if I want to enrich to 20%, like if I have an experimental reactor—like the Iranians had—for producing special isotopes, medical isotopes and things, notice I only need less than half as much separative work to get it to 20% enriched. And what the Iranians were doing is they were enriching to about 20% for quite a while, until they all of a sudden started enriching to 60%.

Now, they only needed 400, 380 separative work units to get from 112 kilograms—remember, starting with 3,200— from 112 kilograms of 20% enriched to about 37.5 kilograms of 60% enriched uranium. So here we have a unit of 37.5 kilograms of enriched uranium. Let's think of it as 40 kilograms of enriched uranium. And we have 400 kilograms of this material, which we no longer know where it is. So each 40-kilogram package of 60% enriched uranium could be enriched further to get 25 kilograms of 90% enriched uranium. Okay. Sounds not good, as we say in the Middle East, in terms of what could happen. Well, let's look at the situation, though.

It turns out that in late 2022, or early 2023, the Atomic Energy Agency reported that it found uranium particles at the Fordow facility enriched to 83.7% uranium-235. It was reported, but nothing much was said about it. What should have been said is that this is weapons grade. Nobody said it, as far as I know. You can correct me, or maybe one of your audience could correct me—I'd be interested to know. Apparently, nobody said that this is weapons grade. It is weapons grade, and I'll show you why. You need 120 separative work units to go from this 37.5 kilograms of 60% to 90%, which gives you enough for an atomic weapon. But you only need 92 separative work units to go to 27 kilograms, because there's more U-238 in it, of 83.7% enriched uranium.

But if we look now, a critical mass of 90% enriched uranium with what's called a 12-centimeter beryllium reflector—I'll describe what that means shortly, it's straightforward to put together—is a little bit over 14 kilograms. So you would need, I forget the exact number, maybe eight centimeters in diameter, something like that, or 10 centimeters in diameter. If you have 83.7% enriched uranium, you can still get 16.5 kilograms of uranium metal, which is good enough for an atomic bomb. So the 83.7% takes your 10 packets of 37.5 kilograms of 60% uranium hexafluoride to your 10 atomic bombs. So it's just about the right number if you want to build atomic bombs. So if you just look at what an atomic bomb could look like, let's look at this configuration here.

This is a postulated uranium metal core—a core of uranium metal. It's about 14 kilograms of uranium-235. It's surrounded by a beryllium reflector. Beryllium is a very light material. It serves the purpose that, when the neutrons are multiplying in the uranium during a nuclear detonation, a lot of neutrons escape out into the atmosphere. So you put this beryllium reflector around to reflect those neutrons back into the material, so you get a much smaller critical mass. Otherwise, you would have a critical mass—maybe a bare critical mass—of over 50 kilograms. So instead of having a bare critical mass, you just use beryllium to surround it, which is a material that you know how to deal with.

So you have about 40 kilograms of nuclear materials: 14 kilograms of uranium, and then the reflector is about 28 kilograms of beryllium. I always find my errors when I'm giving a lecture. So anyway, so be it. All right, so what does it all look like? Well, the other point I want to emphasize, which is very important to keep in mind, is that building a spherical atomic bomb with a reflector out of 14 kilograms of uranium-235 is not a high-technology weapon. I want to underscore that it's not a high-technology weapon. It only becomes high technology when you're trying to implode the

weapon to increase its density so that the critical mass is even smaller. Then you need an exotic explosive lens that doesn't just blow things all over the place. With the 14 kilograms, all you need to do is assemble the pieces.

So this is a notional diagram from the Encyclopedia Americana that postulates you have a subcritical mass with two boreholes in it, where the components that would make a critical mass are explosively driven into the center. This is not a device you need to test to be sure it will work. We dropped the Little Boy bomb on Hiroshima without ever doing a nuclear test on it. We did tests, of course, with U-238. In other words, we made sure that the assembly mechanism would not hang up in some way. But that was a piece of cake—that was like falling off a log. U-238 acts exactly physically like U-235 in a gun barrel configuration. So if you can do it with U-238, you've got a weapon. So the argument that somehow there would be a lot of testing that the Iranians would need to do is nonsense.

That's just not true. So they don't have to test to have a bomb, and they don't have to test to have high confidence that their bomb will work. Now, what should the bomb weigh? Well, you need about 50 kilograms of material, including the reflector, which would be larger than this, so it would look like a different diagram because it would have a much thicker outer wall. And you'd want some devices to implode the mechanism. Maybe it's two hemispheres—who knows what they would choose to do? That's their choice. It could be two hemispheres, whatever. It doesn't have to be anything like what's shown here; it just has to be an assembly. Gun assembly process—gun assembly meaning explosive powder. You don't even need anything high technology. So let's say the whole device weighs twice what the nuclear components weigh.

Let's say it weighs three times the nuclear components. If you give it three times the nuclear components, the deliverable device weighs 150 kilograms. Well, the average long-range missile that's delivering explosives to Tel Aviv and Haifa is delivering 450 or 500 kilograms of explosives. So this means that the payload of one of these missiles is not stressed at all. You could fly this missile on a very lofted trajectory or some other trajectory that would make it much harder to intercept, although the intercept levels are very low. The interceptors are just not working, but you could do that just to ensure you have high confidence that you will deliver the weapon. I could talk about the countermeasures to the missile defenses, but that's another discussion. A simple countermeasure would be to deploy decoys.

You have a lot of extra weight you're carrying. Decoys could weigh fractions of a pound, so you could overwhelm the missile defense with hundreds of decoys from a single missile because you have so much extra weight you can carry in the payload. What I would do, because I'm a really nasty person, is just cause the missiles to tumble. You've got to find the front end of that missile. If you hit some section or part of the missile, you're not destroying the warhead—it's going to be very rugged. So your chances of intercept are, for all practical purposes, zero. The reliability of the rocket motor that launches the warhead is the lowest reliability that you're going to deal with in terms of delivering a nuclear weapon.

So if your motors are 95, 97, or 98% reliable—and they look like they're very reliable, these rocket motors—that's your chance of being unsuccessful in delivering a nuclear weapon. So you have a 95 or 98% assurance of delivering the nuclear weapon if you're Iran. If you think that this is something you should ignore, and you're a political leader of a country that might get a nuclear response from Iran, you need to be replaced, in my view, because you're not serving your country's best security interests. So that's the situation right now. This is the failure. Now, there is something here from a policy point of view that is clear. I have attached to this briefing slide—and anybody who wants it—I've attached an article from Haaretz, this very progressive and honest Israeli journal.

I'm amazed that they're published as frankly as they are. It shows that there's somebody with moral standards left in Israel. That's why I hold on to Haaretz, because the moral standards have dropped. It's like a Nazi state now. When you have people who are willing to carry out these kinds of murderous activities, you have reached the state of Nazi Germany. There's no way to talk around it. I mean, soldiers from a state where there's any morality at all would refuse to do what's going on in Gaza. It's just that simple. If American soldiers did that in Vietnam, they should have been tried. And we had our examples of this. So anyway, that's another discussion.

So with this intelligence officer, who is a reserve colonel—colonel is usually the guy who really knows what's happening. My experience with the military is: don't talk to the admiral or the general, talk to the colonel. And he's talking about the 400 kilograms and what the Iranians can do about it. So I suggest that everybody read this Haaretz article. I'll send you a copy of it after this. But this is a really important article because of who is writing it. This guy is in the know. He was involved. And basically what he's saying, if you read between the lines the way I would—so I'll read between the lines for you, and you can agree or disagree when you read the article.

He's basically saying that we told Netanyahu that if he does this, he's going to have a nuclear-armed state looking down at us, looking back at us. That's the way I read this article. And when he says in the article that we worked very closely with the CIA on this assessment, he's also saying the CIA understood this too. And the CIA would have told the President of the United States if he was listening. And I believe that Tulsi Gabbard was trying to tell the President that we're going to have a nuclear weapons state on our hands if you go ahead and do this thing that you did on June 13. He was told. He was told by Tulsi. In fact, Tulsi Gabbard produced this video prior to this attack.

And she was talking about the consequences of an atomic bomb similar to what destroyed Hiroshima. These are the atomic bombs she was talking about. And she got in trouble for it. And the American press, as usual, ascribes a motive to her: she's trying to get attention. Yes, she's trying to tell you—the president is about to make a momentous decision with his buddy Netanyahu to produce an undeclared nuclear weapons state in the Middle East. And she did her best, and I applaud her for it. I give her high marks for trying, and I think anybody who's responsible and knowledgeable should applaud her for what she tried to do. That's my view of the situation, instead of attacking this person who's trying to do the best for American democracy and for global stability and peace.

So, you know, that's my guy—the guy from the trenches perspective, right? If you want the guy from the sky perspective, who is also very knowledgeable, you talk to Jeffrey Sachs. And, you know, I now know Jeffrey reasonably well, and we communicate with each other. I'm always amazed at how he has this top-down view that correlates perfectly with my bottom-up view. There were all kinds of things going on at the top that I was unaware of, but very concerned about. But that's another discussion, because I could see things were going on. I was in an advisory group at the Department of Energy—we were classified advisors on our nuclear weapons proliferation efforts.

And I could see there was something wrong at the top, but I couldn't tell what. And when I talked to Jeffrey, I find out what's wrong. So anyway, it's been an interesting experience getting involved in these global discussions since this terrible situation has arisen. But all of this was predictable. Netanyahu and Trump had to know. They were told—let me repeat that—they were told by their intelligence people what the result of their attacks would be. And they chose to ignore it. And now we have an undeclared nuclear weapons state on our hands. It's that simple, I think. Find a hole in my reasoning. I'll be absolutely open to it. Please send me emails telling me why you think my reasoning is incorrect here.

And I'm interested. I gave students A's in my courses for papers that attacked the reasoning I offered in class and did it well. If you can show me I'm wrong, you get an A. You know, I was not there to teach people so that they shared my understanding, except with respect to the facts. You have to use factual information or bring factual information that I should have properly considered into the discussion. And if you do, and you show I'm wrong, you get an A for your paper, period. No questions asked. And I gave A's, and I was pleased to do it. I learned from my students. MIT has very smart students. They do very well. I really like them. It was a lot of fun teaching them. So that's the situation.

#M3

No, I think you're very spot on. And I think this is probably the direction the Iranians will go.

#M2

But they must be considered a weapons state now. I don't think they'll declare, and I think they would be wise not to, but they will have to be considered a weapons state. At least that's my view. You'd be crazy, if you were worried—if you did something to them where you thought that they might respond with a nuclear weapon—to go ahead and do that with impunity. You'd be crazy to do that, to put them in a situation where you think they would feel a need to retaliate with a nuclear weapon. You'd be crazy to do that.

#M3

I think this should have been predictable—or predicted. It is predictable.

#M2

Of course it was.

#M3

But I think a key fault we have in the current political discourse across the West is the inability to identify the interests of opposing states—that is, to recognize what opponents should do versus what you want them to do. So, for example, as you said, if you were advising Iran, you would say, get a weapon and don't tell anyone; you have to be prepared, at least. Now, I would say the same. I think at this point, Iran would be foolish not to develop a nuclear weapon. Again, if I was an advisor, I would say, they will come for you again. They will not stop before Iran is another Libya, or Iran is another Syria, or Iran is another Iraq, or pick your country. But again, this doesn't mean I would like to see them have nuclear weapons. I think this would be—but it's actually...

#M2

It's actually, from a policy point of view—let me add to your statement—from a policy point of view, it's actually worse than you just stated, because there's no sense of what the next step is. So if we look at the Obama administration, where I wasted an immense amount of time trying to alert them to intelligence problems they had—which I now understand were not problems; they were lying. I now know. I'm putting together a briefing for some time later where I show how the Obama administration was lying about Syria. And that came out in the hearings, the confirmation hearings for Tulsi Gabbard, where they tried to portray Tulsi Gabbard as listening to a crackpot, Theodore Postol, on the Syria nerve agent attacks.

So Obama was already doing it in 2013, lying about intelligence. But the position of the Obama administration in 2013 was, "We want Assad to go." And my question—not a sophisticated one; I don't claim to be a sophisticated international observer—my question was still, well, what's going to replace him? Have you thought about that? Well, we now know what's going to replace him: al-Qaeda. Right? That's what we have. And we recognize al-Qaeda, this brutal group of people who are murdering people left and right in Syria, just different groups. And Syria has just fallen apart. And this is what we recognize as our success—American success—of taking down Assad.

This is what you call a strategic vision of grand strategy? I mean, how stupid could you be? It's hard not to be more direct and just call it stupid, because it has nothing to do with—well, you could be very polite and say, "Maybe they should have had a little bit more care." But it's incredibly stupid. I don't know what else to say. It's reckless beyond belief. It's reckless beyond belief to force the Iranians into the position they're now in. I think there was a chance that they hadn't put together nuclear weapons—there was some chance. But now I can tell you for sure, as far as I'm concerned, they've got them. That's my view.

And I certainly, if I had to decide whether or not I was going to do something that could get my country a nuclear weapon shoved down its throat, I would never do anything to provoke them. Never. Because my country is too important to me to have one of those weapons shoved down its throat. Anybody who does that and gets a nuclear weapon—an Iranian nuclear weapon—on them, deserves to go down in history as a... a failed leader for their country. And I put Netanyahu at the top of the list. And you can see the anger in this Israeli colonel's statement, because he is saying that you have put my country, Israel, at risk. That's what he's saying. If you read this with the right kind of information in the background—so please read it. Everybody, read this Haaretz paper.

#M3

I know. I think future historians will look back on this attack on Iran as one of the truly stupid mistakes—reckless beyond belief. From where I'm sitting, again, I think a key problem, and why this stupid thing keeps being done over and over, is the narrative obsession. People who say this is a horrible idea, that it will likely result in Iran having to develop nuclear weapons, are seen as opposing it—so then they're accused of taking Iran's side, because that's what Iran would want to say. But this is all you have: it's either us or them. You pick a side, and if you pick our side, then you have to support all this militaristic madness, irrespective of the self-harm it very predictably causes.

#M2

Well, I work from inference, of course, and I try to be clear that I'm doing that. But when I see all these people getting up—Hegseth, our Secretary of Defense, our Chairman of the Joint Chiefs—whose job description should not include lying to the American public, I'm pretty annoyed with that. Because I worked for one of the Joint Chiefs of Staff when I was in the Pentagon. And I made it very clear: I will never lie for my organization. I made that very clear. And I did a lot of good things for the organization—a lot of things the organization benefited from, you know, the Navy itself. But none of those things were not also benefiting the nation. I'm not doing the Navy's dirty work. I told them that right from the beginning.

And I did a whole bunch of things that benefited the nation. And... it's not your job, Mr. Chair of the Joint Chiefs, to lie to the American people. Your job is to protect the American people and make the right military decisions. If they want someone out there lying, you tell them, "You find someone else, please." And he didn't do that. So he goes down on my list. But all of this domestic noise that came out immediately after the attack—that we succeeded, that we destroyed Fordow—which I think we're going to find out is not the case. If they succeeded in destroying Fordow, though, it would still not change the conclusion I just laid out. So even if you destroyed Fordow, the centrifuges in Fordow, it wouldn't change the conclusion that I am discussing here.

But I think you're going to find out that Fordow—the centrifuges in Fordow—were not destroyed. It'll take time because, you know, people have to dig out. And how these people would know that the centrifuges were destroyed in Fordow is beyond me. In fact, I wasted my time writing to Senator

Tim Kaine, telling him how he could query the American intelligence community to get insights, because our early warning satellites should be able to make inferences from the blast plumes that came out of the air vents. We should have been able to tell, with our early warning satellites, whether or not the earth-penetrating warheads actually penetrated into the cavity.

We had data from our early warning satellites that would have given us good inferential data on whether or not—and when—that pilot, when one of the pilots who was quoted said the whole area was lit up like day, what that told me was not that damage was done inside. It told me that all of the damage that could have been done inside was reflected and deflected outward into the air above Fordow, that there was no deep penetration of the blast wave into the Fordow facility. And if we saw that a bunch of times on those vents, then that would have shown us that the vents were not compromised, because those vents would have had blocking mechanisms to prevent shock waves from those munitions getting into the cavities, into the centrifuge halls.

So we should know. We shouldn't know exactly, but we should be able to. And I told Senator Kaine, and I did not even get the courtesy—I'm angry about this—I did not even get the courtesy of a response acknowledging what I told him. And he's out there talking, saying he's concerned about intelligence. I don't think so. I think none of our people in the Senate are doing their job. They're all talking intelligence, and even the ones who talk like they're concerned don't show any interest in actually doing any homework. And I give them an F. I've had it with our Senate and our Congress. I'm fed up.

#M3

Well, I think they probably deserve all the disparagement.

#M2

They're being told. I have the background and technical capacity to tell them. I don't have access to the intelligence, but I did at one time in my career. I could have led the study that they needed to have done. I mean, I just did the study outside, without access to anything in the intelligence. I gave you the intelligence report that they would have been given. I have a lot of technical capacity to do this kind of work. That's why I was the advisor to the Chief of Naval Operations. They have a source of advice. They don't have to accept what I'm saying. I'm just pointing out: here's what you should ask, here's what you should demand as a member of the Senate Intelligence Committee.

They're not interested. So what am I to think when Mark Kelly raises questions about Tulsi Gabbard's judgment, when he's trying to make this iconoclast, Ted Postol—this "weird guy" who happened to be an advisor to the Chief of Naval Operations—look bad, even though he showed her that the intelligence put out by the Obama administration was false and misleading? He should have known. And when I contacted his staff and said, "I'll brief you on this," they weren't interested. I got a snide remark from one of the staff people—I can even send it to people who are interested. "Well,

we're not interested. We don't need your nonsense." This is a staff person who's supposed to be interested.

He's a staff person who's supporting a member of the Senate who sits on the Intelligence Committee, who has information that would show that an intelligence report that almost brought us to war with Syria in 2013 was a false report—that it was briefed by the then Secretary of State, John Kerry, to the Senate Foreign Affairs Committee, where he swore that if they gave the administration authority to take military action, it would have been justified. He was lying to them. You're not interested in that, Senator Kelly? Well, why are you a senator? That's my reaction. Why were you a naval officer? That really makes me angry, because he was a naval officer.

He was a naval aviator before he was an astronaut. Big deal. So, you know, this is the state of our government—American government—right now. This is what our government is: people who are elected to office, some of them actual military officers, trained as military officers, who would have been a little punk at the time I was advising the Chief of Naval Operations, you know, running around, getting coffee for people. And he doesn't want to know that there was false intelligence that almost got us into a war when he's a senator now. I have no use for this. I'm sorry. And I don't feel like I should be polite and politic about it. It's outrageous. I don't know.

#M3

I very much agree. I share your frustration. It's just... I think it's a problem of our times—very poor governance. And... well, Professor Postol, thank you so much. At least there are some voices of common sense out there, and some actual expertise, which should be taken advantage of instead of ignored when it fails to serve a narrative.

#M2

Well, like I said, there are people who are much more knowledgeable about the policy issues—like you and others—and I think that's good. But the technical matters matter. It's the foundation upon which good policy is made in many of the judgments in this area. So, thank you for having me on. Thanks again. Yeah. Bye-bye.