

HIDERS AND FINDERS:
AN APPROACH TO INSPECTION AND EVASION TECHNOLOGY

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FOREWORD

This paper is essentially the same as a memorandum prepared for the U.S. Disarmament Administration on April 26, 1961. It will appear in a book of readings on arms control to be published in late 1961.

I have been talking about the idea developed in this paper for several years, and it has been referred to by Kahn and others in their own publications.

The reader should realize that this paper is an argument for a method, for experiments, for learning by doing, and is not intended to be either a catalogue of possible experiments, nor a detailed design of even one such exercise.

Many disarmament and arms control proposals have been made; many more will be made. Some form of inspection has been part of those past proposals; some form of inspection will likely be advanced as an integral and essential part of any new proposal.

Of all the kinds of inspection technology which have ever been proposed or even discussed -- inspection by aerial reconnaissance, ground inspection, factory or production inspection, "psychological" inspection, seismic inspection, budgetary inspection -- the one technique we have had the most experience with and that we know far and away the most about is aerial reconnaissance.

On the other hand, the resemblance between wartime reconnaissance and the special kind of peacetime reconnaissance embodied in an inspection agreement is, in many respects, superficial. It is certainly true that all of our experience with wartime reconnaissance -- problems of camouflage, problems of daily surveillance of front-line areas, problems of photo interpretation, and the expeditious handling of large quantities of data -- have some carryover value for the novel tasks of peacetime surveillance of huge areas, the monitoring of activities, and many of the numerous other activities (many of which are not yet understood) which are to be subsumed under any inspection agreement, but not enough.

The wartime experience of the early 1940's is as far distant from today's problems as the discussions of World War I reconnaissance were in those same early 1940's!

Given my premise -- that any general arms control agreement will involve inspection, that the most prominent and well understood inspection technique is aerial reconnaissance, and that even for this technique we can not answer questions about proposed applications with confidence -- then it is clear that we have a great deal of homework to do. What is true about aerial reconnaissance is even more true with the other techniques about which we know much less.

Conversations about the hiding-finding problem with groups of people at The RAND Corporation, in the U.S. Air Force, and elsewhere, have turned up an overwhelming preference for hiding over finding. There seems to be an a priori assessment that hiding is easier than finding. (I have called this proposal Hiders and Finders. Many people with whom I have spoken about this idea seem to prefer Hiders and Seekers. I dissent from this on the grounds that the correct and analogous term to "hiding" is "finding". "Seeking" implies the process of looking without connoting success!)

I have talked to many groups of people about the general problem of hiding things from the inspector, and the corresponding problem of the inspector finding the hidden things. A convenient way of integrating and synthesizing opinion about the relative difficulty of these two tasks has been furnished by use of the following device. I invariably ask whether one would rather be a hider or a finder. Although some amateur psychiatrists might ascribe the answer to squirrel and packrat impulses deep within the hearts of most people, I cannot believe that the overwhelming preference for hiding stems from such pseudopsychiatric considerations. It usually appears quite obvious to those who have given these matters thought that the hiding of missiles, or bombs, or warheads, to take a class of interesting

examples, permits one more options than of the finding of them, and people seem to want to play a winning game.

FIELD OPERATION PROPOSED

I propose that studies be undertaken in hiding and finding technology which could and should yield an activity by sizeable military forces. I use activity here in contradistinction to study, library research, or game. Study and library research use paper and produce more paper. The word "game" has gradually come to mean an exercise played in a basement on an electronic computer. "Activity" here means that sizeable groups engage in actual, not simulated, operations, with real equipment -- shovels and cameras, as well as missiles and aircraft. I propose to start with aerial reconnaissance, hoping that the study and experimental techniques will yield insight and subsequently permit or stimulate adaptation of these notions to other forms and their inclusion in inspection technology. The kind of activity proposed may be illustrated by an example.

Setting aside say, a representative quarter of million square miles of the U.S. for large scale inspection maneuvers, we would deploy two teams, A and B, whose aims would be opposite. Team A would have the job, for example, of building a missile site secretly, over a specified time period. Team B, insulated from Team A, and limited to certain techniques and level of effort, would have the job of finding and monitoring the activities of Team A. Mobile missile systems furnish another useful example of important inspectable systems about which we know little, and could profitably be used in this type of exercise. The utility of camouflage could be explored through this technique. This is only an example and not even a complete description of this test.

The proposed study would include the design of the problems to be given Team A, and the allocation of effort allowable to Team B. I have deliberately emphasized the most dramatic aspect of inspection -- finding. Other aspects of inspection can be tested and developed within the proposed framework -- checking given data, monitoring, reporting, discovering evasion, and establishing good communication networks. All of these activities require cycling time studies and considerable understanding of the phenomena under observation.

The notion of cycling time, as used above, means that the time between successive observations depends on the phenomenon being observed. If one were watching the progress of a glacier, infrequent observations, at intervals of several years, might well suffice. A period as long as this might be inapplicable to the problem of monitoring, or even detecting, the construction and hiding of a missile site. The phenomenon could come and go between observations. Hence the requirement to match the observation cycle to the cycle of the phenomenon under observation. One doesn't need slow motion photography to study the growth of a plant; in fact quite the opposite is needed -- time lapse, or speeded-up photography is used. The flight of a bullet, or the explosion of a bomb, requires that action be slowed down. In both cases, the interval between successive observations matches and is tuned to the pace of the phenomenon.

It is impossible to predict results, but even at this stage, seven good reasons for conducting such operations emerge:

1. We should find out what we can do and can not do, so as to not oversell proposed inspection systems.
2. We should find out what we can not do and be prepared not to do it.

3. We could use this kind of activity to test control systems proposed by others.
4. We could use such operating teams of hidiers and finders to probe agreed on and operating systems during actual operation -- to discover whether switches are on, inspectors are awake, etc. This activity could help develop further technical capabilities.
5. We could use results obtained under these tests to perfect inspection systems, to tighten controls, and to reset tolerances and thresholds of either proposals or systems. We might find out that we could, reliably, detect or monitor activities of a certain kind, which a current proposal, or an ongoing system, either did not envision or was incapable of doing. Thus new standards calling for inspection of new activities might be incorporated into treaties and systems, or into proposals. This could lead to the gradual erosion of the uncontrollable, undetectable, and to the successive broadening of control machinery. Confidence in the control and inspection functions would likely increase, as the fraction of uncontrollable, uninspectable activities decreases.
6. This activity is an ideal vehicle in which to pursue research and development in inspection technology of all kinds.
7. We need to know all this for unilateral activities -- both hiding and finding. This last point is important. It should not be thought that the Soviets need always take on the role of hidiers and the U.S. always take on the role of finders. We may well discover an interest in and requirement for, hiding things of ours. This operation could serve to test our ability to hide in the presence of

various kinds of "finding" efforts. Although I want to start with aerial reconnaissance, there is no reason that this scheme need be limited to aerial reconnaissance. In the event of failure of arms -- control or disarmament negotiations, there are things we must be prepared to do unilaterally, just as now for example, in the absence of arms control there are unilateral information requirements and activities.

It may be argued that learning how to cheat, evade, hide, frustrate inspectors, is an unwholesome activity. This is nonsense.

The U.S. scientists who worked hard and imaginatively to discover ways of concealing underground nuclear explosions did an important job. What is overwhelmingly wrong is that there has not been a sufficient (and successful) research and development effort on the other side of the problem -- detection.

We Want Smart-Proof Systems

We do not need a system which works well against a careless, uninformed unimaginative opponent, but one which works well against an opponent who is smart, careful and imaginative.

The large scale utilization of hidiers and finders which I have suggested has another value completely independent of any inspection agreement. This stems from the fact that the differences between inspection, and airborne reconnaissance, lie not so much in techniques, purposes, methods, and results so much as they lie in the simple definition that reconnaissance is usually a unilateral activity, and that inspection, as we usually think of it, is something that proceeds as the result of an agreement. If this is true, then all of the exercises that I am proposing

here would have a direct value and immediate application for whatever kind of unilateral efforts are required in the event of failure to reach agreement.

What would it take to start this activity? The "hidiers" could well be an appropriate U.S. Army group, including as a sizeable portion, the Army engineers. The "finders" could be drawn from a reconnaissance wing of the Tactical Air Command.

Problems of security of one team vis-a-vis the other are relatively easy, because there already exists a good measure of security between the several services. Each military service tends to guard its special secrets from the other services, and there should be no problem in making motivations and competition real.

Clearly such an effort requires extensive planning, including the design of observer, security, and evaluation teams.

The utilization and exploitation of the results obtained in early tests, to design further tests, (or proposals for international agreements) is an example of what an engineer would call "feedback"; the notion that we really don't know now all that we will learn is another reason for making the design of future tests dependent on results obtained from earlier tests.

Although studies on paper are necessary to get this activity started, I would anticipate that the major insights will be gained not from two dimensional paper studies, but from three dimensional activity -- doing, not talking.

We need three-dimensional activity, followed or accompanied by study and then more activity.

This would be a new approach to the problem for us, because we are not now doing this and we ought to. It would certainly demonstrate, to us and to the rest of the world, that we take these problems seriously. We should learn to better employ those techniques and technologies with which we have some experience, as well as learn the rudiments of novel inspection techniques. Novel problems may be attacked by adaptation of old techniques, or may require new techniques. We must find out.

What if we start to do Hiders and Finders on a U.S. only basis? Let me suppose further that we find it good. It is extensible to a joint NATO activity, and eventually to a joint S.U. NATO - Warsaw Pact tests and exercises. But it is premature to propose this idea at the highest level of political - technical complication before we have tried it and understood it, at the other end, the lowest level of political-technical complication, -- an internal U.S. operation.

We must show the Soviet Union why they should be just as interested in inspection and evasion as we are. Understanding this as a proposition of mutual interest is a necessary precondition to success at possibly more formal and higher level negotiations.

