

**Remarks by Lt Gen Ronald T. Kadish, USAF  
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I want to address some misconceptions this morning and lay out the facts concerning the NMD program.

This discussion series has been very valuable over the years in that it has allowed members of the BMD community to air thoughtful and informed views on this important national defense subject. It's also a very timely series this spring, as we've had a number of significant developments in our program over the past year, and, of course, we face some important decisions and test events in the months ahead.

The Ballistic Missile Defense program is comprised of six major elements. I am charged with developing: National Missile Defense, for homeland defense: Upper-Tier Systems, for theater or regional defense - THAAD and NTW; And Lower-Tier Systems, for local or area defense - PAC-3 and Navy Area.

I am also responsible for: developing international programs, to share the burden; executing programs to achieve interoperability, for layered defense effectiveness; and ensuring our technology investment is focused and productive, so that we can meet future evolving threats.

While I will touch on each of these this morning, I'll spend most of my time on the first element, National Missile Defense. My primary objective this morning will be to explain the process we are using to answer the question of greatest interest to us this year - are we technologically ready to take the initial steps to deploy our country's first national missile defense system?

The National Missile Defense program is on a fast acquisition track for one reason and one reason only - the threat. Our program is driven by the projected threat to our homeland, which is real and growing. Two months ago, in his testimony on the Hill, Mr. Tenet, the Director of the CIA, announced that "over the next 15 years, our cities will face ballistic missile threats from a variety of actors." And he specifically pointed to North Korea's ability to test its Taepo Dong II missile **this year**, a missile that "may be capable of delivering a nuclear payload to the United States."

We've seen since the 1991 Gulf War a proliferation of ballistic missile capabilities throughout the world, both through technology and system transfers and indigenous development. Over twenty countries now have ballistic missiles of theater range. Some two dozen countries have, or are capable of developing, weapons of mass destruction. The pairing of these capabilities is a dangerous trend that demonstrates that ballistic missiles are rapidly becoming the weapon of choice among regional powers.

This threat, however, is very different from the massive Cold War Soviet threat we faced when President Reagan launched the Strategic Defense Initiative. The system we are developing is certainly not "Star Wars," or even "Son of Star Wars,"

as some have tried to characterize it. Our architecture does not incorporate space-based weapons and it is not designed to handle thousands of warheads in a massive nuclear exchange. Today's NMD system is designed for a limited threat. And, unlike the aging but currently operational Russian ABM system deployed around Moscow, which uses nuclear warheads to destroy incoming missiles, the U.S. NMD system we are designing is a limited, ground-based missile defense system that relies on hit-to-kill interceptors, or kinetic energy, to defeat a possible limited attack or threat of attack by a dangerous state.

Let me take a moment to explain the major elements of our planned NMD architecture and how we envision these system elements will operate when combined as a fully operational and integrated system. A hostile launch will begin the engagement process. Space-based early warning sensors, Defense Support Program, and eventually SBIRS-High, make the initial detection and report a threat launch. The satellites we will use to keep watch over most of the world are very important elements of our architecture, since we will rely on them to alert the entire system of a potential ballistic missile attack, cue the radars to erect "search fences" to detect the incoming missile, and start evaluation of engagement options at battle-management centers.

When the threat missile crosses into the range of ground-based early warning radars, these radars confirm target missile flight and tracking information. Upon data confirmation, the BM/C3 center cues the X-Band Radar and directs the launch of a ground-based interceptor. The ground-based X-band radar provides high-resolution target tracking data to the BM/C3 system, which sends an update to the interceptor in flight through an In-Flight Interceptor Communications System.

This data will be used by the interceptor to maneuver close enough to the target RV for the on-board kill vehicle sensor to discriminate the warheads from decoys and debris. Sensors on the kill vehicle provide final, precise course corrections to enable the kill vehicle to destroy the target. Multiple interceptors launched at each incoming reentry vehicle, either in salvo or in waves (a "shoot-look-shoot" scenario), are expected to increase dramatically the probability of a successful intercept.

In essence, this is how the system we are designing and will deploy, if directed by the President, will function. Our greatest challenge, of course, continues to be to make sure all NMD elements work together as an integrated system so that it can defeat the postulated threat to our homeland. All of our elements must be focused to getting that 120 pound EKV to a point in space where it can begin to search for the target, a five-foot long "ice cream cone."

The technological and managerial complexity of what we are trying to accomplish in developing and deploying a National Missile Defense is on par with some of this country's past highly challenging programs. These include, for example, the Apollo program to send a man to the Moon and return him safely to Earth, the crash program of the late 1950s to deploy our nation's first nuclear ICBM force, and the on-going Space Shuttle program.

With the missile defense program, one of the most demanding technical challenges has been the development of interceptors that can collide with incoming reentry vehicles at closing velocities more than 25 times the speed of sound. I am pleased to report, however, that since this time last year, we have had six successful intercepts using hit-to-kill technology - one National Missile Defense intercept (we

did it the first time we tried), two THAAD intercepts, three PAC-3 intercepts. Our testing program has convinced me that hit-to-kill technologies can work. I am confident that all our work is finally coming together, and I expect there to be more of the same in the future. Our challenge now is to make them work reliably in an operationally effective system.

But I do not wish to minimize the immense difficulties before us. In the months ahead, there are several more tests scheduled in our national and theater missile defense programs that will involve increasing levels of complexity and integration. We still have lots of hard work ahead of us.

We are striving to deploy an initial NMD capability, or C-1, in fiscal '05. This will consist of 20 interceptors designed to counter a handful of missiles with simple countermeasures. Because the threat is dynamic and we expect some dangerous states to be able to launch more missiles in that timeframe, we will move to an "expanded-capability-one" architecture, or Expanded C-1, in fiscal '07. By 2007, in other words, we plan to deploy a total of 100 interceptors. We have requested from the Congress an additional \$1.9 billion in funds through the Future Years Defense Program to execute this program, or 43% of our \$4.5 billion BMDO budget for next year. In context, this represents less than two-thirds of one percent of the fiscal '01 Defense budget.

Given that we are scheduled to deploy in 2005, and we only started to work this in earnest about a year and a half ago, we are forced to work with a high-risk program. As most of our critics have noted, the program is high-risk, primarily because, as I stated earlier, we are driven today to accelerate the NMD program to field an effective limited defensive system by 2005 in order to meet the threat. We are moving on as many concurrent tracks as we think prudent. High risk means that the schedule is so compressed that a significant setback in one element can delay the entire program. We cannot work this program as we would a normal development program, where we develop and test sequentially. We must do these steps concurrently. To date, we have been able to meet our commitments, but the program will require continued aggressive management if we are to succeed.

Although I continue to be optimistic about the system's eventual capabilities, we should guard against being either overly optimistic or unduly pessimistic about the deployment readiness of the NMD system. Rather, I am realistic. The NMD program is still a high-risk program. But I believe a successful test program and the timely execution of system-element schedules will provide us the information we need to assess reliably the progress in our NMD program.

Which brings me to a very important event in our program schedule. We put a "stake in the sand" this coming summer. This July we are preparing to conduct an NMD Deployment Readiness Review, or DRR. There seems to be some confusion about what this review really entails, so I'd like to spend a few moments describing this process for you.

To put the DRR in proper context, you should understand first what it is not. This summer's review will not result, for example, in a decision to deploy the system. The decision to deploy missile defenses to protect all fifty United States against a limited attack by a dangerous state lies squarely and entirely on the desk of the President, who will decide in consultation with Congress. But before the President can formulate informed answers to the questions of whether, when, and where to deploy, he must

have before him some very critical pieces of information concerning four primary factors: the threat, our national arms control objectives, the technological readiness of the system, and the cost of that system. The DRR is a process that focuses only on the last two criteria - technology readiness and cost.

Understanding that we are talking about **system "readiness," not system "deployment,"** is the key to properly characterizing the review that will take place this July. Led by the Under Secretary of Defense for Acquisition, Technology, and Logistics, Dr. Gansler, the Deployment Readiness Review that I am currently preparing for will concentrate on the technological progress we are making in the development of NMD technologies and system elements. As part of this analysis we also will review overall system operational effectiveness and, as I mentioned earlier, program life-cycle cost and the adequacy of projected funding.

As part of the DRR process, we will be examining the design to see if we have adequately demonstrated that the NMD elements not only work well, but that they work well together. There also are key performance parameters we have to meet and take a hard look at, one of the most important being the ability of the planned system to defend all fifty states. Judgments will have to be made about the maturity of the system and its readiness for deployment by the projected deployment date of 2005. We will also have to immerse ourselves in the evaluation of minutia more directly related to the production and physical construction of the elements, including manufacturing production readiness, our ability to field the system on schedule, and our ability to sustain the system once it is deployed.

The DRR is a process as well as an event.

No one involved in the DRR is going into this process cold. The DRR, while it is the beginning of the deployment decision-making process, is really a later stage of a multi-year developmental program. The people that will be focused on this one major review in July will already have been engaged for months and even years in a series of tiered process reviews within the Department involving all interested parties, from the action officer level up through the senior appointed officials, in what we call integrated product team reviews. This is an established and proven process for handling the development of all complex acquisition systems. In short, the DRR is a point further down an already well-trodden path. No spin up of the principals will be necessary.

The DRR is an important initial step in a lengthy and involved deployment decision process that includes at least three major acquisition decision milestones in the program over the next five years to determine the system's technological status. These decision milestones are steps we must take in the acquisition life of the NMD system. These acquisition decisions will be made in addition to major policy decisions throughout the life of the program made at the levels of the Secretary of Defense and the President. Each acquisition decision made over the course of the next five years will be based on an assessment of the program's progress at that time and will give authority to proceed on further key activities. The July DRR, a part of that acquisition decision process, just happens to be the decision milestone nearest to us in time - and hence, it is receiving a lot of attention.

One of the key criteria we will use when conducting this technology status review will be a determination of success in our testing program. There are literally hundreds of different criteria we are watching, ranging from software development to

construction specifications for this highly complex system. We have used an internal short-hand measure of two intercepts in our integrated flight test program to demonstrate our readiness. We believe this will serve as a good benchmark, though it is not the only benchmark, and that it will help us to understand when we will be in a position to undertake the Deployment Readiness Review. We have one intercept already under our belt and confidence that our basic interceptor design works. As we look forward to achieving our second intercept in integrated flight test number 5, we are increasingly confident that we will be able to get our second intercept.

That said, and I will reiterate this point again later because I believe it is fundamentally important to understand, we were able to achieve a number of successes during the IFT-4 test, even though we failed to get our second intercept. We successfully proved in that test that many of the technologies and systems we will require to detect, acquire, and track the target missiles and reentry vehicles will work. We demonstrated the efficient processing of commands and effective control over critical system elements. From this perspective, IFT-4 was a major success. This is important information that also will be taken into account as we assess the technological status of the program. Our testing program is rigorous, highly complicated and involved. I have full confidence in our testing regime, that once we have completed it, we will have sufficient data and analysis to know with a high degree of certainty whether the system we are planning to deploy will work as designed.

The internal DoD review process we call DRR, therefore, will attempt to assess many, many aspects of this program, to include testing successes and lessons learned, other technical aspects of the program, construction timelines and deadlines, and even such practical matters as construction contracts. The intercepts we are striving to achieve are only the most visible criteria that we will have to take into account when we decide from a technological standpoint whether or not it is prudent to proceed with the production of the system.

If a decision is made in 2000 to deploy, a decision that also will include a commitment to a specific site, we will conduct a Defense Acquisition Board review in fiscal '01 and another in fiscal '03 to assess the acquisition status of the program. The Defense Acquisition Board is a senior level forum that meets as required to advise the Department's top acquisition executive - Dr. Gansler - on critical decisions concerning major defense acquisition programs. As a major acquisition program, the NMD system necessarily falls under the purview of this board. Based on program performance at each point in time, we would seek approval to start implementing the longer lead-time items first, such as construction work on the X-band radar, the missile field, and the upgrading of our Early Warning Radars. This first DAB review is also required before we continue with the integration of our BM/C3 system.

We won't seek approval to procure and deploy the ground-based interceptors and necessary spares until fiscal '03. What this means is that we can continue to test and refine the elements of our system until their individual decision dates are due, as driven by the ultimate deployment date. We are phasing our deployment based on the technological progress of the various system elements, progress that will be reviewed by the Defense Acquisition Board during the five years leading up to the deployment of the initial 20 interceptors in 2005.

This brings me to another important question I frequently get about the DRR, that is, why has it been scheduled for this summer? Why not next summer? The

answer is that there is general agreement across the government that we need to deploy a system to meet a threat in 2005. Construction activities will be limited by short construction seasons, especially if a decision is made to deploy in Alaska. A decision to build an X-Band Radar in Alaska, for example, will mean that site construction must begin in the spring of 2001 if we are to attain our goal of having an operational capability in 2005. Because these activities have long lead-times, construction contracts need to be awarded this fall. But before we can even get to this step, will we need a presidential decision and congressional budget authorization to proceed. If we do not have a deployment decision by this fall, our entire deployment schedule will be jeopardized.

After receiving the results of the Deployment Readiness Review, now scheduled for July, and after making his own judgments about the system and related policy issues, the Secretary of Defense will forward a recommendation to the President. That, ladies and gentlemen, is the phased deployment decision process, and as you can see, the July DRR is only an initiating part of that process.

Now, what about our NMD test program? We have had a very encouraging start in this multiyear series of tests that continue through eventual deployment. Initially, we had two fly-by tests to demonstrate the sensor performance of two different kill-vehicles. These were followed by two integrated flight tests to support the DRR decision process.

Last October's test, Integrated Flight Test Three, demonstrated the ability of the kill vehicle to travel thousands of miles to a very specific location in space - one ultimately defined by inches and microseconds - discriminate among several objects, identify the right target, divert towards it, and collide into it at a closing velocity of over 15,000 miles an hour. We did that very well. We did not do it "by accident." The flash of light captured by our infrared sensors punctuated the technical complexity of this achievement. In spite of what some critics might say, we accomplished all of our test objectives in that flight, which aimed entirely at demonstrating the EKV technology. We now know our interceptor concept works - it worked the very first time we tried - a fact that has helped to build our confidence that we can maintain our aggressive schedule.

Much attention has been given to last January's Integrated Flight Test Four. IFT-4, just our second test, showed that, despite the success in IFT-3, that success won't always happen. But remember, IFT-4 was one in a long-line of increasingly demanding testing events we have planned through 2005. While many have called that flight test a failure, this is not an accurate characterization.

Viewed in a mission context, we failed in IFT-4 to hit the target - we missed the RV. However, in the context of testing, IFT-4 was a successful developmental test that proved we could integrate our separate major elements and make them work together as one system. The major elements of the architecture we tested were: the early warning satellite constellation and tracking radar system, the X-band radar prototype, and the battle management system. Together, they brought the kill vehicle within striking distance of its intended target - the EKV deployed, conducted its navigational star shots, acquired and diverted for the target cluster.

In the final six seconds, we had a malfunction in our interceptor sensor system that prevented us from colliding with the target. We've since learned that we had an obstruction in the EKV's krypton cooling system. We've taken the necessary

corrective actions, both on the equipment and in our processes, to mitigate against a recurrence in our next and all subsequent tests. Everything we did in IFT-4, except the intercept part, we did perfectly. And because we did it near perfectly, we actually had to do very little else in the integration and command and control part of our test in order to prepare for IFT-5. As a result of the fixes we have had to make, we postponed by two months the next integrated flight test, IFT-5, to June 26. There are two key points to take away from this. First, our accelerated NMD schedule does not mean we are "rushing." If we were rushing, I would have stuck to our original test date. Second, everything that failed on IFT-4 worked on IFT-3. We believe we have a solid EKV design, and that we will not have to go back and review the fundamental science of our hit-to-kill vehicle.

As I said earlier, the NMD system is one of the most complex systems our country has ever attempted to develop and produce. The interception phase of the NMD mission is clearly the most visible phase and it is key to our success. Yet we must not lose sight of the fact that the successful integration of the highly interdependent system elements is no less critical. The integration and support aspects of our testing events are transparent to most people, but I assure you that we could not do the job without them. Our tests are designed to weed out flaws. While we strive for success on every test, we do not expect that we will always have it. We learn from our successes and failures - and, often, we learn more from the failures.

The country has accepted the higher level of risk associated with the compressed NMD development and deployment schedules in order to complete the program on time. As someone who has had a lot of acquisition experience, it would be nice to move ahead with a program that allowed me to do development testing and production sequentially, rather than concurrently. But I assure, we do not have that luxury with this program.

Now, I will have failed in my discussion with you this morning if I have not driven home the following point concerning the NMD program - that is that the program is driving the decision-making process - and not the other way around. I have the very challenging job of balancing the technical requirements of this program with other requirements, including the requirement to deploy a system to meet the projected threat to our homeland.

So we are compelled to work the NMD program concurrently. We are making good progress against the schedule we must work, which is geared to deploy an initial capability by 2005. The DRR will start the process of committing to the NMD system, but there are many things to be evaluated along the way. Our test program is good. And we can always use more data. I believe we are where we want to be. Thank you.