Summary of the first meeting of the Missile Defence Discussion Forum

'The technical feasibility of missile defence and countermeasures'
Dr. Lisbeth Gronlund, Union of Concerned Scientists and MIT Security Studies Program

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The Forum is conducted under Chatham House rules, so only the comments made by the speaker, Dr. Gronlund, are attributable. Hence, the following combines Dr. Gronlund's responses with participants' remarks and her responses.

NMD Events To-Date

Dr. Gronlund sketched out plans for the US National Missile Defence (NMD) programme developed under President Clinton. The system was planned to have up to 250 interceptor missiles that would destroy in outer space incoming missiles aimed at US territory. The interceptors were to be supported by up to 10 radars placed around the world and by space-based infrared sensors. President Clinton set up 4 criteria by which he would determine whether to continue with the NMD plans: the readiness of the technology, the impact of deployment on arms control and relations with Russia, the cost of the system, and the perceived threat to US security. In September 2000, he decided not to authorise deployment , thus leaving the final decision to his successor.

The US debate about NMD (and the Clinton administration's political commitment to developing NMD) changed dramatically with the Rumsfeld Commission report, said Dr. Gronlund, which stated that North Korea, Iran, and Iraq would be able to field an inter-continental ballistic missile (ICBM) capable of hitting the US within five years of a decision to develop such a missile, and that the US might not know if such a development program was underway. The short timeframe was because the Commission did not think these emerging missile states, or so-called 'rogue states', would conduct many flight tests or seek highly reliable missiles Two months later North Korea launched a missile that passed over Japan, which exacerbated the US domestic situation further and put a finer point on the report's conclusions.

The Rumsfeld Commission was asked just to look at missile proliferation, and no other security threat, operating as if with blinders on. They also considered what these countries *could* do if they really tried, not what they were likely to do. What is often forgotten is that the Rumsfeld report noted that well in advance of a long-range missile threat, the US could be threatened by short-range missiles launched from ships near the US coast.

Importantly and equally forgotten, is that the Rumsfeld report *did not* recommend an NMD system, or indeed any remedy for the threat it outlined. In fact, during his confirmation hearings in the Senate, Donald Rumsfeld stated he was an expert on the *threat*, not on missile defence. However, the Rumsfeld report was picked up and used by those favouring an NMD. The report's assessments were made on technical grounds, which were correct. She did not, however, find it to be either relevant or correct to base policy-making only on its conclusions.

The new US President George W. Bush has stated he is committed to developing and deploying a NMD system, as has US Secretary of Defense Donald Rumsfeld. If one were to believe much of the US media coverage of the new administration in relation to NMD, one would think that the decision to deploy the system has been taken and that deployment is imminent. In Dr. Gronlund's estimation, there is an intent to

reduce criticism of the plan by portraying it as a 'done deal', where in reality there is nothing to deploy and most decisions have yet to be taken.

The fastest track for president Bush would be to continue with the Clinton NMD system.. According to the original time schedule, the first phase of the system would be deployed by 2003; this was later changed to 2005, and as of last fall, people were discussing 2007. Dr. Gronlund said that deployment in 2007 is probably still unrealistic and would at a minimum require there be no more delays in testing. Thus, on the technical front alone, a deployment would not be possible before the end of a possible second presidential term for Bush, which would be 2008. This fact could have important political ramifications for Allies as they decide their position on the issue.

Bush will probably initiate a unilateral American cut in missiles and nuclear warheads, said Dr. Gronlund. This is because Bush's advisors are not in favour of arms control and by making unilateral cuts there will be no constrains on a future build-up. However, having 1 000 nuclear missiles and a launch-on-warning policy could be far more dangerous than the current situation, especially if the US increases the role of its nuclear weapons. She said some in the Bush administration endorse using nuclear weapons not just to deter nuclear attack, but to deter and respond to biological, chemical or even conventional attacks. The US and Russia have thousands of nuclear missiles on hair-trigger alert at the moment. That policy gives rise to a danger of a mistaken attack, launched in response to false warning of a first strike. The danger of such an attack from Russia is far greater than any potential future threat from North Korea.

Boost-Phase Missile Defence: Practical or Feasible?

In part because Bush is not satisfied with the Clinton plan, probably for political as well as technical reasons, he has stated a preference for including more options, like a sea-based missile defence or a boost-phase system. In his recent presentation of the budget to Congress, President Bush allocated an extra 1 billion USD to the Ballistic Missile Defense Organization (BMDO) in the Pentagon for research and development of alternative NMD systems. Dr. Gronlund remarked on the substantial enthusiasm for boost-phase missile defence, partly inspired by the desire to be seen to break with the Clinton strategy.

For a boost-phase system to work, the interceptor, or 'kill vehicle', has to be very fast and also capable of manoeuvring quickly to follow the launched missile, which will change its trajectory during boost phase. This is different from trying to intercept a missile in the mid-course of its trajectory, as the Clinton system would, since in outer space a warhead will follow a predictable trajectory. In a boost-phase system, the interceptor sensor 'sees' the heat coming out of the launched missile, the 'plume'. But in order to be effective, an interceptor should hit the nuclear or biological warhead. Boost-phase missile defence may be less vulnerable to countermeasures than a mid-course defence, said Dr. Gronlund, but the development challenges would be substantial.

Another attractive characteristic of some types of boost-phase defences is the politically-desirable aim of easing Russian and Chinese concerns. Because a land-based or sea-based boost-phase system would only be able to reach missiles launched from relatively close to where the interceptors were based, and China and Russia are large countries, such a boost-phase system would be unable to reach their in-land arsenals. However, for exactly these reasons, some observers do not like surface-based boost-phase missile defence (as opposed to space-based boost phase), as they want the US NMD to be designed against China, as well as emerging missile states.

Types of Missile Defence: NMD v. TMD

Dr. Gronlund pointed out that there appears to be some confusion between strategic and tactical missiles, as well as between Theatre and National Missile Defence (TMD and NMD). The vision of some is to have a spectrum of missile defence, where NMD and TMD would interlace seamlessly together. TMD

has been designed with the intention of protecting conventional, forward-deployed forces (as in the NATO context) and NMD is planned to protect sites and populations from ICBMs tipped with nuclear or biological warheads.

The ABM Treaty allowed for the US and USSR to develop air defences and defences against short-range missiles, but is not very precise on where to draw the line. Beginning in 1992-3, Russia and US had discussions on how to distinguish between legal and illegal missile defence. They decided having interceptors slower than 3 km/second was legal, which includes US Patriot missile defences and the Theatre High Altitude Area Defence (THAAD), which is under development. There was no clear agreement on which defences with interceptors faster than 3 km/sec would be legal. Navy Theater Wide (NTW), with an interceptor speed of 4.5 km/second, is not clearly permitted by the US-Russian interpretation of the ABM Treaty, said Dr. Gronlund.

The US Navy did a study in 2000 of the potential role of NTW in NMD. The study found that NTW could be a useful addition to the Clinton mid-course land-based NMD. However, the study also found that NTW alone would not be useful as a NMD system because the NTW interceptors would need to use the ground-based radars (and space-based sensors) that would be deployed as part of the land-based system. The Clinton NMD system planned for up to 250 interceptors, but once the 600 NTW interceptors are included that number climbs to about 800 in total. The NMD radars and space-based sensors are at the heart of much Russian concern, as hundreds more interceptors can be added quite quickly once these sensors are up and running. An expanded system might then have the potential to counter the larger Russian arsenal.

The ABM Treaty in the Spotlight

In Spring of 2000, some US negotiating documents that the US had presented to Russia on its proposed ABM Treaty modifications were leaked (copies available at http://www.thebulletin.org/issues/2000/mj00/mj00schwartz.html). They stated that Clinton's plan was to keep the ABM Treaty but to make exemptions where needed to build NMD. The leaked documents revealed two main talking points for US negotiators to convince Russia that it need not fear a US NMD: 1) that even after more strategic cuts, Russia and the US would continue to have at least 1 000 warheads, which is far higher than the NMD system could handle; and, 2) Russia's hair-trigger, launch-on-warning policy would prevent any US first strike from being effective and hence any missile defence from negating their own deterrent . Dr. Gronlund said that one question now for Bush is whether he can de-link US NMD from Russian launch-on-warning, which is a very dangerous policy. Another question is whether NMD is compatible with cuts below 1 000 nuclear weapons.

Bush cannot begin real negotiations with Russia, as there are no specifics yet to discuss. This means that for the next few years the ABM Treaty will probably remain untouched. The US will engage in discussions with Russia on how to amend the ABM Treaty, although on this point the Bush administration is still trying to reach agreement within itself. Clinton's plan was to only change the ABM Treaty for the first phase of NMD deployment, then to continue negotiations when further amendments were necessary. That approach undercuts the value of the treaty, which is in part to provide predictability for other countries , said Dr. Gronlund.

Reactions from China

Under Clinton, the US National Intelligence Council did a classified assessment of the reactions of other countries to US NMD deployment, parts of which were leaked. US intelligence agencies confirmed the suspicions of many in the report by saying if the US builds an NMD system that could shoot down Chinese missiles, China would build up its arsenal (up to 200 nuclear missiles). The report further stated that this would likely motivate India to likewise increase their numbers, which in turn would cause

Pakistan to expand as well. In Dr. Gronlund's estimation, China has only 20 ICBMs which has taken them about two decades to build. In future, China wants mobile ICBMs because they are worried about a pre-emptive strike. The problem is not just that the US is planning NMD, but that no one knows when development will stop or where. That makes planning in other countries impossible.

Procurement of Missile Defence

The US has a so-called 'fly before you buy' law for defence procurement that requires a major weapon system to complete operational testing and be shown to work before the government can buy it. Therefore, said Dr. Gronlund, if the NMD system was a new tank, the US government would not be allowed to take a decision to go ahead until it had driven it through muddy fields and over hills. Because the NMD is at the very early stages of development, and the tests conducted so far have been rather unrealistic, making a decision to deploy at this point is unprecedented. Under the Clinton plan, operational testing would not even begin until 2005. Now it looks as if it will only begin in 2006 or 2007, and not be completed for several years after that. But planning for NMD deployment continues anyway because politics have dictated forward movement regardless of technical realities.

Support for NMD in the US

Dr. Gronlund warned against believing that there is a political consensus in the US on NMD, even though things have been relatively quiet since Bush entered office. As she repeated throughout the session, 'The debate is just beginning'. Dr. Gronlund predicted that what will probably happen is that Democratic senators will insist on elements of the Clinton criteria being fulfilled before they give their approval.

It should also not be taken for granted that the uniformed military supports NMD plans. They do so generally, but only conditionally. For example, if the money for the NMD is *in addition to* the current defence budget, then they can go along with it. But it is a different story if money for NMD is to be taken from existing defence budget lines.

Feasibility of the Proposed System

Dr. Gronlund and other US scientists did a study on the Clinton plan. They posed the question: *If a state poses an ICBM threat then what else will that state possess technologically and how effective would the NMD be in the light of this?* In the study, sponsored by the Union of Concerned Scientists and MIT Security Studies Program,* they found that the level of technology required for workable ICBMs, would easily mean the same state could employ a number of countermeasures to trick the defence system.

There are several steps a state could take to counter NMD interceptors. With biological or chemical weapons it is possible to have them spread out in a hundred or more small bombs, called bomblets or submunitions. With a nuclear warhead, a state could deploy mylar balloons, coated with aluminium, for example, with the warhead hidden in one of dozens of such balloons. In outer space there is no air and therefore no air resistance, so all objects travel at the same speed regardless of their weight. Also, the attacker could heat the balloons so it would be impossible for the heat sensor to determine which one contained the warhead. Dr. Gronlund said that these are quite simple countermeasures that would provide far too many targets for US interceptors to destroy.

Dr. Gronlund said that the US confidence in an NMD system would affect the ways in which the US could use it. Understanding how well any military system would be expected to work is based on testing the system under realistic conditions and on using it. Because an NMD system would need to operate in a wide variety of circumstances and against a variety of countermeasures, understanding how well the system would work will require a relatively large number of tests. However, each intercept tests costs

about 100 million USD, so the US will not be able to conduct as many tests as it would need to in order to have high confidence in how the system will perform under various conditions.

If the US was planning to use the NMD as an insurance policy—in case all other means of diplomacy and deterrence had failed and an emerging missile state launched a nuclear-armed missile at the US—then any missile defence would be better than none, and the US would not need to have high confidence in the system effectiveness.

However, that is not the stated rationale for the NMD. Secretary of Defense Rumsfeld says the US needs a NMD to protect against 'nuclear blackmail' and to preserve US freedom of action to use its conventional forces even in the face of a threat to attack a US city with a nuclear-tipped missile. In such a situation where the US was genuinely faced with the prospect of an ICBM attack, the President would ask how much confidence the military had in the effectiveness of the NMD. But the US will have very little basis for knowing in advance how effective the NMD will be. According to Dr. Gronlund, a missile defence of unknowable effectiveness would not be useful in this situation, and in reality would not give a US President more options.

Role of Europe

Dr. Gronlund emphasised that it is important for Europe to do its own assessment of the potential threats and of the technical feasibility of missile defence. Rumsfeld's recent trip to Germany was designed to convince the Europeans NMD is happening with or without their approval, so resistance is useless. But the fact is that the US is not ready to deploy a missile defence for a long time to come. The ideas contained in the recent Russian proposal handed over to NATO of *first* doing a threat assessment *then* considering the possible tools for countering the threats, is a very sound concept. If, for example, it is believed that North Korea indeed poses a threat, then—because the US cannot build a missile defence for years— the only thing the US can do (and should do in any event, according to Dr. Gronlund) is to engage North Korea diplomatically. This is something Europe should support very strongly. Clinton came close to hatching a deal with North Korea. Whether Bush will take it up seriously remains to be seen.

Europe must say that missile defence is fine only as long as other means of addressing potential problems have been explored first, according to Dr. Gronlund. In other words, set conditions for acceptance of NMD. Discussion must include more than just whether the US goes forward or not, but also aspects like the risk of derailing arms control agreements with Russia and a potential arms race in Asia.

There is a belief in DC at the moment that Europe is in retreat, said Dr. Gronlund, but when talking to those behind the scenes in Europe she found that opinions have not changed substantially. It is merely a change of strategy. As long as the US does not reveal any details, then the Europeans can 'wait and see' before reacting. That is a better way of describing what is happening in Europe right now. It is worth remembering that this is only the beginning stage of the missile defence debate. In this, Europe is very important and has still ample time for influencing the US decision, said Dr. Gronlund. The European reaction strongly affected Clinton's decision in autumn 2000 to postpone a final decision. In the US debate , Russian and Chinese concerns can sometimes be dismissed but not so with the European worries.

A country's wishes for defence are hard to criticise, said Dr. Gronlund. But one can criticise the details of the defence plans. She said it all comes down to the specifics.

*Report entitled, 'Countermeasures: A Technical Evaluation of the Operational Effectiveness of the Planned US National Missile Defense System'. Copies available at http://www.ucsusa.org/security/CM_toc.html

Submitted by Jens Mosegaard, MDDF Rapporteur