WHITE PAPER:
POST-START II ARMS CONTROL

(U) (S) **PURPOSE:** Provide USSTRATCOM's position on post-START II arms control.

(U) **BACKGROUND**

(U) (S) The primary source for guiding post-START II arms control is PDD-37. USSC b1

Building on PDD-37, this paper proposes national security objectives of post-START II arms control and then introduces a framework . In doing so, two questions are answered: USSC b1 First, what must the U.S. protect, and secondly, what does the U.S. want to get out of a post-START II arms control agreement?

(U) (S) The three-part analysis that follows first examines the U.S. force structure in an effort to identify those areas that must be protected and those that offer potential for further reduction. Then, the Russian force structure is examined in order to identify those areas that pose the most threat to the U.S. and also offer the greatest potential for negotiated reductions. Finally, a discussion of Safeguards, Transparency, & Irreversibility (STI), warhead elimination, and disposition of fissile materials is incorporated.

(U) The final section of the paper synthesizes these three studies into a comprehensive recommendation for a post-START II arms control framework.

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~~CLASSIFIED BY: Multiple Sources~~
~~DECLASSIFY ON: Original Marked OADR~~

(U) **INTRODUCTION - National Security Objectives**

(U) Presidential Decision Directive 37(PDD-37), [redacted] provides several 'first principles' for arms control. These principles must guide any effort to develop objectives for post-START II arms control. These principles are: USSC b1

- (U) Deterrence
- (U) Stability
- (U) Equivalence
- (U) Hedge

- (U) Given the backdrop of these first principles, the first question that must be answered is, "What does the U.S. want out of post-START II arms control?" In response, the U.S. should seek to:
  - (U) Protect U.S. strategic nuclear delivery vehicle force structure. There are currently no new platforms planned, so it's important to retain as many of the existing ones as possible. *Hedge*
  - (U) Retain U.S. warheads at a level consistent with war-fighting needs *Deterrence*
  - (U) Minimize the impact of those Russian systems, [redacted] that pose the greatest threat to U.S. interests *Deterrence, Stability* USSC b1
  - (U) Reduce and eliminate U.S. and Russian non-deployed warheads and fissile materials *Equivalence, Stability*
  - (U) Nonstrategic Nuclear Forces must be addressed as part of the overall effort to stem the nuclear proliferation threat. USSC b1

    [redacted] *Equivalence, Stability*
- (U) Within this framework, some potential post-START II arms control actions include:
  - (U) Stockpile data exchange
  - (U) Warhead reductions
  - (U) Warhead dismantlement
  - (U) Dismantlement inspection
  - (U) Warhead elimination
  - (U) Warhead elimination inspection
  - (U) Fissile material protection
  - (U) Fissile material disposition

- (U) SOA reductions (no lower than 2000-2500)

(U) **PART I - U.S. Force Structure (What do we protect, what can we give up?).**

(U) Background. The Nuclear Posture Review recommended a force structure compliant with START II. The following chart summarizes the NPR force structure as modified by the START I Force Structure Task Force. Warhead declarations depicted in the chart are not approved. (Note: All B-1s are reoriented to a conventional role, one B-52 and one B-2 are in "test" and do not count in the aggregate totals):

Type of SOA	Number of Vehicles	Warhead Declaration	Total Warheads
B-1	0	0	0
B-2	20		
Minuteman III	500		
Peacekeeper	0		
D-5	336		
TOTAL	976		

Table 1. U.S. START II Force Structure (

(U) *Assumptions for Post-START II Arms Control.*

- (U) START II will enter-into-force; the NPR force structure will be implemented
- (U) **Warhead** elimination must be the centerpiece of post-START II arms control, and should come **before** further **force structure reductions** occur
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- (U) Force structure will be driven largely by the central limit.
- (U) ~~(S)~~ Force structure should be retained and maximized to ensure adequate hedge capability.
- (U) ~~(S)~~ Further reductions in the ICBM force structure erodes the number of strategic targets in the U.S. and could be considered destabilizing.
- (U) ~~(S)~~ B-52s should remain in the force mix throughout their programmed life (FY2040?).
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(U) *Constraints.*

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(U) *Options.*

(U) Modification of B-52s:

- (U/~~S~~) If all B-52s were to be retained in their START II configurations, they would count for[

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- (U/~~S~~) All remaining B-52s could be modified to carry eight cruise missiles. This reduces B-52 warheads to 520. This would leave 1160 warheads for SLBMs,[ ]In order to maximize the number of boats, some SLBM downloading must be accomplished.

VSSC b1

(U) SLBM downloading:

- (U/~~S~~) More boats can be retained if further downloading is accomplished.[

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- (U/~~S~~) The following chart shows the impact of various SLBM downloading/force structure options on the B-52 force structure/weapon loading mix (START II

configured vs. 100% modified to carry eight CMs). In each option, all 500 ICBMs and 21 B-2s would be retained.

Warheads⇒ ⇓ Boats	5	4	3	2	1
14	1680	1344	1008	672	336
13	1560	1248	936	624	312
12	1440	1152	864	576	288
11	1320	1056	792	528	264
10	1200	960	720	480	240
09	1080	864	648	432	216

No B-52s 100% Modified B-52s START II B-52s

Table 2a. SLBM/B-52 Matrix at 500 ICBMs (U).

(U) The value of this matrix is its usefulness in pointing out the possibilities and ramifications of various force structure and weapons loading options. For example, it clearly shows that the START II SLBM and B-52 force structure and warhead loading cannot be retained at a 2500 warhead level. Furthermore, it shows that in order to retain the START II SLBM force structure and warhead loading, no B-52s can be retained. Likewise, in order to retain the START II B-52 structure and weapon loading, SLBM loading must be reduced to two warheads if more than nine boats are to be retained.

(U) Reductions in ICBMs:

- Because MIRVed ICBMs are banned by START II, reductions in the ICBM force will require elimination of launchers. It's estimated that there is only a small difference between 350 and 500 ICBMs in terms of both Russian targeting and impact on the U.S. SIOP. Beyond that point, the impact is significant.
- Elimination of 150 Minuteman III only frees up 150 warheads. This step would permit the following options:

Warheads⇒ ⇓ Boats	5	4	3	2	1
14	1680	1344	1008	672	336
13	1560	1248	936	624	312
12	1440	1152	864	576	288
11	1320	1056	792	528	264
10	1200	960	720	480	240
09	1080	864	648	432	216

No B-52s 100% Modified B-52s START II B-52s

Table 2b. SLBM/B-52 Matrix at 350 ICBMs (U).

- This reduction has no effect on U.S. forces if 14 boats are retained. Certain advantages appear, however, when the number of boats is dropped. For example, at 10 boats, five RBs could be retained if all B-52Hs are modified. Alternatively, if nine boats loaded at four RBs are retained, no additional B-52Hs would require modification.
- U.S. ICBM elimination could have modest value in encouraging the Russians to accept some mobile ICBM reductions, but even if a ceiling of 350 total ICBMs were imposed, the Russians would likely field an "all mobile" force in response. The end effect would be a net reduction in mobile ICBMs, but a relative increase in Russian reliance on those mobile ICBMs that remain.

(U) *Recommendation.*

[redacted] USSC b1, b5

(U) **PART II - Russian Force Structure. (What do we get out of it?)**

(~~S~~) The Russians have not provided definitive insight to their proposed START II force structure. What is available are several estimates. Three estimates are shown in the following tables. [ ] is derived from the paper, "Approaches to Mathematical Modeling of the Process of World-wide Strategic Nuclear Conflict Used in the Former USSR" by Anton V. Surikov. Surikov, currently with the USA and Canada Institute, formerly worked in Pavel Grachev's office the Russian MOD. The final estimate is based on START II numerical limits, and provides a "worst-case" scenario in which the Russians maximize warhead loading. USSC b1

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Type of SOA	Number of Vehicles	Warhead Declaration	Total Warheads
Bear H16	50	12	600
Blackjack	10	12	120
SS-19	105	1	105
SS-25 (Silo)	350	1	350
SS-25/27 (Mobile)	360	1	360
Kal'mar (Delta 3)	176	3	528
Del'fin (Delta 4)	112	4	448
Typhoon	120	6	720
TOTAL	1333	N/A	3231

Table 4. START II Force Structure (From the paper, "Approaches to Mathematical Modeling of the Process of World-wide Strategic Nuclear Conflict Used in the Former USSR" by Anton V. Surikov). (U)

Type of SOA	Number of Vehicles	Warhead Declaration	Total Warheads
Bear H6	28	6	168
Bear H16	35	12	560
Blackjack	6	12	72
SS-19	170	1	170
SS-25 (Silo)	144	1	144
SS-25/27 (Mobile)	690	1	690
Kal'mar (Delta 3)	176	3	528
Del'fin (Delta 4)	112	4	448
Typhoon	120	6	720
TOTAL	N/A	N/A	3500

Table 5. START II Force Structure (Based on START II numerical limits). (U)

(U) *Explanation of Table 5:*

- (U) ***SLBM.***
  - (U) (S) [ ] START II limits SLBM warheads to 1750. If a reduction approaching that level, consistent with Table 1 and Table 3, is assumed, then more than 1750 warheads remain available for ICBMs and bombers. VSSC b1
- (U) ***Heavy Bombers.***
  - (U) (S) [ ] If all Bear H and Blackjack bombers remain in the fleet under START II, the following bomber force structure could be deployed: VSSC b1

Bear H6 (6 warheads)	28/168
Bear H16 (16 warheads)	35/560
Blackjack (12 warheads)	6/ 72
Total	69/800

- (U) ***ICBM.***
  - (U) (S) Given this SLBM and heavy bomber assessment, 1004 warheads remain available for ICBMs. Under START I, mobile ICBMs are limited to no more than 1100 warheads. Currently, the following mobile ICBM force structure is deployed in Russia:

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  - (U) (S) If under START II, all SS-18s are eliminated, all 170 five-warhead SS-19s and all mobile ICBMs are downloaded to a single RV configuration, the following START II ICBM force structure will result:

SS-19	170/170
SS-25	360/360
Subtotal	522/522

  - (U) (S) As a result, the SRF will deploy the SS-X-27. Some will be backfitted in up to 90 converted SS-18 silos; the remainder will most likely be mobile versions. The following SS-X-27 deployment is possible:

SS-X-27 (silo)	90/90
SS-X-27 (mobile)	338

- (U) ~~(S)~~ The effect of this deployment will be a mobile ICBM force of 690 warheads. This START I/II compliant force represents more than 61% of the Russian ICBM force, and nearly one fifth of the overall strategic forces of the Russian Federation.

- (U) ~~(S)~~ What conclusions can be drawn from these varied thoughts on Russian START II force structures? First, until the Russians express their intentions, any estimate is simply a guess. Despite this, and the obvious differences in the estimates, three trends clearly emerge:
  - (U) ~~(S)~~ Decreased emphasis on heavy bomber weapons
  - (U) ~~(S)~~ Increased emphasis on mobile ICBMs
  - (U) ~~(S)~~ Increased reliance on SLBM weapons; they will comprise the single largest share of the Russian strategic forces

- (U) These points are supported by the following informal J2 Assessment of post-START II force structure objectives:

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(U) *Options.*

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(U) *Recommendation*:

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(U) **PART III - Other Components.**

(U) ***Safeguards, Transparency & Irreversibility (STI).***

(U) (~~S~~) It is critical to obtain a comprehensive understanding of the total inventory of warheads and fissile materials. This information will establish the baseline from which warhead reduction will proceed. Admittedly, this is an extremely difficult task, and holding a high level of confidence in its validity will be even more difficult. To be completely accurate, and have complete confidence in it, may be impossible. High confidence, however, is not the same thing, and high confidence in nearly-complete data may be the right goal. In that sense, at least an honest effort at completeness is achievable. The path to this type of information is STI.

(U) There are three basic components to STI: Data Exchange, Mutual Reciprocal Inspections (MRI), and Chain of Custody. Related to, but not a part of STI, is the DoE material protection, control, & accountability (MPC&A) program.

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(U) Data Exchanges

(U~~S~~) *The objectives of data exchange* are to enhance transparency, promote strategic stability, deny advantages of arms buildup by minimizing breakout/reconstitution concerns, provide a basis for MPC&A, increase knowledge of the U.S. and Russian stockpiles, and maintain control of sensitive data. Completion of an "Agreement for Cooperation" is essential; the Atomic Energy Act of 1954 requires it in order to share classified information with another country.

(U) *The scope of data exchange* includes historical and current information on production, stockpiles, and dismantlement. Data exchanges should occur semiannually.

(U) There are several issues which must be resolved:

- (U) *What types of data should be included, and for what types of weapons?* Historical and current for strategic, tactical, and naval weapons should be considered.

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- (U) *If providing historical data is a stumbling block, why not ignore it?* The fact that the Russians may not be able to provide historical data doesn't necessarily mean that the U.S. shouldn't ask for what they can give us. Any information provided, even if it is suspect, helps to understand their process, and gives a better picture.

(U) Mutual Reciprocal Inspections (MRI)

(U) *MRI is not traditional arms control on-site inspection.* Rather, it is a tool that will give us a level of confidence in the data exchange. "Pit" counting is probably sufficient for MRI, but the question becomes, "How do you show 'pitness' at an unclassified level?" Both U.S. and Russian experts agree that there are no unclassified measurements that can ensure that an item is a pit, but certain signatures can provide enough information: isotopic composition, mass, and shape. Current technology is adequate to provide confidence that an item is a "pit" without revealing classified information.

(U) Chain Of Custody

(U) The purpose of chain of custody is to provide confidence that excess warheads and the resulting excess material are not reused in weapons production. But to take it all in a single step could prove impossible. Conventional wisdom is that the U.S. should begin by developing a policy of limited chain of custody.

(U) *Limited chain of custody* is a good first step toward verification of warhead elimination. Chain of custody decreases the risk of diversion and enhances security. It provides confidence that excess warheads are dismantled and the resulting excess material is not reused in further weapons production.

(U) ***Warhead Limitations.***

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~~(S)~~ Warhead limitations are an essential part of any post-START II arms control agreement. There are several options for how such agreement may be incorporated:

(U) *STI lays the groundwork* for a warhead limitation regime with MRI, data exchange, and chain of custody. Compared to the START treaties, warhead limitations and reductions may not be as attractive as reducing delivery systems, in political terms. There has never actually been an agreement on warhead reductions, but negotiations were conducted on warheads under START. For example, warhead

elimination on a one-for-one basis with SNDV elimination was discussed with the USSR. The U.S. position was that since it could not be verified, it should therefore not be done. Since the determination at that time was that warhead regimes were both expensive and pointless, why reopen the issue?

(U) *STI provides a new opportunity.* If STI succeeds, it lays the basis for a warhead elimination regime. The question then becomes, how is elimination defined? If it's warhead disassembly, then additional questions arise: what is considered excess, and under what controls does disassembly occur? Could the material be remanufactured, and if so, under what conditions? What would be the means of verification, and would it interfere with normal disassembly/reassembly? How would classified information be released, how could the active stockpile be kept separate, and finally, how much would it cost?

(U) *Correct Approach.* Possibilities include elimination of some number of warheads without addressing the stockpile, eliminating to an agreed level, and eliminating warheads associated with START reduced delivery vehicles. The first and third methods would avoid stockpile issues. The second method would be less likely to be agreed to by the Russians, since they begin with a larger stockpile than the U.S..

(U) SYNTHESIS - Folding in STI and Warhead Limitations with SOA Reductions.

(U) *First Steps.*

(S) The first element of a post-START II arms control agreement must be elimination of the threat posed by warheads removed from SOAs[ ] To that end, the **following steps must be accomplished prior to further SOA reductions:** USSC b1

- (S) Data Exchange must be accomplished first. This could be done in a fashion similar to the SNDV and Warhead data exchanged under the START I MOU. The prerequisite to this step is the completion of the Agreement for Cooperation on Data Exchanges.
- (S) A system of On-Site Inspections (OSI) to confirm exchanged data must be agreed to.
- (S) A formula for the dismantlement of warheads[ ] This will require an inspection regime similar to the Perimeter Portal Continuous Monitoring (PPCM) under START I. In addition to the PPCM element, it is desirable to have a more intrusive component to the regime in which the actual dismantlement of warheads could be verified. This type of inspection could be accomplished in a manner that would not reveal classified information. USSC b1
- (S) Development of an agreed upon method for disposition of excess fissile material from the eliminated warheads should be pursued in conjunction with the other agreements. Failure to reach agreement on the disposition of fissile materials should not be a showstopper. Although fissile material disposition is a worthy goal, it could easily be an element of a separately concluded agreement.

(U) *Limiting Factors.*

- (S) It is not desirable to proceed with warhead elimination until detailed, verifiable information on the strategic and nonstrategic stockpiles is obtained. Without data exchange, our efforts are effectively limited to those warheads accountable under the START Treaties. This does not address the true strategic and nonstrategic stockpiles, and would result in unbalanced reductions.
- (S) It may not be desirable to proceed with warhead elimination based on warheads removed[ ] USSC b1
- (S) Disposition of fissile material is dependent on the outcome of the environmental assessment of three disposition options: MOX fuel burn, deep borehole burial, and vitrification. Currently there is no clearly preferred option for the U.S.. Russia

prefers the MOX fuel option because it makes use of the plutonium recovered from dismantled warheads. The technical solution for fissile material disposition may be driven by the environmental assessment outcome.

- (~~S~~) Cost of accomplishing each element will be significant

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(U) *Timing.*

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(U) The following timetable depicts each of these three options:

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(U) NOTES:

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(U) **RECOMMENDATION:**

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