

CONFERENCE OF THE EIGHTEEN-NATION COMMITTEE ON DISARMAMENT

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Preliminary Study of Problems Connected with the Verification of the Destruction of Certain Nuclear Delivery Vehicles

1. Any disarmament scheme pre-supposes that some weapons will be destroyed to reduce the stockpile of those held.
2. This paper examines the methods which are available for the actual destruction of certain nuclear delivery vehicles that it has been agreed shall be destroyed and the effort which would be required to verify that their destruction had taken place. Destruction might either be complete by blowing up or crushing to pieces, or partial in accordance with an agreed schedule which would specify what components were to be destroyed by burning, cutting, crushing, mutilating or melting down and what pieces could be disposed of as having civil uses.
3. It is envisaged that the process of destruction would be carried out by the country owning the weapons and that the inspectorate would merely need to satisfy itself that the weapons scheduled for destruction had in fact been destroyed. There is always the possibility that a country might try to evade the spirit of a disarmament treaty by destroying sub-standard weapons either produced specially to defeat the agreement, or constructed from the sub-standard components which arise in the normal course of production. If this possibility were rated seriously, it would be necessary for the inspectors to check that the weapons destroyed were up to operational standard. The paper considers methods of doing this.

Ballistic Missiles

4. A certain way of ensuring that operational ballistic missiles are destroyed is to fire them on a range and check that they perform as expected and fall within some prescribed area. This would ensure that accurate guidance systems were destroyed along with the carcass of the missile and its rocket motors; moreover to do this would not require the inspected power to divulge the precise details of its missiles. If thought desirable it might even be possible, at the very earliest stage of disarmament, to dispense with the presence of inspectors on the territory of the country owning the weapons, since the missile could be fired,

after prior notification of the time, from inside the owner's country; it could then be watched by the inspectorate's radar from outside the country, and it could fall into a sea area such as the Pacific, outside territorial waters, or on international ranges. The instrumentation facilities required are already available in the Pacific to both sides.

5. However, if any large number of missiles had to be destroyed in this way there is always the possibility that accidents might occur which might destroy the launching complex and so make the scheme unworkable. Moreover, if any country felt that the reliability of its missiles was low, they might resist this method of verification of destruction since they would have to fire sufficient missiles over and above those which they had agreed to destroy to ensure that the correct number was observed by the inspectorate as having been fired. This difficulty would not arise if the country destroying the missiles allowed inspectors to watch the launching of the missiles at the launching site; this kind of inspection can therefore be held to confer some advantage on the inspected country.

6. Alternatively, a "demolition factory" could be established where the missiles could be broken down or otherwise mutilated. It might be sufficient in some cases to destroy the missile carcasses (e.g. fuel tanks), since these are easy to destroy and might be more readily made available to the inspectorate than the more sophisticated parts of the missile.

7. If, on the other hand, it were thought necessary to check that the missiles destroyed were up to full operational standard, it would be necessary to establish a test centre at which all the highly specialised navigation and control equipment removed from the missile scheduled for destruction could be tested for accuracy and then destroyed or salvaged for civil use. Similarly, the fuel metering equipment and rocket motors could be tested before destruction.

8. The inspectorate at this factory would require technicians who could carry out the accuracy tests mentioned above. We estimate, for instance, that in the case of inertially navigated missiles about $1\frac{1}{2}$ to 2 man-weeks would be required to check the navigation equipment of each missile. Supervisors would also be needed to watch the destruction after the accuracy checks; about half a dozen should be able to supervise the destruction of any likely output of a test centre. Clerical staff to maintain the records of the destruction carried out,

together with security services to protect these records would also be needed. The combined figure is unlikely to amount to more than 100 men per factory.

Aircraft

9. Aircraft would be required to fly in to the destruction centre - this would at least check that the machine was airworthy and would make it more certain that operationally complete aeroplanes had been destroyed than if crates of components had been delivered by road to the destruction centre.

10. By analogy with the firing of a ballistic missile to check its accuracy and so ensure that it was a fully operational weapon, it might be possible to specify that each aircraft should carry out an exercise, characteristic of its role, after being flown to the destruction factory, and before destruction. If the exercise could be specified precisely it would go some way to ensuring that the aircraft destroyed had not been stripped of its main high quality components, which, if previously salvaged, would facilitate the production of other aircraft to replace those destroyed. For instance, the aircraft might make a sortie at normal operating height and speed to its full operational radius of action, drop practice bombs under specified conditions on a range and then return to the destruction airfield. The inspection effort to ensure that another aircraft was not substituted during the course of this exercise would be small, since the existing Air Traffic Control organisation could monitor the flight. The procedure would not require the owners to divulge secrets of the machine's construction provided that the actual destruction at the "factory" was carried out by the country owning the aircraft - and this might be regarded as an advantage. On the other hand, occasions would admittedly arise when it would be difficult to distinguish between unintentional human or mechanical errors and the deliberate use of inferior equipment.

11. If it was felt necessary to check that the components were up to standard, by means other than an operational test flight, a test centre, similar to that suggested for missiles, could be set up to examine the navigation and bombing systems for quality before destruction. The checks in this case would be much simpler than those for missiles, unless an inertial navigation system was fitted, in which case, tests similar to those suggested for ballistic missiles would be required. An inspection similar to the daily inspection performed on the Radar of a strategic bomber (a few man hours) should suffice provided that the aircraft

flew in to the destruction factory to give an assurance that its engines and controls worked. Such checks would, of course, inevitably reveal details of the aircraft's construction.

12. The manpower needed for the process of destruction would be supplied by the country owning the aircraft. It would not be large: it has been estimated that about 50 men - engineers and workmen who could use blow lamps, large shears, crushing machines, etc. - could destroy beyond repair about 500 operational aircraft and their vital components in about one year, provided that all these aircraft were flown to a destruction centre.

13. The international inspectorate needed to supervise the same rate of destruction would amount to perhaps 10 key engineers and some 20-30 supervisors who would watch the destruction and ensure that only authorised components left the centre in an undamaged condition. Numbers would probably increase roughly proportionally with throughput. As for ballistic missiles the international staff would need clerical support and guards to protect records.