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WDTQ

26 December 1957

MEMORANDUM TO COLONEL TERHUNE

SUBJECT: R/W Final Report on Advanced Guidance Systems Study, Phase I

1. This office has read with interest the subject report and find it to be a fairly comprehensive technical treatise on the possibilities of improving guidance system accuracy. However, we feel that the contents of the report are somewhat out of context with military requirements, for example: it dwells at great length on achieving super-accuracies with ballistic missiles, pointing out that these accuracies would permit destruction of hard point targets such as missile launching sites, airfields and dams; (hardened command posts would also be a target). Under our national policy of not attacking unless attacked, it appears that the major mission for our ballistic missiles will be as a deterrent force aimed at the enemy cities. The enemy probably will have launched his missiles and strategic air force prior to the arrival of our missiles on target. We should assume that his salvo force capability will increase with time. Further, a counter-force mission pre-supposes that we know the location of the enemy launch sites. This is not believed to be a valid assumption due to the difficulty of obtaining this intelligence and keeping it sufficiently current.

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2. We, together, with WDO, have carefully studied the role the "Q" Weapon System should play, and have arrived at the firm conclusion that it should be primarily that of a deterrent force with the enemy cities as our targets. A super-accurate CEP for this mission is not a requirement. We feel that the accuracy potential of the ARMA guidance system will be adequate for this purpose. The R/W report goes to great length to describe the virtues of a combination inertial-radio system employing doppler techniques. Our aim has been to free ourselves of the restraints imposed by ground guidance stations with the objective of ultimately employing all inertial systems in all of our ballistic missiles.

3. Wooden-ness of the "Q" Weapon System is the keystone of the operational concept. To achieve this it is fundamental that all elements of the missile including the guidance system, be simple, reliable, highly producible so that they lend themselves to mass production, and be low in cost. The subject report, although discussing simplifying present guidance systems, does not reflect the wooden concept.

4. The operational concept of the "Q" Weapon System treats the missile as a black box. In order to transport the missile by road and air, we must keep within an acceptable weight and size. A careful assessment of transport limitations and costs, warhead yields versus city damage capabilities, and warhead weights versus gross missile weight revealed that the missile should have a 1/2 MT warhead and have a gross weight of approximately 65,000 pounds. A CEP of 1 to 2 nautical miles is adequate for a city-force mission. The gross weight of the missile increases exponentially with increase in warhead weight. A solid propellant ICBM having a warhead sized for counter-force missions would

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be of such size and weight as to virtually negate the operational concept of the "Q" Weapon System. By keeping the missile small and the weapon system cost low, we can more readily afford to size the force so that a sufficiently large portion of the force will survive, irrespective of actions taken by the enemy.

5. If we wish to develop a counter-force capability, it would appear logical to concentrate on TITAN for this role. With the potential of carrying a warhead of much greater yield than at present, with a nose cone of higher weight-to-drag ratio, and with an improved guidance accuracy, the TITAN would have the capability of destroying hard point targets.

6. We do not wish to discourage attainment of greater accuracies. Greater guidance accuracy, if pursued as a long range objective, will naturally follow with improvement in the state of the art. However, this requires additional time which we can ill afford in the face of the enemy threat. A force which provides numerical superiority over the enemy will provide a much stronger deterrent to war than a numerically inferior force of greater accuracy. If too much time is expended in development the enemy may achieve a numerical superiority such that any hope of regaining superiority may be lost. We can achieve numerical superiority sooner by accepting an accuracy satisfactory for a city force (deterrent) mission, by compressing the development cycle to the utmost, and by committing the "Q" Weapon System to production as soon as possible. As significant improvements in missile performance are achieved, the improved missiles can be phased into the force to the degree required.

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