NATIONAL MISSILE DEFENSE: THE FIRST INTERCEPT TESTS
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TOM COLLINA: Good morning, thanks for coming. My name is Tom Collina, I'm director of the arms control and international security program at UCS. Missile defense, national missile defense, is our topic today. As you all probably know, on Saturday, if all goes as planned, out at Kwajalein Missile Range, the national missile defense interceptor will for the first time try to knock out a target in space. This will mark the beginning of a string of tests and decisions over the next year that could very well lead the United States to deployment of a national missile defense system. I emphasize that this is no mere development program, but a decision-making process.

Let me run you a little bit through some of the key dates and decision points. We're over here in October of 1999 where the first test will be. That will be followed by two more tests, January 2000 or so, and in April-May 2000, for a total of three tests leading up to a June 2000 program review called the Deployment Readiness Review. Followed thereon -- possibly -- by a presidential decision to initiate deployment, and if the green light is given then they could start construction in Alaska as soon as May 2001.

Now in between there're going to be a presidential election. I don't need to tell you all how political this issue is. Elizabeth Dole and George W. Bush have already come out endorsing deployment, and I think it's fair to say the Clinton administration and Al Gore are feeling the pressure of that.

Meanwhile, to add to the complication of this, once site construction would begin in Alaska in May 2001, the U.S. would be in violation of the Anti-Ballistic Missile Treaty, unless Russia agrees to modify it or the U.S. withdraws with six months' notice, and that notice would have to come sometime in the fall of 2000. Russia has so far refused to budge on negotiating changes to the ABM Treaty and China has registered its own concerns about U.S. national missile defense plans. We'll talk more about that later.

So what we have here is a very complex equation with at least four variables. The first is what the results of these tests will be over the next few months. Second is what happens to U.S. relations with Russia and China as a result of U.S. actions. The third is what happens with the external threat, particularly North Korea, against which this system is aimed. And fourth, the national elections. Any one of these factors could potentially trump the others, and the stakes are high, as we'll talk about in a minute.

So the question we want to put on the table today is this: Will this handful of tests that we'll see over the next few months tell us what we need to know to decide whether the benefits of national missile defense – that is, will it protect us from potential rogue missile threats that it's intended to – will those benefits outweigh the potential costs of national missile defense in terms of our strategic relations with Russia and China? Or, as some people think, is this all politics devoid of substance? Since this is a two-part question, we have two speakers to help us answer it.

First up will be Lisbeth Gronlund, who is a physicist and senior scientist at UCS and MIT. Dr. Gronlund will analyze the Pentagon's test program, and tell us what we may know and cannot know by summer 2000, when the administration is slated to make its decision. After her will be John Steinbruner. He is a senior fellow in foreign policy studies at the Brookings Institution and Dr. Steinbruner will talk about the potential downsides of national missile defense – what we can

expect from Russia and China. And then they will take your questions.

LISBETH GRONLUND: A lot of what I'm going to say is in this sheet which should be in your packet, titled "The Planned U.S. NMD System: Is the Technology Ready for Deployment?" The presidential decision next July will be based on four criteria. One is the cost. Two is the threat to the United States. Three is the arms control context, how negotiations are going with Russia on the ABM Treaty. And the fourth criteria for making a decision on whether to go forward with deployment is the technology readiness. And that's the one I'm going to talk about today.

On this chart (see chart at end of section, pg. 5), on the left side, you see UCS's criteria for deployment. I want to emphasize that this is not something that we invented, that this is really a standard criteria for assessing technological readiness for deployment of any system, commercial or military. These are the steps that you would need to go through in order to determine whether the technology was ready for deployment.

The first one is technological maturity. Is the technology mature? The second one is operational effectiveness, which is a more demanding requirement. It asks the question whether the technology can be expected to perform in the real world. Not whether it's mature, but whether it will actually do the job we want it to do. And the third criteria is, will the system work reliably? What is the reliability of the system? And I'm going to discuss each of those and talk about whether the Pentagon's planned test program will be able to answer those questions by next June, when there will be this deployment readiness review, and by 2005, which is the target date for completion of deployment.

So, as Tom said, the first intercept test is scheduled for Saturday. This will actually be a test of just the kill vehicle, not the full system. There will be a surrogate booster that will be used. The radars – which ordinarily would detect the target and tell the interceptor where the target is – will not be integrated into this test, so instead the target will have on it a GPS receiver and it will then be telling ground stations where it is, and the ground station will then relay that information to the booster, so that the kill vehicle can be positioned in the right place. So it really will be just a test of the homing of the kill vehicle – the ability of the kill vehicle to detect the target and intercept it.

The second intercept test is slated for next January, and the third one for next April. These three will be the tests that will be conducted prior to this deployment readiness review. The Pentagon at that point will assess the technical readiness of the system for deployment.

So turning to these three criteria, will these three tests be able to tell us something about these three criteria? What about the technological maturity? In order to assess the technological maturity, you need to test not just the components but the full integrated system. Only one of these three tests, the third one, will be a full system test, and even that one will have a surrogate booster, because the booster they're planning to use has not been developed yet. So, I would say if all of these three tests are successful, and I think we should expect that some of them will be, that it is a strong indication that the basic technology is in hand. But it will not -- that's why I have "no" up there -- it will not be a complete test of the technological maturity, because you need to do several system tests in order to assess this. And on the right hand side of the chart under 2005, I have "yes." I think the Pentagon will be able to test the technological maturity by then, because it's planning to conduct additional tests, additional full system tests, between next June and 2005. So the first criteria, the Pentagon will be able to assess, not by next June, but following next June.

The second criteria, which is actually much more stringent, but essential, is what is its expected performance under real world conditions, as compared to controlled test conditions (which is the

sort of thing that will occur in this upcoming test on Saturday)? This is a particular issue for missile defenses, because it should be expected that countries employing ballistic missiles will also use countermeasures to try to defeat the missile defenses. And this has been a point of contention for the past year or so, with some arguing that emerging missile states – like North Korea, Iran and Iraq – would not have the technical wherewithal to deploy countermeasures, even though they would have the technical wherewithal to deploy missiles. And I think that has been laid to rest quite conclusively by the recent National Intelligence Estimate which just came out in September, and I believe is also in the packets. On the last page you'll notice it says, "Many countries such as North Korea, Iran and Iraq, probably would rely initially on readily available technology to develop penetration aids and countermeasures." And they list some of what that readily available technology is, and then the NIE goes on to state that Russia and China each have developed numerous countermeasures and probably are willing to sell the requisite technology, suggesting that the U.S. should expect that perhaps even more sophisticated types of countermeasures will be available to emerging missile states.

So the difficult task for the national missile defense system is not detecting decoys, but discriminating the real warhead from all the false ones. So it's important that in order to assess the operational effectiveness of the system, the test has to include decoys and real warheads, and the interceptor, the whole system, has to be able to discriminate the real one from the false ones.

So the first test, this coming Saturday, will apparently use one balloon decoy in addition to the mock warhead. This, however, is not the kind of test you would do to test for operational effectiveness. This is basically testing whether the basic technology is functional – can the sensor on the kill vehicle discriminate between a warm warhead and a cool balloon decoy? This is part of the basic package that it has to do, so that really falls under technological maturity. If you wanted to test for operational effectiveness, you would need to include decoys that looked more like the warhead, which is of course the kind of strategy that an attacker would use. So you might cool the warhead or heat the decoy or make them all different temperatures so that the warhead is not clearly warmer than all the other objects, because the sensor, the homing sensor on the kill vehicle, uses an infrared sensor.

So these kinds of tests will definitely not be done by 2000. And it is a question whether they will be done before 2005. That's why I have question marks up there under "Will the Pentagon's Test Program Be Able to Assess Operational Effectiveness by 2005." Now the Pentagon is aware that this is, if nothing else, a political issue and there are a lot of claims made by some of the BMDO officials and Boeing officials that they are in fact testing against realistic countermeasures. In fact, Brigadier General Willie Nance, who is the national missile defense program manager within BMDO, in discussing this upcoming test, said that the targets would be "more than representative of the decoys and countermeasures that a rogue state might employ." That is absolutely not true. And in fact, the Pentagon's own director of operational testing and evaluation (in their most recent report to Congress where they evaluate the testing programs of various military systems) said the following: That the "NMD program is building a target suite that may not be representative of threat penetration aids," and that "test targets of the current program do not represent the complete design-to threat space." In other words, they're not testing the full range of things that they should be. This is not surprising because they're just starting. You wouldn't start with the most difficult thing. But in order to assess operational effectiveness you have to get those in there. This certainly will not occur before next June, and it's unclear whether it will occur before 2005.

The third criteria is the reliability of the system. The Pentagon has actually set a relatively high standard for itself which is not surprising, because this is a system that is supposed to defend against weapons of mass destruction. It has said that the system should be 95% effective against an incoming warhead with a confidence level of 95%. That's a little bit confusing, but what they mean is that the president has to be 95% confident that in fact the system will be very effective. They are assuming that they will fire four interceptors at each warhead, so if you work backwards from the 95-95 criteria, what you find is that each interceptor should have an 85% probability of intercepting the warhead. You have an 85% probability of doing that, with a confidence of 95%. So the Pentagon needs to be 95% sure that 85% of the time, any given interceptor will take out the target. That is a very key assumption underlying the way the system is set up to work, underlying political expectations of what the system can do. So that is something that you want to be fairly sure about. That's the kind of thing that you want to conduct enough tests that you have a statistical measure of reliability. They have said, well, they have not publicly said but it has come out, that their criteria is 95% confidence level of 95% effectiveness. And that they're assuming four interceptors per target. And the reason they have multiple interceptors per target is that the single-shot kill probability, the probability that any one interceptor will hit the target, is 85%. So you need four of them to get up to 95% probability that at least one of them will hit the target.

So obviously, the three tests conducted between now and next June are not enough to give you any sense of whether the system will be this effective. In fact, the other thing that's important is you cannot conduct these tests with surrogates, you cannot conduct it with prototypes, you need to conduct them with the actual production level hardware. Because so often if you build a prototype there's more care taken than in the production version. So these are tests that you would conduct basically after development was finished and you had the system in hand and you wanted to see how effective was it really. And for the same reason, there will not be enough tests between now and 2005 to assess reliability. I can't stress enough how important this is to the assumptions made about the effectiveness of the system.

If it should come down to a point where the President is contemplating using conventional forces in a situation where North Korea might respond by threatening to attack Los Angeles and the President wants to know whether he should go ahead and plan to shoot down the North Korean missile with this national missile defense system, he or she has to know how effective it will be. How big a risk are you running? The decision to use four interceptors against one target is also based on this figure of 85% effectiveness. So if in fact the interceptors are only 35% effective you might need to launch 20 at each target in order to guarantee that we'll shoot it down with a high probability. So that one parameter is very important, and currently there will not be enough tests to assess with any degree of confidence what that effectiveness really is between now and 2005.

What I've just illustrated is that, of these three criteria, there will not be enough information by next year for the Pentagon to assess any of the three. And while there will be enough information to assess whether the technology is mature by 2005, it’s unclear whether the Pentagon plans to test for operational effectiveness in a realistic way, and the system’s reliability will still be unknown.

Now what is the Pentagon planning, what have they set as their criteria for a positive decision on the DRR, the deployment readiness review? The Pentagon has said that it will give a green light to deployment if two intercept tests are successful, so long as one of them is a full system test. And that won't occur until the third test. So if Saturday's test and test number three are successful, or if the second test and the third test, the one in January and April, are successful, the Pentagon has already said that they will consider this to be a sign that the technology is ready to deploy.

Moreover, they've said that even if that criteria is not met, if there's one successful test between now and June, they will give a provisional green light to deployment, so long as another full system test is successful before they break ground in Alaska. So basically, if this test on Saturday is a success, then the Pentagon has already said that come next June, their decision will be to give a provisional green light on the question of whether the technology is ready to deploy. So the bar has been set very, very low. Much, much lower than it should be, which leads me, at least, to conclude that this is really not about assessing the technology. The data simply will not be there to assess whether the technology is ready.

Is the NMD System Technically Ready for Deployment?

Criteria for Technical Readiness	**Will the Pentagon test program be able to assess whether this criteria is met**	
	by June 2000?	*by 2005?*
1. **Technological Maturity** *Is the technology mature?*	**no**	**yes**
2. **Operational Effectiveness** *Will the system be operationally effective against a real-world threat?*	**no**	**??**
3. **Reliability** *Will the system work reliably?*	**no**	**no**

JOHN STEINBRUNER: It's true of most policy issues that you have to understand the context to really understand them, and the context can be fairly broad. That is decisively true for the question of national missile defense. This is not simply about the economics and technology of intercepting flying ballistic objects, although that's the core. This has to do with the basic rules of international security and the central relationships that embody those rules. I want to try to explain to you why that is.

In doing so let me note at the outset that a fairly explosive political situation is developing around this question. Prevailing American political attitudes, with quite a high level of emotion associated with them, are seriously misaligned with international judgments, not only those of former or potential opponents but also with some of our allies. I will speak today mostly of the opponents. The situation promises to be a hard lesson for the American political system. The consequences could be very costly, both in economic terms and in terms of the basic conditions of international security

Let me say a few things about the basic features of context. First it is important to realize that the United States and Russia are still running classic cold war deterrent operations. That is, they are constantly preparing for massive retaliatory attacks enacted in rapid sequence on very short notice to receipt of tactical warning. That situation does produce a large deterrent effect, of

course, but it also enables a truly massive accident to occur. The inadvertent or unintended triggering of these deterrent operations is the single greatest manmade disaster that one can readily define. That therefore represents the greatest single problem of safety this society faces. The coupling of the two deterrent forces do not meet reasonable standards of safety. We would not tolerate anything like a situation of this sort if we were talking about the operation of a nuclear reactor. This is a fundamental problem for both of the societies entangled in this relationship.

For Russia there are additional features to the problem which become important to us because they are important to them. The overall balance of capability for Russia has shifted dramatically. They are operating the deterrent force they inherited from the Soviet Union but they are not the Soviet Union's position. Their capabilities are not remotely comparable to the U.S. alliance system for any of the major missions, nuclear or conventional. I will not attempt to review all that implies but the central fact is that Russia can barely meet the traditional criterion for an adequate deterrent, that is they do not have a reliably robust second strike capability. If the United States should choose to organize a cold-blooded initial attack against their normal configuration of forces, they could not count on having more than a few tens of launchers available for retaliation. So they have to tell themselves that the United States simply wouldn't do it, but that already violates the traditional rule of stability. Deterrence is to be based on a calculus of capability not of intention.

Moreover, the already beleaguered Russian deterrent operation is embedded in a military establishment that is radically underfinanced, and I mean radically. They are receiving less than 10% of the financial assets that would be required to sustain their forces let alone keep pace with the developing international standard set by the United States. That means, inexorably, they are subjected to a process of progressive internal deterioration which affects the nuclear weapons component, even though they are preferentially protecting it. Underfinancing affects their entire force. And that means that they are in very poor position to sustain indefinitely even currently inadequate standards of safety for their deterrent operations. They simply can't do it financially.

For China, the situation is somewhat different. China has not historically been entangled in continously alert deterrent force operations. The Chinese nuclear weapon deployment is operated below that threshold. China currently maintains only about twenty launchers that could readily reach the United States. Those are not kept in ready status. And for its part the United States, to a first approximation, does not operate against the Chinese deterrent force in the immediate way against them in the way that we do against the Russians. They have been excused, if you will, from frontline deterrent interaction and they've positioned their forces accordingly. They are, however, entangled with the United States in the single most serious territorial issue to survive the cold war; namely, the affiliation of Taiwan. That issue, to put it mildly, has not been resolved, and it could produce a military confrontation. That worries Chinese leaders a great deal and levies an implicit burden on their military forces.

North Korea is a player in this situation in a less strategic but nonetheless important way. It's not in a global strategic confrontation with the United States, but it is in one of the primary local ones. The North Korean economy is apparently on the verge of collapse and the entire society is isolated to an extent that no society can sustain and still prosper. Its very mysterious leadership does appear, despite their historical reputation, to have an appreciation of that fact and at least the outline of a strategy to overcome it. Basically they're trying to deal their way out of an impossible hole using missile technology as one of the few cards they have available to play.

All right, let me talk about this implications of this context. The first point is that Russia and China can readily penetrate any first generation American missile defense system. Even if the open issues of operational effectiveness and reliability are solved in the course of a decade, as they probably could be if we dedicated ourselves to that effort, the Chinese and the Russians can readily produce technology that would penetrate this system and/or bypass it. The Russians can easily bypass it with cruise missiles on ships; we haven't thought about that. Other countries have not yet developed cruise missiles to the extent that they could, but a US NMD deployment this would be a pretty good incentive to do it. Russia could do that readily; China would have to work at it.

Despite having the ability to penetrate the project US NMD system, if they initiate operations to do so, both are severely threatened by the implications of an NMD system being added to the very formidable U.S. offensive capabilities. And neither Russia nor China is inclined to believe the United States would operate the projected defensive system as advertised * that is to wait until somebody shoots at us and then knock down a flying warhead with 95% confidence. But they do believe there is a possibility that in a confrontation we would preempt against their forces and use the defensive system to clean up any ragged retaliation they could manage in the aftermath. That gets extremely close to being the decisive first-strike capability that both Russia and China would both consider to be exceedingly dangerous to them, particularly given the fact that U.S. conventional forces are also dramatically more capable than anything that they have. Both Russia and China therefore encounter a very serious policy dilemma. If they accommodate to a limited American deployment, they will avoid an immediate political confrontation on the issue but they will lock themselves into a dynamic that could lead to decisive inferiority. They are very likely to judge that to be unacceptable. If they resist at the outset -- and Russia, of course, is legally in a much better position to resist than China is * they are likely to trigger a political crisis in their relationship with the United States thereby endangering their efforts to work out terms of economic engagement. That would require them to pay a very high short-term price in order to protect themselves against this long-term danger. No political system likes a dilemma of that sort, but that is what the situation poses.

The core of the Russian military planning system, such as it is, appears to have looked at the situation very hard and to have reached their own conclusion about it. They haven't advertised it but it*s pretty apparent if you listen carefully to what they're saying. They've concluded that they have to resist right from the start, damn the consequences politically. They have understood that, never mind the dynamics of individual interceptors, the really critical problem is the whole infrastructure of sensing systems that will go along with this. That is the most important item in the projected deployment. They believe the United States will use the limited deployment to build the infrastructure of remote sensing and information management that could support a much larger capability. So even the most limited deployment would create in their view the potential for the United states to negate their entire deterrent force. Moreover, from their point of view, the initiative from their point of view is a fundamental violation of the basic rules of restraint. The ABM Treaty, which they consider to be an original and necessary condition for all offensive force limitations, is a pillar of mutual accommodation. If that is attacked what can they count on at all?

And in that regard it is important to note that the Russian political system has recently absorbed two other shocks to what they understand to be foundation agreements. NATO expansion was one of these. The Russians thought they were promised at the time of German

unification that NATO would not extend its jurisdiction eastward. Kosovo was another. They thought they were told that NATO was an exclusively defensive alliance which would never attack outside of its treaty area unless one of its members was first attacked. An yet a mere two years after Russia signed a formal accommodation with NATO based on that understanding, the alliance initiated an attack on Kosovo and bypassed the UN in doing so. Do not underestimate the importance of those two items in Russian assessment of the situation. What that says to them is the United States' political system is not reliable. They can't make deals with it and expect them to be honored. That, combined with our military capacity, is about as dangerous a situation as you can imagine.

God knows how Russian politicians will react to this circumstance. They may choose to obfuscate or accommodate. But we are putting truly severe pressure on the Russian military and I would not want to bet upon easy accommodation there. They aren't going to be easy to deal with on this question.

China does not appear to have reached a conclusion as to how to handle their version of the dilemma. But I wouldn't bet on congenial accommodation in that case either.

And so in this context the projected American NMD deployment promises to drive a general confrontation with Russia and China. We ought to recognize that broad implication and ask hard questions whether it is really in the United States' interest. As you can readily detect, I personally do not think so.

I will not say a lot about North Korea at this point but just let me note that there is plenty of evidence if you watch the details that their political system is trying to make a deal. They're trying to say, okay, if we turn in our missile system, what do we get? Security assurances? Political rehabilitation? Some economic compensation? Since their missile program is one of the few items of leverage they have to bring to bear, they need substantial terms in order to make the deal. The United States and its regional allies have not yet offered terms they might reasonably accept. They understand the leverage that they have, but in fact in some perverse way it is dangerous leverage to have. If they do an additional missile test to display the leverage, they bring down the wrath of the whole region upon them. So they are also dealing with a major dilemma, although it is different in character. They are not remotely a strategic player in the larger situation.

Finally let me comment about the implications for the United States of this international situation. We need to realize that, as you just heard in discussing the details of the testing program, we are at a very early stage in working out missile defense this technology. Even if one assumes that basic intercept capability can eventually be developed, it is likely to take a good decade to do so. Meanwhile, we will experience the political and technical reactions much more rapidly. In addition to whatever they do in political terms, potential opponents will predictably develop and deploy technology that will both penetrate and bypass the system. So by the time the first generation system is completed it will predictably be obsolete with respect to most if not all of the deployed offensive missiles. The situation is roughly comparable to the use of antibiotics. Although effective in individual cases, indiscriminate use virtually assures the emergence of resistant strains and is therefore recognized to be socially irresponsible. Deploying a national missile defense system against dedicated opposition virtually assures the countervailing deployment of offensive systems capable of penetrating it or by-passing it.

And so let me conclude by again saying that if we project a commitment to deploy a national missile defense system we are in for some hard lessons. Most of those who currently

support such a commitment do not appear to have thought through the implications I have just discussed, have not acknowledged that there is no bargain to be struck within the terms of our current policy that would prevent countervailing reactions by those who consider themselves threatened by this initiative. We will not be able to proceed very far with a deployment effort before the reactions become palpable. The United States political system will then have to think out what kind of world it wants to live in. Does it really want to drive desperate confrontations with Russia and China in at least partial regeneration of the cold war pattern? We haven't had that debate, we haven't made that judgment, and yet we're heading into a situation that will predictably have consequences of that sort. There is something wrong here with our political discussion.