Transcript of Verbal Remarks of VADM J. D. Syring

During His Presentation at BMDS Symposium

August 13, 2014

Meeting Host: (to audience) [few seconds of unintelligible audio] We had to adjust our schedule this morning to accommodate Admiral Syring. I think most of you know Jim Syring and what he does with the missile defense business. He has a big job; a very hard job. He does it very well. Ladies and gentlemen, please welcome to the stage, Vice Admiral Jim Syring, Director of the Missile Defense Agency. (Audience claps)

Admiral Syring: (to audience) [tells a joke. Audio is unintelligible] (audience laughs) So I apologize to everyone here. I greatly appreciate several of you adjusting the schedule. I really am on my way to Romania. Literally. We all know what's going on out there and that there's… are many folks from around the world who are meeting there for a big party on Friday— a big meeting on Friday—and who look forward to seeing the progress and how it's going there. I'm not going to talk about regional missile defense too much today; but I am going to talk a lot about regional missile defense history and homeland defense history. Hopefully provide a little bit different presentation ,than I normally do, and you will walk away from here with a great appreciation of the history on; how do we get to where we are today. And what this future holds for our homeland missile defense? I like to think about history as us to understand and study and learn from, those from the agency know that and I think that there are a lot of valuable lessons that we've learned over the last few decades with missile defense that put it in the right perspective, and make a lot of sense in terms of how are we here today, what do we need to do for the future. So if you don't walk away with anything else, I think it's a good refresher on the history of homeland missile defense and a good perspective of the way ahead. Since this morning I am going to start with something, with a little music, if that's ok, next slide and play a video. (Video plays)

(Video ends. Audience claps)

Admiral Syring: (to audience) So, this is the end, I mean, where we are in time today. Thousands of kilometers, hundreds of kilometers of altitude; speeds in excess of 20,000 mph to a value of an eight point [few seconds of unintelligible audio] of very small pieces. There is a lot that needed to work right in that event, it's not just the interceptor, and it's not just the kill vehicle. There was a OPIR satellite detection that was necessary that then queued the Aegis BMD scorer, that then fed the Sea Based X band radar SBX, that generated weapons TACLAN to the GMD system and GBI interceptor, all in a matter of about eighteen minutes. If you think about that from a system perspective, I think that it just goes to show what can be done, and what would be done, if we were in flight. They do a great job, it's not just in the GBI, EKV and all the hard work that went in to this but it gave me continued direct confidence in the system, the C2BMC system, the SBX, the Aegis System, everything that contributed to the mission. Many folks actually say, "Aegis is just a regional defense capability." I said, "Oh no it's not. It's very important to us in defense of the homeland; I think it shows what it did for us in this case."

I am going to talk more about this towards the end but that scene in the middle of the left hand corner of that chart is the dumbed down version of the actual discrimination scene of the EKV, thought through. It's not; it wasn't just a single object it was multiple objects that needed to be discriminated by the system and then the EKV into that perspective and so forth. Next slide.

We're going to talk today about the program history specifically our homeland defense; some of the achievements, where we are with testing, the vision of the future. Then I am going to wrap up with some of the responses to the criticisms that are out on the net and give you my perspective of how I think those questions should be answered. Next slide please.

Back in 1998, we all knew that the ML2 Taepodong-1 launch from Korea over Japan downrange thousands of kilometers; really, I think woke up the world on the need for missile defense; and the need for a national missile defense program here even more urgently than the path we were on. They did not manage to put a third stage satellite into space but the third stage was what was anticipated. I think it

really changed the game, in terms of what they might be able to do. It happens though in the months after the flight, the report of the Rumsfeld Commission that they said probably the same thing, you can go back and read that and I think validated those findings. It really looked at, the revitalization of the missile defense program. I just wanted to--next slide please— talk a little bit about some open source quotes that are in the press recently and I won't give them the dignity of saying the name, you can read the name, "if the US imperialists threaten our sovereignty and survival our troops will fire our nuclear-armed rockets at the White House, the Pentagon, the sources of all evil." Lieutenant General Flynn said of North Korea, "Persistent spoilers. One of them is North Korea; they fired a ballistic missile today, they want us to know that they have this capability but that is clearly a spoiler. Iran, a man claimed to have test fired two homemade missiles including a laser-guided surface to surface and air to surface missile and a new generation of long range ballistic missiles carrying Multiple Reentry payloads." You just have to read the press and you see it every day and I think it will tell you the importance of what we are all working on in this room, and the importance of missile defense.

Go to the next slide please, I'm going just rapidly flip through some history from back in 2001, and these are actual slides that I brought over with the caveat of historical slides, they are not my slides, they were charts developed by General Kadish back in that time frame as this program was being restructured. Some of the characteristics of the program were that it was to be an aggressive RDT&E program without limit to a single architecture, no procurement until ready, structured to permit test asset for operational use on interim basis if directed. Hold that thought, we know what happened. Directions specifically for Missile Defense Agency was to rapidly capitalize on our promising concepts and promptly adjust program priorities by ensuring rapid decision making cycle times. That was the impetus for the authorities that are invested in MDA today, that they'd serve great purpose and value to recalibrate our kill systems and improve them in a very real time manner. Another important point; improve BMDS system through incremental improvements. Next slide.

And then finally, the National Security Presidential Directive 23 back in December 2002, the United States plans to begin deployment of a set of missile defense capabilities in 2004, these capabilities will serve as a starting point for fielding

improved and expanded capabilities later; will not have a final, fixed missile defense architecture; rather we will deploy initial capabilities that will evolve. In 2004 and 2005 went through the GBIs, sea-based interceptors, and additional PAC-3 units, sensors on land, at sea, and in space. Missile defense cooperation will be a feature of U.S. relations protecting not only the United States and our deployed forces, but also our friends and allies. And everybody, that is the history of how we got to where we are today. And that direction and that policy directive really served as the impetus for the initial capability which I am going to talk about. And really some of the decisions that were made along the way; over the last decade now, in terms of how we field the capability and what capability to field. Next slide.

The top of the slide, just to walk through, this is a program that has four slides that I recommend we walk through in terms of the GMD program history and discover different names that would revert some discussion about BMD. The 1990 to 2002 SDIO organization was then the BMDO organization in 1993 which then turned into MDA, at the top of the screen in 2002. We withdrew from the ABM treaty in 2001 because in the middle of the slide you can see the EKV technology development program, also known as the LEAP program, actually bore the technology for both GMD and for the Aegis Kill Vehicle came out of that program, lightweight exo-atmospheric projectile. There were several different fits and starts with our booster programs which initially started with a Boeing booster program and then went to, sort of a varied Lockheed Martin booster program with multiple missions and then finally set up the Orbital booster program in the 2002 timeframe. The nomenclature that we used back then, it was called capability enhancement zero, one and two. We just fired the CE-2 but there was a CE-0 way back then, back in the 1997 and 1998 timeframe, at the bottom you can see that there was flight 1997; and really the first successful intercept of the CE-0 was in 1999. Then there were two failures and we are going to talk a lot about failure today because I think it's important to understand failure and complexity of failure of mechanisms to give you a confidence of this program. The first failure in IFT-4 was a coolant blockage issue caused by foreign object debris in the queue. The second was a Booster Avionics Package Failure for booster or assertive booster that wasn't even part of the program and multiple other programs in the IFT and forward. So again, test bed in nature, prototype in nature, pieces of debris in coolant line and a

surrogate booster program problem but they didn't resolve the failure; IFT-4 and 5 are categorized as failures. Theu iu 2001, and two tests in 2001, on the right hand side, two successful intercept tests.

Next slide, followed by two more successfnl intercept tests in 2002 which gave the CE-0 five successfnl intercept tests and served as the basis for President Bush's announcement in 2002, the induction of NSPD-23 and direction to field this capability in 04-05. There's was a lot of work going on at that point with the system to rapidly ready Fort Greely and get it ready for the missile silos to start a terminal installation and the GFC Node installation and starting to build the system for deployment; to include by the end of 2004, the Vandenberg silos as well. So after the President made his announcement in December, very close to that was another failure in CE-0. A failure to separate caused by [unintelligible word] in a pin in a laser firing unit, a very simple mechanical type of issne. That was then followed by another booster characterization test, if you remember we were changing boosters, and if yon go to the next slide. After we achieved limited defense capability in September of 04, another test was scheduled, at the bottom of this slide, in Decemher of 04. It failed to leave the silo and it was caused by a huilt-in test error; nothing wroug with the interceptor itself. [Unintelligible words] got it back to test in about three months and we had another failure; and the interceptor never left the silo cansed by a traction arm that rusted, that didn't fully retract. Ok, so you are talking about a built in test anomaly, I think it was a very simple software correction, if I got my history right, one [unintelligible word] and a rusted support arm at the bottom part of a test bed silo; again not the tactical silo. Again, my point being, that tbey have not heen complicated errors at this point. That said, General Obering established an Independent Review Team, General Kadish, General Nance, to review the flight test failures, to review the fact that those haven't left the silo or what happened. A lot of recommendations were made. Many of those recommendations were incorporated into the program; we went back in flight in December of 2005 with now the CE-1. We'll talk a little bit more about the CE-1. But it was the next original of the demonstration flight not an intercept flight, followed by an intercept flight in 06 and then another sort of non-intercept flight in 07 and a no test in 07; and then another successful intercept test of the CE-1 in September.

All the while in the 2004-2007 time periods, the infrastructure continues to be built. We build SBX, we upgrade Beale, we start to think about the TPY2 in forward based mode. We deploy the SBX in 2007 and twenty one GBI's at Fort Greely and three at Vandenberg. Next slide.

In 2007 and 2012, another successful CE-1 intercept test, three for three at that point. In December of 08 and the infrastructure to completion for thirty GBI's between Vandenberg and Alaska; more in terms of completion of the architecture and the completion of power plant upgrades. Down at the bottom, the first testing of the CE-2 started in 2010. The CE-2 was really a follow on to the CE-1where they worked on connector obsolescence issues. The CE-2 was more processor obsolescence. Nothing real, [unintelligible word] for reliability yet there were a lot of reasons for that; some program direction , some work they had started on the MKV with both going to [unintelligible word] some day and frankly, some program changes that were directed and I'll talk a little more about those. The intercept of 2010, a failed intercept of 2010, was caused by a missing lockwire on the DACS and then an initiative of SBX again a very early deployment of SBX; an early software load. 06a was the attempt to get back an intercept and there was a failure of internal- caused by high frequency vibrations, [few seconds of unintelligible words]. We'll talk a little more about that next but the return to intercept then was initiated. Next slide.

We flew the CTV-01 in January 13 with the fixed for the Track Gated Anomaly and isolated the IMU. The failure of CE-1, really the first flight failure of the CE-1, caused by leakage [unintelligible word] from a battery that was physically leaking electrolyte per the design, it was a matter of the electrical system not being robust enough of the early prototypes, to fight through it, accounted for in the CE-2 design already. Again, we learned something there and then the 06b return to intercept flight in June. All the while the upgrades continued and the Secretary of Defense makes the announcement in March of 13 to field 44 interceptors by 2017. And that is what we're in the progress of doing. Next slide.

So let me just summarize the flight test, usually we are really good about talking about our successes; which we do, but I want to talk about failure and the complexity of the failure and what model of the interceptor the failure actually occurred. So these were the eight failures that we account for, we say we are nine

for seventeen. You can look from the chart and you can see the top five are on the CE-0 venture, ok, again direction to rapidly field prototype but it was a test bed at the time with a design cycle, I would even say half complete. So that, to me, would not be unexpected. We talked about the [unintelligible word] coolant blockage, we talked about the surrogate booster failure, we talked about the pin in the laser firing unit, we talked about the one line of software, and we talked about the rusted release arm; to me nothing unexpected in a prototype for a test bed. More issues, that you see as you manage missile interceptor programs; which I been through in my career, that you work out in the test phase of a program. The program learned from that, accounted for it, and improved upon it in the CE-2. So your next question, what about the CE-2s then? Well, talk about the missing lockwire, that everybody knows, that was a manufacturing production error that I think woke up the community and industry on the need of evolving the whole process control and really treating these as national strategic assets of a strategic program; and I get to give industry and government the very credit for the actions that they are undertaking. I've got to say that a lot of the quality and production issues that we saw early in the program are behind us. Second issue, I would mostly say, was the guidance of the tracking anomaly we've been talking about and then for completeness, I put the CE-0 and the battery issue there. Next slide.

So, the tracking anomaly. If you go back and you study space programs and you study the science and art of combustion. It really is an art. It's not unexpected for a space vehicle or a larger booster to have combustion issues and it's very common, matter of fact; it dates back to the early 50's of FT1 and the rocket [unintelligible word] program. And if you go back and study the history it takes years sometimes to work through these issues. It can get so bad you can have a booster failure at launch or a booster failure in flight. In this stage we are talking about rough combustion of the divert system causing vibration, and inducing upset to the inertial memory unit; a much smaller scale of a booster rough combustion issue on a big rocket but fundamentally the same issue.

Reactions seen back in 2001 on IFT-6, initially they thought it was caused by EMI. There were a lot of mitigations that were incorporated, it wasn't that the agency stood still, they knew about it and they were working on it. We've never seen the issue affect a flight before until the 06a flight. For history, the 06b, 06a, 06b the variation [unintelligible words] actually started in 06 was with a new IMU, a more

sensitive IMU for performance, so now you take this Tracked Gate Anomaly which has been seen in the three IFT flights and overlay it on a much more sensitive IMU and the software all we have with tracked gate [unintelligible word] and the error we saw in 06a. It all makes sense today, all that was many years of engineering to get to that conclusion; but it makes sense in terms of what happened. And that is why we isolated the IMU and updated firmware to account for that, if it happens again. Next slide.

So let's shift gears a little bit and talk about the engineering timeline that this program is up against because I think that programmatically, it's equally important to understand that that's a technical issue that the program thought through. Starting with the CE-0 design note for the test bed on this slide, that's where it was until the direction was given. To field capability, the big "X" is in the middle of the chart cause that is when the design was cut short. The normal cycle of taking a spin for producibility, manufacturability, and liability was knocked out. It was directed, and I support the direction, it was tbe right decision that some capability now was better than waiting ten years for a capability later when we saw the TD-1 flight over the country, sovereign country of Japan. So that's what happened, the program then worked very hard to transition from a test bed to the CE-1, to the CE-1, to the CE-2 in a rapid manner, building an aircraft [unintelligible word]. Next slide.

Program Timeline. On the left hand side of the chart you can see NSPD-23 and when that came in; and the changes that really have, the program has undergone from then to now. We talked about the MRTF task force [unintelligible word] charter and the reason for that. There were then adjustments made and decisions made to build a third missile site in Europe; radar in Europe and some of those directions that were given now eight years ago. And then the Presidential mandates in 2009 to really stop the 30 GBI's and now focus on EPAA phase four, phase one through four, and it was going to be a homeland defense capability provided by the phase four. Return to intercept is shown and the drivers for those changes are shown; what was done and then the SECDEF made the decision to go to forty four by 17. That really restarted, kick started the program again to get to forty four as rapidly as possible, plan for an additional forty four beyond the ones already in

progress; refurbish Missile Field 1 and put some interceptors in there and continue to focus on reliability. The program's been under constant change over the last ten or twelve years and one of its methods is now that we have the future outline in a clear path to where we need to be; we should not deviate from the path that we went out from and the Department has forwarded and Congress has forwarded wholeheartedly our path ahead and for that I appreciate it. Next slide.

So let's talk about how rapidly these things are deployed from a production standpoint. I've talked about the test up above that informed leadership in terms of the state of the program's three CE-1 successes are shown in the middle. The yellow interceptors are CE-1s; below the pink are CE-2s and the take away from this chart is that there are CE-1s going into the ground even before the two CE-0 flights, CE-0 failures, in terms of leaving the silo. There hadn't been a CE-1 test before those were fielded. The CE-1 test had shown another intercept test followed by three more but the current delivered; the current delivered 24 CE-1s by the end of 2007. The first CE-2 flight test was in 2010 and you can see how many CE-2s were failed or fielded before that flight test. To me the [unintelligible word] needed direction. I testified and continue to testify that moving forward we must fly before we buy; meaning we must fly before we field interceptors. We got to learn from this, in terms of, flying and I'm a big proponent of the CTV first, followed by an intercept flight. I think we learned a lot from the CE-2 non intercept flight. And it gave us greater confidence going into an intercept flight and I am not going to deviate from that path. It, I think, helps us from an engineering standpoint to the former [unintelligible word]; but even more importantly it serves as a great engineering data collection and rebuilding for us, on paper, a model so we can project or just look at the flight test that we were doing or project over [unintelligible words]. Next slide.

We talked about what provides the initial defense capability before today's capability and then the future capability. I think that is absolutely in line with the direction we were given; to improve this program over time, to improve the capability over time, to continue to move ahead and not stand still. We are going to continue not just with the interceptor, but we are going to complete the kill chain; and focus on improving some C2BMC, focus on improving some sensory, focus on improvements in discrimination, focus on improvements of the architecture in

terms of moving it from its test bed ground architecture to attacking the system architecture that can serve the warfighter for decades to come. Next slide.

So I wanted to put that in perspective against both the Aegis development timeline and the THAAD development timeline. The Aegis system was born; the Aegis was again born out of an elite program eventually brought the Terrier and interceptors in the late 90s. It was once called the Navy ERI Program transitioned now to the Aegis BMD. What you see at the bottom, I think, in terms of the combat system development tbat goes hand in glove with the missile development. You don't just focus on building an SM-3. You focus on the weapons system and radar improvements that must go with the interceptor. It must be linked together through both systems [unintelligible words] and Aegis did that. They had the time to do it, they had the time to engineer this completely, they had the time to incrementally test the SM-3 block zero and block one [unintelligible word] in any significant numbers and then down to the final integration of the warhead. And again, build a little, test a little, learn a lot. Get something fielded, tested, get it to work right and get a little comfortable with it and work to improve that over time; and that is what the 1B does and that is what the 2A will do. They will design a 2B capability properly from the ground up. Next slide.

So let's talk about the Aegis test failures, for the, the bean count for the Aegis intercepts is point A through 34 plus a satellite shoot down with all your caution to include that. The, again, I think the bearing of the missile here is important. You can see it at the top, on the upper part of this chart, that the SM block 3, the SM-3 block zeros and the block ones begin again, not [unintelligible words] with any other; and then the three failures down below since 2008, the divert control system malfunction, a third stage rocket motor pulse failure, and then a chip error, a big error in the IMU floor in the memory. Again, not a complicated failure in that system. It's mechanical, the system is mechanical and the bit error was more a manufacturing issue. But again, reject the top three and talk about the bottom three, in terms of the six failures in the count and the perspective of those three against twenty eight successful intercepts. Next slide.

The THAAD Development program. We all know the history on THAAD. Back in 89, concept development started and they struggled, two for eight intercepts; six failures. They stopped the program and said, "We are going to stop this and we are

going to take time to redesign it". And they did that; and it took six years to do that. But when they went back in flight, they were eleven for eleven. They haven't missed since; and that gives me great confidence the best system not just for today but to be able to improve, again, prove the [unintelligible word] system then work to improve it over time. Next slide.

THAAD has been tested in both the endo and exo extensively and played a part in our original tests. They had us sit still. They work to increase the complexity of the interceptor over time. The intermediate MRBMs need a longer range than that [unintelligible words] constantly improving that system and testing it. And we will test it again in FTT-15 it will be a big part of the operational test coming; which you can see in the upper left hand corner, it gives us great confidence and capability; and certainty of function, in terms of, being able to intercept both endo and exo. Next slide.

So again, to my point on evolving the GBI, [unintelligible word] the CE-I and CE-II, it's actually a CE-II block one that we'll test next year, oh I'm sorry, in 2016, let me get my dates right. That is the next step of improvement. There will be some DACS tank work and some DACS thruster work. Down below you will see how we migrated from, what we call the heritage booster design to the current design that was flown from the three stage design in MDA. [Unintelligible words] very hard to develop and build a two stage booster by 2020 to give us the battle space to give the warfighter the battle space they need with a threat. Next slide.

We talked about discrimination and the importance of discrimination, we don't have and we'll never enough interceptors to fire at every lethal object the radar sees. It is just physically impossible. That is just bad design, bad math. We want to be able to fire in a controlled approach through shot doctrine that has the right lethal object. And that is what our discrimination efforts are focused on. And it's not just the EKV, its discrimination improvements across the radars, the C2BMC system, the GMD system, the fire control system, everything that connects that must process and provide the warfighter with a decision making screen to both [unintelligible word] and the EKV that they got confidence that they are going to hit what they aimed at. I would submit, given the [unintelligible word] where the threat is going [unintelligible word] this is not a choice, this is imperative that we remained focused on these improvements. And with the support of the Department

and the Hill, we will be there with capabilities that sees the projected threat by 2020 and we'll know way ahead the route that's taking us. Next slide.

So what is homeland missile defense going to look like in 2020-2025 time period? Thirty to forty four missiles by 17, I call it the C-3 GBI, that will include the redesigned EKV, we are working hard on the two stage booster, homeland defense discrimination to incorporate and at a minimum a large discriminating radar intercept and again, our commitment couldn't be more solid on this; on the need to do this and I have great confidence this will be [unintelligible word] during that time period.

I'll finish and talk….next slide, about some of the criticisms that I hear in and out and I will give you my perspective. "MDA has not tested against the ICBM." True. We never had an ICBM target. We approached ICBM ranges, altitudes, and speed on the last intercept test. Our test approach, has been, continues to be increase in complexity over time. Starting in 2016 will be our first real test against an ICBM; we have seven tests planned between now and 2024. Next slide.

"We have not demonstrated a capability to do target discrimination." That was false. You saw the dumbed down scene of discrimination scene on the FTG-06b.

06a and 07 had absolutely nothing to do with discriminating of a lethal object and there were early developmental tests done against penetration aids that [unintelligible words] recovery time today. Next slide.

"We can't do hit-to-kill." We and the warfighter have proved repeatedly, we and the warfighter people have proven that it is technically feasible. Those are the numbers since 2001. Sixty five for eighty-one even counting the ones that we shouldn't have because they are not tactical configuration but we count them anyway; eighty percent. Next slide.

"The GMD tests are scripted for success." No, our test philosophy is to add to complexity and reduce the amount of controls as we mature the system. We do deliver variables in this test and deliver variables in every test. To get the lessons learned in missile area data and [unintelligible words] our models to inform the analysis, to get confidence in the warfighter [unintelligible words] and we were constrained by range, we're constrained by safety; we're constrained by environmental regulations. This is what must be done on significant new operational tests and BMDS systems we'll be taking to operational test once the European testing is behind us. And if you go back and look at the Aegis and

THAAD contributions during that original test, they were not scripted; the warfighters were out on a boat, out to sea and on station in a totally unscripted environment. And I am very proud of what we did. Next slide.

So, we have come a long way since 2001 and I think you can get a feel for the rapid direction and the rapid fielding and the designs that we deal with and the program has worked to improve. And every single missile we've fielded. We knew that we were only going to improve over time and we knew that we were going to increase the capability over time. With any program there are technical and physical challenges; but we remain committed to do this. We must stay committed to the discrimination capability for both homeland and the regional, my biggest concern in terms of us staying committed and fielding rapidly because we can. And I think you got my perspective on misconceptions that are in the press about the system itself and where we are today. Next slide please.

That is what I mainly wanted to talk about. We are great at talking about rocket science part of our business and it's fascinating to fly out to see the flight tests but without the people, it would not be possible. I just put a collage here of the work aligned with the sailor, the soldier, the MDA folks, the SMDC folks, pick your organization they contributed to this mission and they are probably depicted on that slide. I'm [unintelligible word] with a special thanks to folks in the GMD, the test program and all that but the program manager who knew all this, I get the year wrong, probably to 2008. I think Carlos Kingston. He's retiring on August 29th so it's going to be a huge lost to the program and I think his leadership and his commitment to the Agency, return to the intercept flight; was the foundation for our success. There were several others that contributed to that who at all times had support for that test and accomplished that test, down to the warfighter. Keith Creekmore with the government, John Anderson in Raytheon he was there, Paul Smith was there, and probably most importantly the 100th missile defense brigade. And those five guys that executed this test. [unintelligible sentence]. And it was executed from Colorado Springs in a major way. That's the history, that's our future, it's an honor to serve and I look forward to seeing you around the world. And thank you for your time. (Audience claps) I was told not to take questions but I can't help myself. [unintelligible jokes]. Of course. (Audience laughs) He'll probably run after me; you can ask me in the hallway. So, any questions? Ok. Thank very much for being respectful, I really got to get to Romania. I think you know why and God bless you. (Audience claps) (VADM Syring leaves.)