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The START Proposal: Verification Issues

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Introduction

At Eureka College on May 9, 1982 President Reagan gave a basic outline of the approach that the United States will pursue in the upcoming START (STrategic Arms Reduction Talks) talks. This approach, not all of which was detailed in the Eureka speech, involves two phases:

Phase 1: a mutual limit for the United States and the Soviet Union of 5,000 warheads on no more than 850 ICBMs (Intercontinental Ballistic Missiles) and SLBMs (Sea Launched Ballistic Missiles). Within that limit no more that 2,500 warheads could be deployed on land-based ICBMs. This reduction would take place over a 5 to 10 year period.[1/]

Phase 2: the aggregate throw weight (i.e., the sum of the payload capacities of all ballistic missiles expressed in poundage for reentry vehicles of all types, both warheads and decoys) of both forces would be equalized. The United States will reportedly seek to have the limit on ICBM throw weight be no larger than that of the current U.S. ICBM force (approximately 2,220,330 lbs., as opposed to 9,954,100 lbs. for Soviet ICBMs).[2/] This phase would also take other systems into account, and would seek further reductions as well.

1/ The Administration reportedly is willing to allow equal numbers of bombers to both sides, but without limit on the weapons they carry. Such a limit would include the controversial Soviet Backfire bomber. See Corddry, Charles W. Bombers, too, subject to arms cuts, U.S. sources say. Baltimore Sun, May 21, 1982: A4.

2/ These figures were calculated by A.A. Tinajero, Specialist in National Defense, CRS.

As with all other arms control proposals, the ability of both sides to adequately verify* compliance with these agreements will be crucial. Indeed, verification requirements have become key determinants in shaping agreements, as well as means of checking on compliance. The SALT I limits on launchers rather than missiles or warheads was in part an expression of monitoring** capabilities and their limits. In the still-pending SALT II Treaty, strategic arms control moved from wholly quantitative to some qualitative limits, in part through the introduction of counting rules and planned observable differences in systems as aids to monitoring and verification.

The debate over SALT II in the Senate Foreign Relations Committee also indicated how important the adequacy of verification is in gaining congressional approval. Thus, for political as well as security reasons the adequate verification of the Reagan START proposal, or any eventual strategic arms agreement, will be crucial.

This paper examines some of the monitoring and verification implications of the START proposal. The analysis is limited by the fact that no comprehensive document exists. This analysis will be based on the outline of the proposal as summarized above.

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* Verification experts do not use the word "verifiability," as this is seen as an absolute term implying a capability which cannot be attained. Instead, they speak of the "adequacy" of verification, which is in turn expressed in terms of levels of confidence (High, High Moderate, Moderate, Low and Very Low) in the "adequacy." See the testimony of Harold Brown in U.S. Congress. Senate. Committee on Foreign Relations. The SALT II Treaty. Hearings, 96th Congress, 1st session on EX. Y, 96-1. July 16-19, 1979. Washington, U.S. Govt. Print. Off., 1979. Part 2, pp. 240-41.

** Monitoring is the actual collection of data on arms control and other activities; verification is the process by which these data are assessed and decisions are made as to significance and necessary responses.

Reduction of ICBMs, SLBMs and Warheads

The major goal of the Reagan proposal is to reduce the number of MIRVed (Multiple Independently targetable Reentry Vehicle) long-range ballistic missiles on both sides down to equal levels, as these are seen as being the most destabilizing weapons in either strategic arsenal. The proposed reduction here is two-fold: a limit of 850 ICBMs and SLBMs, and a reduction of ballistic missile warheads from the current level of approximately 7,500 down to 5,000, with no more than 2,500 warheads on ICBMs. This entails three sets of verification issues: the reduction and continued limit on ICBMs and on SLBMs, and an agreed method for determining the number of warheads.

The problem of reducing ICBM and SLBM forces was already addressed in SALT II, which included a sub-limit of 1200 MIRVed ballistic missile launchers, of which no more than 820 could be ICBMs. For the Soviet Union this would have required a reduction from 1398 ICBM and 950 SLBM launchers in their inventory as of December 1979. There was also an aggregate limit of 2,250 strategic weapon launchers (ICBMs, SLBMs, and heavy bombers). However, it must be emphasized that these limits and reductions concerned the launchers, and not the missiles. It is not clear, at this moment, whether the Reagan proposal addresses only deployed missiles or deployed missiles and launchers. The Administration reportedly plans to build START to some extent on the basic framework of SALT.[3/]

3/ See, for example, the testimony of Secretary of State Alexander Haig before the Senate Foreign Relations Committee, concerning Nuclear Arms Reduction Proposals, May 11, 1982 (hearings not printed yet).

The difference is very important for its effect on monitoring and verification. If the reduction in the number of missiles was not accompanied by a dismantling of their launchers without inspection or some new means of verification, there would be a large potential for cheating by secretly deploying additional missiles in existing ICBM silos or SLBM tubes. Thus, for the sake of prudence one would have to assume that any reduction in missile forces would also require the dismantling of the excess ICBM launchers and SLBM tubes.

Procedures already exist for dismantling ICBM and SLBM launchers. Specific details remain classified, but in general the dismantling procedures require rendering the launchers wholly inoperable and incapable of being easily restored to working condition. For ICBMs this entails removing the cables and wires, severing all connections with available power sources, destroying the silo itself, and then filling in the blown silo with dirt. In the case of SLBMs the launch tubes must be rendered inoperable, either by destroying the submarine, cutting away the sections with the tubes and welding together the remaining sections of the hull, or removing a certain percentage of the tubes and welding plates over the areas removed. Such procedures would still be required if the number of launchers were to be reduced and not be readily restorable to operational readiness.

Reducing the number of MIRVs has to date been dependent, in part, on counting rules long urged by the United States and finally accepted by the Soviets in SALT II. The most important is "Once MIRVed, all MIRVed," which applies to certain Soviet missiles (SS-17, SS-18, SS-19) which are

which are dual capable, i.e., have been tested in both single RV (reentry vehicle) and MIRVed types. The United States argued that once a missile was in a silo the number of RVs could not be determined, and therefore it must be presumed to be carrying the maximum number of MIRVs with which it had been tested and observed by national technical means.

Verification of this reduction is in part dependent on an accurate and agreed data base, drawn largely from test observations of the dispensing of RVs from the "bus" on which they are carried. Such a data base existed as part of the SALT II agreement, as follows:[4/]

United States	Soviet Union
Minuteman III - 7 RVs	SS-17 - 4 RVs
Poseidon C-3 - 14 RVs	SS-18 - 10 RVs*
Trident C-4 - 7 RVs	SS-19 - 6 RVs
	SS-N-18 - 7 RVs

This data base is of significance; Secretary of State Alexander Haig has already stated that some of the data already compiled in past agreements will be used for START.[5/] However, in SALT II the United States stated that the Minuteman III ICBMs had been deployed with only 3 RVs despite their capacity for 7 RVs, and that this would not be increased. Under a reduced strategic arms regime it would be very difficult for either side

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4/ SALT II Treaty, First Agreed Statement to Article IV, Par. 10.

* The SS-18 has reportedly been testing in a manner to allow the dispensing of 14 RVs.

5/ See Haig's testimony before the Senate Foreign Relations Committee, cited in n. 3 above.

to accept such a statement, given the increased incentives for non-compliance (see below: Break-out: Incentives for Cheating).

In the absence of an agreed data base and strict counting rules dependent on the maximum number of MIRVs tested, monitoring the number of MIRVs would be extremely difficult, as there is no sure way, other than physical inspection, that the number of MIRVs on a missile can be determined once the missile is in its launcher. Inspection would require an intrusive on-site procedure, perhaps by one another or by a neutral third party or group, which would probably not be acceptable to the Soviet Union, and perhaps not to the United States either. Furthermore, unless such an inspection were comprehensive and repeated it would leave unresolved any doubts about additional MIRV deployments.

Production

While the actual number of missiles deployed may be limited, it is probable that the production of additional missiles will continue, either for test purposes, or as part of ongoing force modernizations and improvements, as was to be allowed in SALT II for both regular replacements and for improved missiles.[6/] Presumably some such allowances would be sought by the United States in START, especially as the M-X and Trident II D-5 missiles are not scheduled to be deployed until 1986 and 1989, respectively.

Continued production raises a number of compliance issues. First, there is the question already raised concerning the fate of excess launchers.

6/ See the SALT II Treaty, Article IV, Pars. 4 and 5, and Article X.

If these launchers were not dismantled there would be the danger of additional missiles being placed in them in violation of the agreement.

Second, there will be continued concern about the Soviet SS-17 and SS-18 missiles, which are cold-launched, i.e., the missiles are elevated above their silos and then fired, leaving the silos available for further use. The ability of the Soviets to rapidly reload these silos, especially under wartime conditions, is still a matter of debate among members of U.S. intelligence agencies. Nevertheless, there remains the danger that these silos could be reloaded in a fairly short time, again raising the issue of excess and undetected production of missiles, perhaps in facilities close to launch sites so as to avoid detection during transportation.[7/] While certain activities associated with the production of missiles (or any other manufacturing) can be detected, such as the transport of raw materials to the plant, the changing of work shifts, etc., the actual product cannot be ascertained without seeing it removed from the plant or without someone in the plant to see it. This once again raises the issue of some more intrusive form of inspection than has currently been accepted, and its reliability as an adequate means of verification.

Throw Weight

Although the Reagan proposal does not foresee going to some equivalence in throw weight until the second phase of START, this concept will raise

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7/ SALT II specifically prohibited the development, test or deployment of rapid reload ICBM launchers, and forbade the storage of excess ICBMS "above normal deployment...at launch sites of ICBM launchers." See SALT II Treaty, Article IV, Par. 5. The issues of prodcution and cold launch raise further questions about the proximity of storage facilities to launch sites, and the necessity of hardening them as perhaps one indication of their use.

monitoring issues immediately. Verification efforts are dependent on data bases, either agreed numbers of weapons, launchers or warheads, or on data obtained during observed tests of missiles as to their overall capabilities (launch weight, throw weight, range, number of MIRVs, etc.). Secretary of Defense Brown testified during the Senate's consideration of SALT II that a weapon system requires between 20 and 30 tests before it can be considered reliable, and that a sufficient number of these tests can be successfully monitored to provide a data base for verification.[8/]

Those systems already in the Soviet arsenal have obviously gone through this test sequence, and will only be tested now on a more sporadic basis to insure continued reliability. This significantly reduces U.S. monitoring opportunities, which are also made more difficult by the nature of the monitoring task required for throw weight. Unlike MIRV deployment, which is "observable" either directly or through radar and other surveillance techniques even when Soviet test flights do not leave Soviet territory, monitoring throw weight requires more complete monitoring from launch to reentry. This is largely dependent on signal intelligence, i.e., intercepting the signals, or telemetry, sent by the missile back to the test center on its performance, which are then used as the basis for complex calculations (called mensuration) from which throw weight estimates are made.[9/]

8/ U.S. Congress. Senate. Committee on Foreign Relations. The SALT II Treaty. Hearings, 96th Congress, 1st session, on EX. Y, 96-1. July 16-19, 1979. Washington, U.S. Govt. Print. Off., 1979. Part 2, pp. 242-43, 258.

9/ See U.S. Library of Congress. Congressional Research Service. SALT Verification [by] Mark M. Lowenthal. Report No. 78-142 F. Updated April 24, 1979. p. 17.

These data have already been the subject of extreme controversy because of Soviet encryption, or encoding of the telemetry so that it can be intercepted but not necessarily understood. The SALT II agreement contained a provision banning "deliberate concealment measures which impede verification," including "telemetry encryption, whenever such denial impedes verification."[10/] There have been frequent accusations that the Soviets have encrypted past tests in order to impede verification, although U.S. officials have denied that the encryption has had that effect. Continued Soviet encryption does raise the possibility that necessary data could be denied. Nor do the SALT II provisions against encryption, which both sides are presumably tacitly observing, mean that encryption will cease. Rather, encryption which one side feels is impeding verification is then brought up at a meeting of the Standing Consultative Commission, where the issue is then discussed and negotiated.*

In order for the limit on throw weight to be introduced in phase two of the Reagan proposal it would appear be necessary to begin monitoring tests well before then in order to establish a sufficient data base. This raises several questions. One is the sufficiency of the current data base. Closely related to that it the question of how large a data base can be expected for Soviet missiles already in their arsenal, which have presumably

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10/ SALT II Treaty, Article XV, Par. 3 and Second Common Understanding.

* The Standing Consultative Commission is the U.S.-Soviet forum for considering compliance questions. It is important to understand that the SCC does not function as a judicial proceeding, with the introduction of evidence and a subsequent verdict, but rather as a forum for raising and negotiating outstanding issues. Thus, raising an issue does not necessarily insure the desired outcome.

been through the normal number of test flights. If the current data base is insufficient, and if the Soviets do not have a large enough number of subsequent tests, then there could be problems in establishing a data base for throw weight limits. Further, if there are new Soviet tests and the telemetry is encrypted, this raises the question of its effect on verification. In order to have a data base ready in time for Phase 2 of the START proposal these questions will presumably have to be dealt with as part of the negotiations for Phase 1.

Break-out: The Incentive for Cheating

One of the major concerns in undetected cheating on arms control agreements is the issue of break-out, the ability of one side to secretly amass a significant number of additional weapons so as to upset the strategic balance. In the past some analysts have argued that the respective forces on both sides were so large that any cheating which could go undetected would be too small to upset the balance.

However, in the START arms control regime the size of the relative forces decreases, also decreasing the number of weapons necessary to alter the balance. While this does not argue against the concept of reduction, which is a generally agreed goal, it does raise an unfortunate side effect. Moreover, should one side decide that it is worth the risk of detection to violate the agreement, the absence of strong verification measures could add to that incentive. Two areas discussed above seem to be particularly susceptible to this temptation. The first is the question of excess launchers; if these are not fully dismantled, the covert introduction of additional missiles could pose a danger. Second, there is the problem of

counting MIRVs; unless a counting rule crediting each missile with the maximum number of MIRVs already tested is adopted there would be a quite easy opportunity for a power to cheat by increasing its MIRVs above the agreed limit.

As noted, break-out would be more attainable as reductions in strategic forces proceed, simply because the numbers involved become smaller. A "significant" advantage in nuclear weapons cannot be determined with any precision. The advantage is in part dependent on the size of the reduced forces, and in part may always remain a perceptual issue. The implied threat of enhanced motivation to cheat, however, underscores the importance of stringent verification in order to prevent such an imbalance.

START Verification and Force Structure

Just as verification has become a major determinant of the shaping of SALT I and SALT II, under START the influence of this requirement may deepen and could become a major factor shaping negotiated force structures.

The reason for this lies in the discrepancy between the tested MIRV capabilities of some missiles and the number of MIRVs actually deployed on them. At least four missiles would appear to be particular problems in this area: (1) U.S. Minuteman III has been tested with up to 7 RVs, although its deployment is reportedly with a maximum of 3 RVs; (2) U.S. Poseidon has been tested with 14 RVs, but reportedly carries an average of 9 or 10 RVs; (3) U.S. M-X has been designed to carry up to 12 RVs, although it has not been tested yet; its currently presumed deployment would be with 10 RVs; (3) the Soviet SS-18 has been tested with a dispensing capability of up to 14 RVs; it has three deployments, 1 RV, 8 RVs, and 10 RVs.

If it was assumed that strict counting rules were established under START, in which each missile was credited with having the maximum number of RVs with which it had been tested regardless of stated deployment, then both powers would have to drastically reduce their missile forces in order to accommodate only 5,000 warheads, of which only 2,500 could be on ICBMs. There would then also be an incentive to deploy the maximum number of warheads on each missile with which it had been tested, as each missile would be counted as having that many in any case.

The following table shows how a strict RV count, regardless of actual deployment, would severely limit the force structure of both nations:

Missile	Number of Missiles	Max. Number RVs Tested	RVs Deployed	Current RV Count		RV Count Under Maximum	
Minuteman III	550	7	3	1650		3850	
Poseidon	320	14	9-10	2880-3200		4480	
M-X	100	10-12*	10-12*	1000		1200*	
SS-18 (Various Mods)	58)		1	58)		812)	
	225)	14	8	1800)	2108	3150)	4312
	25)		10	250)		350)	

The verification problem posed by ICBMs is difficult, given the accuracy ICBMS offer compared to all other systems. However, individual missiles can be added or deleted as necessary, allowing relative fine tuning of force structure. But SLBMs pose a much more difficult problem, as these missiles are not deployed individually, but in groups on SSBNs

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* The M-X will presumably be tested with 10 MIRVs, although it will have the capacity for 12.

(nuclear powered ballistic missile submarines). Thus, one Ohio-class submarine carries 24 Trident I missiles, each with 8 RVs, for a total of 192 RVs. Therefore, a relatively small number of SLBMs could use up a significant portion of the 5,000 warhead total.

Such an effect on force structure would drastically reduce the number of launchers on both sides, perhaps below the 850 currently sought by the Administration. This, in turn, could introduce an increased element of strategic instability, as the perceived prospects for a successful first strike might appear to be enhanced as the number of targets decreases. Here again there could be a further incentive to cheat in order to attain that first strike capability. This analysis underscores how interconnected all of these verification issues are, and the difficulty in isolating them from from one another.

Summary and Conclusion

Changing the "units of account" for strategic arms agreements from launchers to missiles and warheads and ultimately with compliance on throw weight imposes new verification requirements:

Missile Reduction: the number of missiles can be reduced, but without new safeguards this reduction could be rendered meaningless without a concomitant dismantling of excess launchers to prevent cheating.

Warhead Reduction and Limit: a set of strict counting rules (once MIRVed, all MIRVed; and all missiles counted as carrying the maximum number of MIRVs with which they have been tested) would obviate some monitoring problems. Such rules, however, would also have a dramatic effect on START force structures, severely reducing the allowed number of launchers and therefore also

increasing first strike risks and temptations. An alternative to these rules would be more intrusive inspection, which raises separate issues of political acceptability, practicality and adequacy.

Production: excess launcher capacity could make new missiles a threat to stability. The issue of Soviet cold-launched missiles and the deployment of the cold-launched U.S. M-X also remain to be dealt with.

Throw Weight: the necessary data base for Phase 2 throw weight reductions must be dealt with in Phase 1. A major issue here is that of telemetry encryption and its effect on monitoring.

Verification was originally seen, in part, as a confidence-building measure in the arms control process, although it has not functioned in that manner.[11/] Indeed, verification has become a major point of contention with enacted agreements, with advantages going to those who accuse the Government of being lax on alleged Soviet violations. The consideration of SALT II by the Senate Foreign Relations Committee also showed how important verification has become as part of the process of congressional approval for any strategic arms agreement.

In summary, Reagan Administration spokesmen have attacked past verification standards, and have made adequate verification a keystone of their arms control policy,[12/] while now attempting to take the strategic arms control

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11/ Lowenthal, SALT Verification, pp. 64-65.

12/ See, for example, Secretary of State Haig's opening statement before the Senate Foreign Relations Committee on May 11, 1982 (hearing cited in n. 3 above), in which he said any new agreement must have "effective verification, with the necessary counting rules, collateral restraints, and cooperative measures."

process into new and more complex directions, in terms of both the agreements themselves and the required monitoring tasks and verification decisions.