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DEFENSE SCIENCE BOARD

SUMMER STUDY

ON

Approaches to the Countering of
Warsaw Pact Command, Control,
and Communications Systems

(Counter-C³) (U)

Volume I-Summary Report



DECEMBER 1977

OFFICE OF UNDERSECRETARY OF DEFENSE RESEARCH AND ENGINEERING
WASHINGTON, D.C. 20301

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DEFENSE SCIENCE BOARD
SUMMER STUDY
ON
Approaches to the Countering of
Warsaw Pact Command, Control,
and Communications Systems
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Volume I-Summary Report

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[REDACTED]

[REDACTED]

[REDACTED]

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OFFICE OF THE UNDER SECRETARY OF DEFENSE
WASHINGTON, D.C. 20301

RESEARCH AND
ENGINEERING

The Honorable Harold Brown
Secretary of Defense
The Pentagon
Washington, D.C. 20301

Dear Harold:

(U) I am sending you the final report of the DSB Task Force on Counter-C³. This is a study of the usefulness of and methods for interfering with the Command Structure of Pact Forces.

[REDACTED]

[REDACTED]

6) I believe that you are familiar enough with the subject to take some actions to support it. Let me list the actions that, if you are in agreement, could be taken by your office right now:

1) [REDACTED]

2) [REDACTED]

~~SECRET~~

~~SECRET~~

3) [REDACTED]

4) [REDACTED]

5) [REDACTED]

(U) I believe that the above actions, and others described in the report, will contribute a great deal to restoring the balance in the European theater.

Thank you for your attention.

Sincerely,



Eugene G. Fubini
Chairman
Defense Science Board

~~SECRET~~

SECRET



**OFFICE OF THE UNDER SECRETARY OF DEFENSE
WASHINGTON, D.C. 20301**

**RESEARCH AND
ENGINEERING**

MEMORANDUM FOR CHAIRMAN, DEFENSE SCIENCE BOARD

**SUBJECT: Final Report of the DSB Task Force on Approaches to the
Countering of Warsaw Pact Command, Control, and
Communications Systems (Counter-C³) (U)**

[REDACTED] The report documents the findings and recommendations of the Counter-C³ Task Force in four volumes. Volume I is a summary of the results at the Secret level. Volume II and Volume III are back-up reports for those who require more detail and are at the Secret and Special Access levels, respectively. [REDACTED]

(U) The effort reported was conducted during the spring and summer of 1977 and was a part of the DSB 1977 Summer Study. The results were partially reported at the Summer Study and at subsequent briefings to USDRE, the Services and NATO.

(U) The Counter-C³ subject is complicated, and the report, although extensive, is far from being comprehensive. It is difficult to condense further the findings, and hence I will not attempt it here. Instead, I would like to highlight a few points which are, from my perspective, of special importance.

[REDACTED] I am convinced by the DSB Summer Studies of 1976 and 1977 that good C³ is vital to success in modern warfare. The speed, range, and lethality of modern weapons are such as to require and permit rapid and precise command and control to both capitalize on opportunities to cause serious attrition of the enemy and to avoid or withdraw from conditions unfavorable to our forces. Good sensors, communications, and other aids to the decision and control processes are essential requirements for success. [REDACTED]

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[REDACTED]

(S) Several important Counter-C³ actions were conceived in the study, and they are described in the report. The opportunities are not limited to electronic warfare (EW) but include all four components of Counter-C³; namely, destruction, disruption, deception, and exploitation.

[REDACTED]

(U) The ideas for Counter-C³ produced by this study are only a start. Larger, full-time efforts by the Services – such as the ongoing Air Force Counter Mission Analysis – will produce more and better defined ideas.

[REDACTED]

(U) *Even so, in my view, we are not yet taking full advantage of the remarkably great opportunities available to develop battle management and weapon control systems that will provide a new threshold in our overall tactical capabilities.

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

Concerning the question of how to organize for the development and deployment of a C-C³ capability, the Task Force recommends that the Army and Air Force be tasked to prepare a joint plan which recognizes the joint nature of the problem and the need for a staff which is closely coupled to the intelligence program and has competence in analysis, R&D, and operational tactics and exercises.

[REDACTED]

A number of approaches for vulnerability reductions are discussed in the report. I believe this area

[REDACTED] the study concludes that [REDACTED]

I believe that these conclusions are correct, and I urge the DoD to take the indicated actions. If they do, I am confident that a significant military capability will result from comparatively modest expenditures.

Charles A. Fowler

Charles A. Fowler
Chairman
DSB Task Force on Approaches to the
Countering of Warsaw Pact Command,
Control, and Communications Systems
(Counter-C3)

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SUMMARY REPORT

A. INTRODUCTION

The 1976 Defense Science Board (DSB) Summer Study on "Conventional Counterforce Against a Pact Attack" concluded that effective C³ is essential for both NATO and Pact forces.

The DSB recommended that certain actions to strengthen our C³ should be taken and that counteractions to destroy or disrupt enemy C³ should also be considered. As a result of these recommendations, among other things, DDR&E under the direction of Dr. Malcolm R. Currie established a DDR&E point of contact for Counter-C³ (C-C³) and requested that the DSB form a task force to explore the area. The DSB was asked to provide a basis for a development and acquisition program in Counter-C³ commensurate with the military worth of the area in land, air, and sea warfare. The Terms of Reference for the task force are found in Appendix A.

(U) The DSB responded by establishing the requested task force under the chairmanship of Mr. Charles A. Fowler. The effort was conducted under the cognizance of Mr. Everett D. Greinke, Assistant Director (Combat Support) (ODDR&E), with Mr. John M. Porter, OAD(CS), serving as Executive Secretary.

* (U) Team Leader and author of corresponding backup section(s) of this report. The material in this Summary Report is based on the backup material but the emphasis given is intended to reflect the consensus of the entire Task Force as interpreted by the Task Force Chairman.

[REDACTED]

*sent out part together
submitted by
9-10-68 to [REDACTED] for evaluation*

(U) In addition to the above assignments, the effort was significantly influenced by the dynamic leadership of Dr. Eugene G. Fubini, who gave time and technical inspiration to the study. The Chairman was also assisted by Mr. Edwin L. Key, who contributed several important technical ideas, helped organize the study, and participated in the generation of the final report. The study received outstanding support from NSA on all phases of the endeavor and especially benefitted from the extraordinary effort of Edward A. McDonald, who provided valuable material prior to the study in San Diego. Others also significantly provided support to the study, and a complete listing of the participants and their organizational affiliations is given in Appendix B.

The Summer Study focused on consideration of [REDACTED]

It was not possible to examine the technical details in many areas. This level of effort remains for follow-on by R&D agencies. Although the study focused on the European Theater, considerations of the NATO implications of Counter-C³ need further effort.

[REDACTED]

This report is organized into four volumes. Volume I is an overall summary of the findings, recommendations, and general considerations that permeate all aspects of Counter-C³. Volume II contains detailed backup reports on [REDACTED]

[REDACTED]

*(U) Team Leader and author of corresponding section(s) of this report.

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B. SOVIET/U.S. COUNTER-C³ COMPARISON

Argument for Counter-C³

(U) Command, control, and communication (C³) is an area that is receiving ever increasing emphasis by the military, the DoD, and the R&D community. Yet, there is nothing new in C³; it has always been a part of war and has always been important. Why then the increased interest? What has changed? Although the general character of war has remained the same, the weapons employed have undergone very significant changes in terms of their mobility, their lethality, and their range. The capabilities of surveillance and targeting systems have also been improved significantly. These improvements make possible and require a rapid control of force maneuver. Force maneuver control is very likely the most important function of C³, and the time constants required for this control have been diminishing rapidly. It is usually conceded that the primary function of control is to manipulate subordinate force elements so as to achieve favorable contact with the enemy and to avoid or terminate such contact when circumstances are adverse. In general, contact is favorable when either local superiority or advantageous weapon asymmetry (weapon mix is effective against the enemy, but the opposite is not true) is achieved.* These considerations are classical. The time scale is what has profoundly changed. Today, a brief lapse of time with less than adequate C³ can equate to a very large attrition or to a lost opportunity of great military value. This we argue is the reason for the increased emphasis on C³.

(U) It is hard to say by what factor the pace of modern war has increased, but it is clear that the increase has been dramatic and the impact profound. One manifestation of the change has been the transition to the so-called "electronic battlefield" where the classical functions of command, control, and communications have become almost completely dependent on electronic devices. A wide variety of sophisticated sensors are needed to observe the state of the battle, computers are required to rapidly process information to assist in the decision process, and rapid communications must be used to convey almost instantaneously the commands to control forces. With this extreme dependence on electronics, it is not surprising to find the emergence of weapons to disrupt or exploit its use. The entire field of electronic warfare (EW) has grown in its importance and must be regarded as a vital part of any modern weapon inventory.

(U) Thus the argument for Counter-C³ is clear. Modern warfare depends on timely information, rapid decisions, and swift communications for its success. These functions then become important points of vulnerability and are targets of high value for destruction, disruption, deception, and exploitation.

* (U) An extreme example of the principle is found in the disastrous condition of encirclement; here the surrounded force can no longer control relative numbers of weapons or weapon mix and is unable to withdraw, reinforce, or resupply.

Soviet C³

[REDACTED]

[REDACTED]

[REDACTED]

(U) It should be clear from this description that C³ is regarded by the Soviets to be a very important function worthy of large expenditures to provide and to protect the capability; and in the process, they have provided their enemies with a challenging but lucrative target for Counter-C³ actions.

Soviet Counter-C³

[REDACTED]

[REDACTED]

[REDACTED]

More will be said about this in Section D of this volume.

U.S. Counter-C³

[REDACTED]

Several answers are suggested.

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C. ELEMENTS OF COUNTER-C³

(U) Four major Counter-C³ actions were considered throughout the study. These are destruction, disruption, deception, and exploitation.* Each action has a range of usefulness and a set of problems. To many, destruction is the best Counter-C³ action because it is decisive and final. However, it can be very difficult to locate, identify, target, and destroy a C³ facility since such facilities are usually hidden, can be hardened, are well defended, and are moved frequently. Disruption or jamming can be a very valuable weapon in circumstances where denial of communications is sufficient to achieve a momentary objective, but jamming also has its limitations. First, it has an impact only during the interval of application (destruction is more permanent); and second, one can never be entirely sure of its impact. It is possible that the disrupted communications are merely replaced by alternative channels or other means, and it is well known that jamming does not always have the anticipated result because it is not applied correctly or well. Deception is the technique of injecting false information into the enemy's sensor or communication system. To an unwary enemy, it can have a profound impact but suffers from the fact that a cautious adversary is not easily deceived. There are too many techniques available to authenticate information if it is important. Exploitation is a natural consequence of the necessity of modern forces to use electromagnetic radiation for a large variety of purposes, such as communications, navigation, identification, and sensing. There are essentially two forms of exploitation: 1) The information being radiated for the enemy's own use is extracted and used against him. 2) The mere fact of enemy radiation can be used to locate his position by direction or time of arrival measurements. The counter to the first hazard is usually encryption which can be either very effective or a disaster depending on how well it is handled. The counter to the second hazard is more difficult because it requires radio silence or its logical equivalent—covert radiation.

(U) These then are the "Four Horsemen," and each has its place in Counter-C³, but a successful application depends on the coordination of these actions with other military actions. Destruction of an enemy CP in the heat of battle has one effect, and destruction of that CP when not much is happening has another. A CP can be replaced with new equipment and qualified personnel but at a loss of time. The consequences of lost time are widely different depending on the circumstances. In the middle of an important engagement, it can be very costly because the control of forces is critical at this time. However, if no important action is underway, the loss of a CP might not have much impact on the war. The same is true of other Counter-C³ actions, and this observation is fundamental to successful Counter-C³. For this reason, Counter-C³ assets should be integrated into the entire weapon mix and coordinated with the combined arms forces, selecting for each action the appropriate weapon mix including the best Counter-C³ techniques.

* (U) During the Summer Study, several of the task force members called these actions the "Four Horsemen."

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(U) Since Counter-C³ should be considered as one element in the combined arms force, it should be evaluated in that context. The military worth of Counter-C³ must be measured in terms of its impact when combined in a coordinated action with other weapons. This should be achieved by first developing meaningful models of the military actions and their results with and without Counter-C³. The net effect of Counter-C³ can then be measured in live tests and analyzed with computer simulations, and the results compared with the model. In such a manner, we could in time establish a useful model of Counter-C³ military impact and assess its worth in varying circumstances. More will be said on the subject of Counter-C³ evaluation in Section D of this volume.

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D. ANALYSES

(U) During the course of the study, several topics were analyzed by the task force. The topics fall into essentially three categories: (1) opportunities to counter Soviet C³, (2) operational problems resulting from Counter-C³ activity, and (3) organization problems created by Counter-C³. This section of the report will briefly summarize the findings in these categories in the order mentioned.

High Level Counter-C³

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

~~SECRET~~

[REDACTED]

[REDACTED]

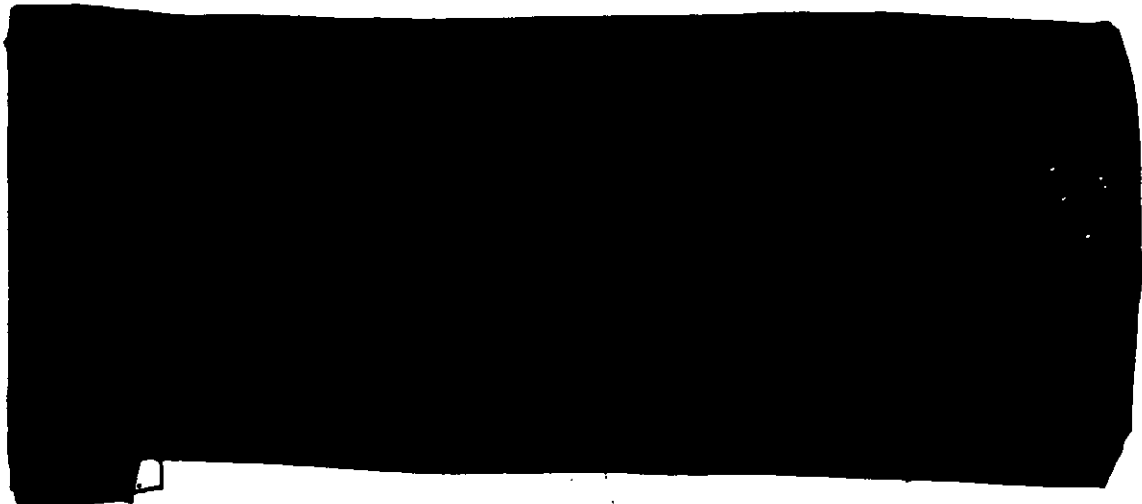
[REDACTED]

Cover and Deception

[REDACTED]

[REDACTED]

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(U) C&D sometimes suffers with respect to clear and understood definitions. Commonly used terms in connection with discussions of C&D are stated below. Other terms that appear occasionally are diversion, misimprinting, and disinformation:

- a. Camouflage — use of concealment or disguise to minimize detection or identification.
- b. Manipulative Deception — methods generally used through communications procedures; basically falsification of evidence by entering the nets of the enemy although providing the enemy false war plans conceivably falls in this category.
- c. Imitative Deception — use of similar equipments to cause the enemy to react in a manner prejudiced to his own interest.
- d. Cover — actions taken to mask the true intent of courses of action to be taken.



- [Redacted]
- [Redacted]
- [Redacted]



- [REDACTED]
- [REDACTED]
- [REDACTED]
- [REDACTED]
- [REDACTED]

[REDACTED]

Personnel

- a. [REDACTED]
- b. [REDACTED]
- c. [REDACTED]
- d. [REDACTED]

Background

- a. [REDACTED]
- b. [REDACTED]

In the information-oriented warfare of the future, [REDACTED]
[REDACTED] in this regard, there is a need to better understand enemy weakness,
i.e., where he is most vulnerable. [REDACTED]

[REDACTED]

[REDACTED]

It was concluded that an active peacetime effort in terms of organization and planning is required simply to ensure that this Counter-C³ option will be available at the outbreak of hostilities.

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

Tactical Counter-C³

[REDACTED]

[REDACTED]

[REDACTED]

Armor/Mechanized Infantry

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

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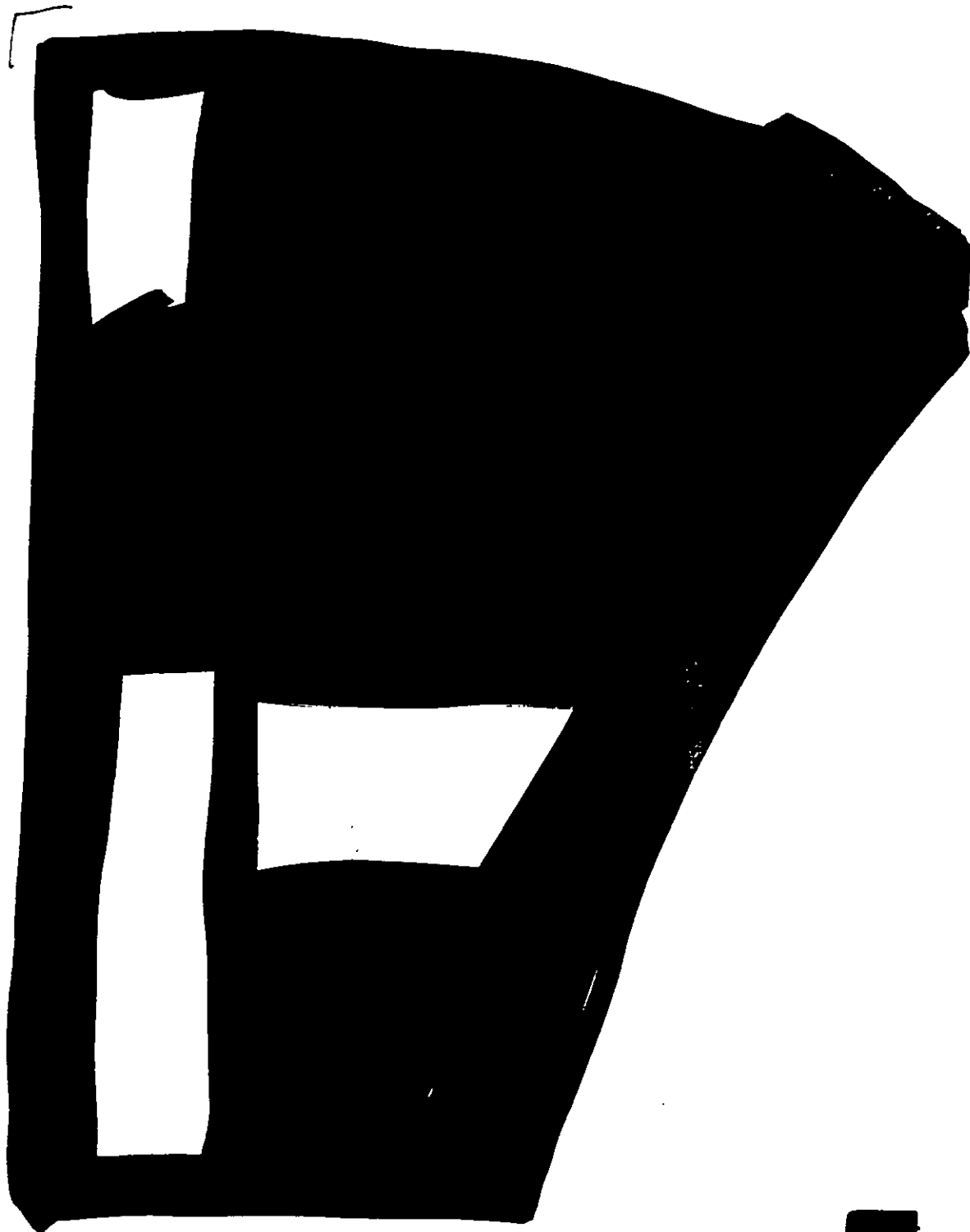


FIGURE 1. MOTORIZED RIFLE DIVISION TYPICAL DEPLOYMENT OF
MANEUVER UNITS BREAKTHROUGH ● H-HOUR (U)

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[REDACTED]

[REDACTED]

(C) [REDACTED]

(S) [REDACTED]

(S) [REDACTED]

(S) [REDACTED]

SECRET

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

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[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

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[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

Air Defense

(U) The task force focused its attention on Soviet air defenses that operate below the Front level of command. Of particular interest was the interlinkage of the various air defense elements via voice and data communications channels. Some attention was paid to Frontal level air defense since it is at this level that interceptor aircraft are

[REDACTED]

attached and the means provided for their operation within Soviet SAM and air defense artillery effectiveness envelopes.

The task force sought to develop an understanding of the roles of each of the air defense system elements and the interrelationships among the elements. This was done

[REDACTED]

The Forward Area air defenses are composed of a layering of longer range systems over shorter range, more forward deployed systems. Thus,

[REDACTED]

In a prestrike posture, this deployment provides

[REDACTED]

As the FEBA becomes fluid

[REDACTED]

Such a condition of the defense

[REDACTED]

(S) [REDACTED]

(S) [REDACTED]

- [REDACTED]
- [REDACTED]
- [REDACTED]
- [REDACTED]
- [REDACTED]

[REDACTED] This set of properties presents a number of opportunities that can be exploited to counter the C³ elements. [REDACTED]

[REDACTED]

- [REDACTED]

- [REDACTED]

- [REDACTED]

- [REDACTED]

The coordination and alerting functions of C3

[REDACTED]

3) The Central Front combat scenarios showed

[REDACTED]

[REDACTED]

(1) [REDACTED]

(1) [REDACTED]

(5) [REDACTED]

(5) [REDACTED]

(1) [REDACTED]

Air Offense

(4) [REDACTED]

(7) As might be expected, the [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

In order to understand the functions of the C³ system

[REDACTED]

[REDACTED]

As noted earlier, it appears

It therefore appears

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

(b) There are a number of programs [REDACTED]

(b) Although there are a number of radar jammers [REDACTED]

(b) In the communication jamming area, [REDACTED]

Artillery

(b) [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

- [REDACTED]
- [REDACTED]
- [REDACTED]

(U) ECM requires less accurate target locations than do weapons, and though they cannot destroy, they can achieve broader suppressive effects per attack (one effective jamming operation can suppress or disrupt the fire control for one or more batteries). Figure 2 shows the Soviet field artillery radio communications below regimental level. All links shown are VHF/FM. Above regiment more redundant communications are used.

(C) [REDACTED]

(C) [REDACTED]

CONFIDENTIAL

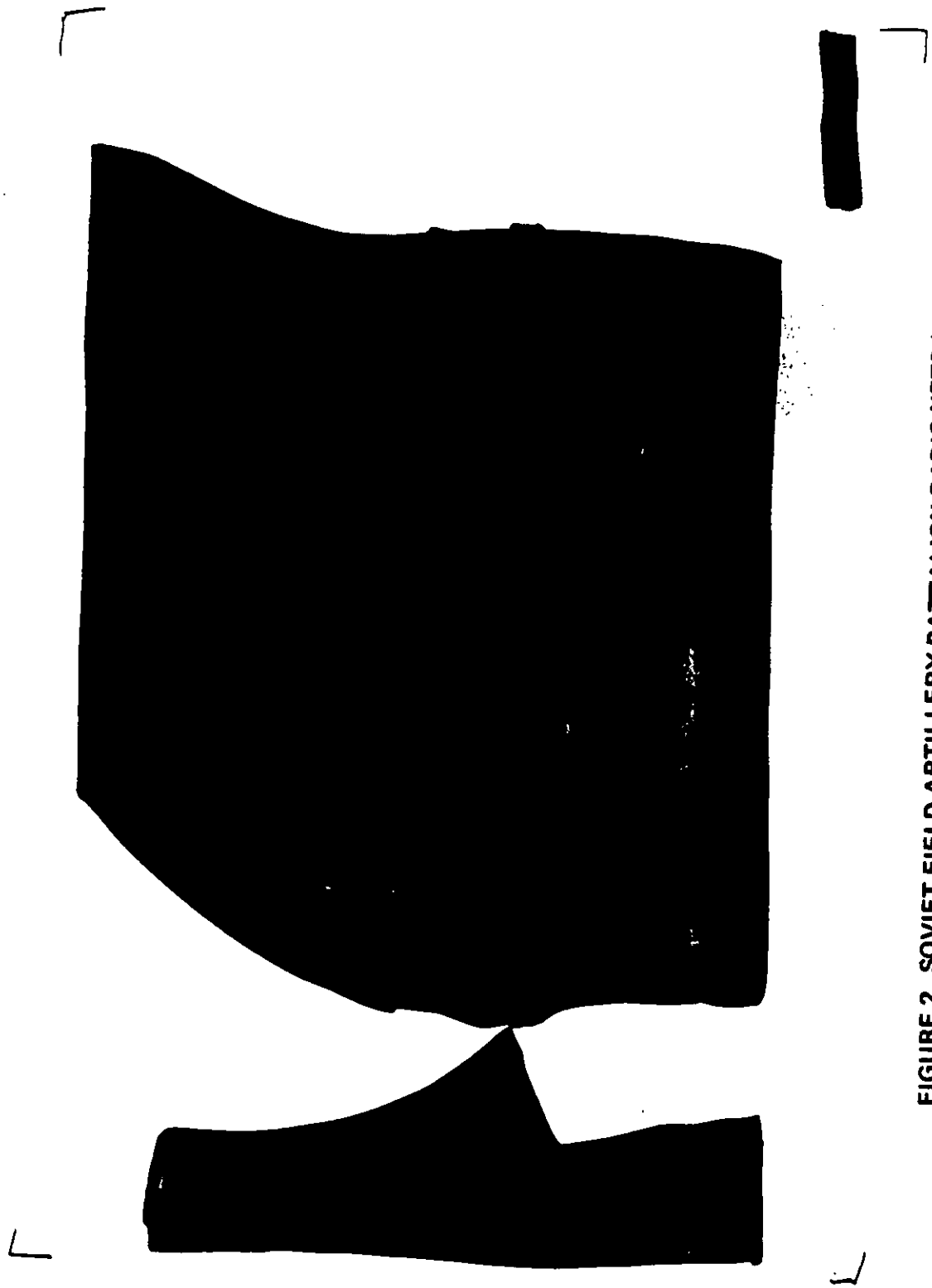


FIGURE 2. SOVIET FIELD ARTILLERY BATTALION RADIO NETS (U)

CONFIDENTIAL

- [REDACTED]
- [REDACTED]
- [REDACTED]
- [REDACTED]

[REDACTED] er.]

[REDACTED]

Destruction of Command Posts

(C) [REDACTED]

The 1977 Summer Study looked into the matter in some detail.

(S) [REDACTED] the community has assembled sufficient information such that the DSB Summer Study group could begin to grapple with the problem.

(S) [REDACTED] There is not a complete understanding of the former, and little is known about the latter.

(S) [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

These correspond roughly to U.S. Army nomenclatures as follows:

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

- [REDACTED]
- [REDACTED]
- [REDACTED]
- [REDACTED]

(U) Relevant data on Army and Division command posts, including their alternates, are provided in Table 1.

One observation is clearly in order at this juncture. [REDACTED]

- [REDACTED]
- [REDACTED]
- [REDACTED]
- [REDACTED]
- [REDACTED]
- [REDACTED]
- [REDACTED]
- [REDACTED]
- [REDACTED]
- [REDACTED]
- [REDACTED]
- [REDACTED]

(U) Although these questions were not fully answered, some insight into these questions was obtained.

First, it needs to be said [REDACTED]

- [REDACTED]
- [REDACTED]
- [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

(S) Although not certain, it is the judgment of the task force [REDACTED]

[REDACTED]

(S)

[REDACTED]

[REDACTED]

(U) These munitions should be treated against command post type vehicles and equipment to verify their effective range potential.

[REDACTED]

TABLE 2
MUNITIONS SIZING FOR COMMAND POST TARGETS (U)

[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]
[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]
[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]
[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]
[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]
[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]
[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]
[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]
[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]
[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]

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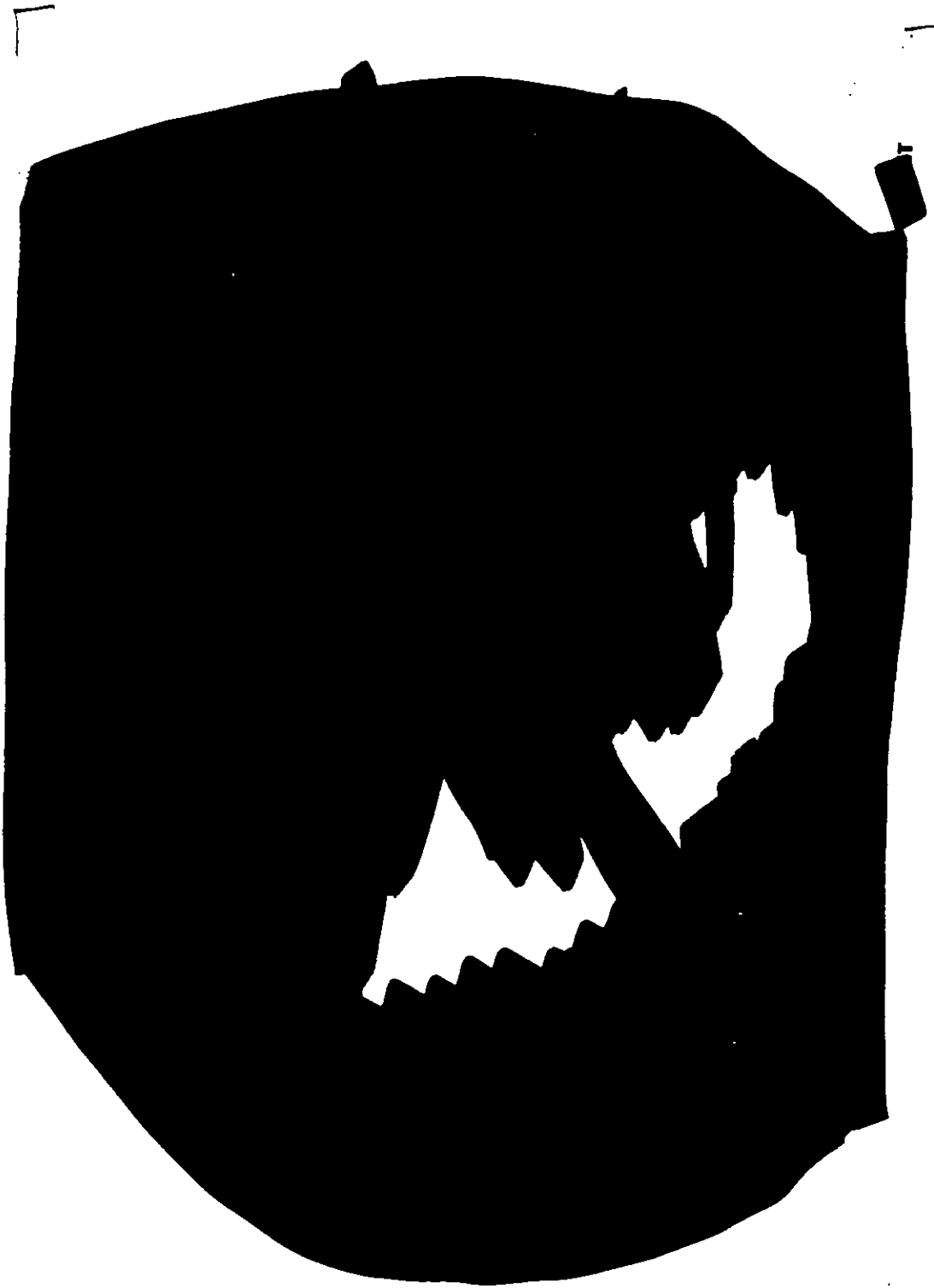


FIGURE 3. LAYOUT OF CLUSTERS IN A DIVISION MAIN COMMAND POST LOCATED IN A FOREST (U)

~~SECRET~~

TABLE 3

CHARACTERIZATION OF CP ELEMENTS AS TARGETS (U)

[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]

TABLE 4

ALTERNATIVE MUNITIONS CANDIDATES (U)

The table contains several rows of redacted information. The redactions are represented by thick black horizontal bars of varying lengths and positions, completely obscuring the text underneath. The table structure is not discernible due to the redaction.

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Self-Jamming Problem

(U) If there is to be an extensive jamming activity for the purpose of disrupting enemy C³, then careful consideration must be given to the impact of such an operation on our own C³. The task force examined this problem, and it is clear that an extensive jamming operation would most likely cause very serious problems for our forces as they are today. However, several actions can be taken to alleviate, if not eliminate, the problem.

[REDACTED]

(C) A second important approach is

[REDACTED]

[REDACTED]

[REDACTED]

(U) All things considered, it would appear that the correct solution to this problem is to be found in the structure established for the C³ of the ECM assets and cannot be found unless these assets are managed by careful and thoughtful commanders who coordinate their actions with other friendly elements.

Military Worth of Counter-C³

(U) Effects of Counter-C³ operations (jamming, deceiving, exploiting, or physically destroying command links and nodes) on the capability of a military force to wage battle are not clearly understood in a quantifiable way. Hence, the military worth of equipment specifically designed to perform this task is difficult to determine. This becomes especially important in the case of jammers, for example, when they must compete with destruction-oriented weapons for acquisition dollars.

(U) For the latter, various measures of effectiveness (MOEs) have been developed and are generally accepted as indicative of the weapon's military worth. For example, probability of kill (P_k) is a measure of weapon effectiveness against a specified target. Given this value, the military worth of the weapon system can be calculated in a scenario-type engagement as "numbers of things killed" and "loss exchange ratios" (attacker to defender). These measures are calculated in combat simulations which must be validated by tests in a "real-world" environment. Generally, similar quantitative estimates to weapon effectiveness measures have not been developed for nonlethal Counter-C³ actions (e.g., jamming). This is mostly because insufficient tests and troop field exercises have been conducted whose priority objective has been to measure and collect data on the impact of Counter-C³ actions on force effectiveness. As a consequence, the analytical community has not been totally successful in developing effectiveness variables leading to quantification of the military worth of Counter-C³ actions.

(U) For small unit engagements, a high resolution model can demonstrate the military worth of successfully jamming the opponent's radios (unit loses fire control and coordination) by comparing the difference in loss exchange ratios (attacker's killed to defenders killed) with and without jamming. For example, without jamming, the model might calculate the loss exchange ratio between an attacking Soviet tank company and a defending U.S. tank unit as less than 4-1, whereas with jamming the ratio improves to 7-1. However, these kinds of results must be validated with troop tests. In this case, the U.S. Army REALTRAIN tank engagement scoring system could be used to refine and validate the model.

(U) Another example of how to estimate the military worth of jamming analytically uses a larger force-on-force simulation. The effectiveness variable could be time delay (induced by jamming), and military worth can be measured as the increase achieved in friendly to enemy force ratios as a result of disrupting the planned phased arrival of

(U) It was even suggested [REDACTED]

(U) In summary, it was concluded that with a combination of judicious management and advanced technology, the self-jamming problem is solvable; but we should put forth the necessary effort to bring about the solution.

Jam vs. Listen Problem

(S) [REDACTED]

(S) [REDACTED]

ECM in a different way.

(S) [REDACTED]

(U) Several other important points were made on this issue that should be mentioned. Some of the task force representatives

[REDACTED]

[REDACTED]

Soviet second-echelon regiments at the FEBA. Again, however, data derived through troop exercises is needed for validation. In this case, the level of the test has to focus on a vertical regiment of a division vis-a-vis company and should have at least one battalion size maneuver force to permit a more realistic evaluation.

(U) In effect, the essential ingredients leading to a better appreciation of the combat value or military worth of Counter-C³ capabilities are:

- Troop tests and field exercises where principal objectives are to measure Counter-C³ procedures and actions on combat effectiveness which would also afford an opportunity for training in an EW environment
- Analyses and simulations to reduce the scope and costs of field tests and provide an analysis framework in which the effectiveness of various Counter-C³ actions can be judged

part of a mission conclusion

Organization

[REDACTED]

- [REDACTED]
- [REDACTED]
- [REDACTED]
- [REDACTED]
- [REDACTED]
- [REDACTED]
- [REDACTED]
- [REDACTED]
- [REDACTED]

[REDACTED]

[REDACTED]

There are no doubt other problems that impede progress in Counter-C³, but these are representative and suggest areas of activity and organizational approaches that would help the mission. Problems associated with Counter-C³ certainly imply the need for a joint Army/Air Force organization. The need for joint organizations has been recognized in other areas; e.g., joint operations problems must be addressed in fielding an effective and unified tactical fighting capability. Army/Air Force recognition of this fact has led to the establishment of the Air Land Force Application (ALFA) Agency at TAC and TRADOC. The results of this agency's work to date including the E-PAR studies are encouraging.

[REDACTED]

- Joint Army and Air Force sponsorship with Navy technical liaison
- [REDACTED]
- [REDACTED]
- Capability to translate opportunities into action plans for doctrine, tactics, field exercises, and needed R&D
- Capability to provide a preliminary assessment of the military value of each opportunity and to support the justification of the necessary funds to undertake the action
- Modest budget for specific studies and analyses and to support the evaluation of Counter-C³ techniques and equipment

There are several possible organizations of such an effort. The task force concluded that the services are best suited to define the exact arrangement which would produce the best results. To this end, the task force recommends that the services be tasked to prepare a detailed joint plan for the organization and management of the Counter-C³ effort.

Counter-Counter-C³ (C⁵)

The protection of our own C³ from enemy Counter-C³ action was not — strictly speaking — included in the task Force's Terms of Reference. However, it is difficult to devote a substantial effort conceiving harsh and devious actions directed to enemy C³ without at the same time developing some concern over the vulnerabilities of our C³. Although a detailed analysis of our C³ vulnerabilities was not undertaken, several general considerations flowed naturally from the study. These are provided in this section.

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

(U) It is recognized that none of the above suggestions are new; but since the vulnerabilities they attempt to reduce are real and are not being rectified, they are still worth making.

NATO Implications

(C) Many of the contemplated Counter-C³ actions have important NATO implications, but the task force did not have the time or proper NATO contacts or representation to explore these. However, the discussion did attempt to examine certain aspects of the problem, and there are a few points that should be made.

(C) Any war in Europe is by its very nature a NATO war. U.S. forces in NATO, although impressive, are not by any means the most significant part of NATO. So as we seek solutions to the NATO defense problem, we must bear in mind that improvements that can be made to only the U.S. forces would not significantly alter the force posture. It is only if we can apply these improvements across the entire force and integrate them into that force that we will have a large impact. It is therefore necessary to examine Counter-C³ opportunities in that light and determine whether they are a possible adjunct to NATO. This has not been done and can only be accomplished by discussion with NATO. It should be done, and the task force concluded that OSD should in some suitable fashion undertake to do so.

(C) [REDACTED]

It is clear that the NATO implications of Counter-C³ remain to be fully explored, and additional effort is absolutely required.

[REDACTED]



E. CONCLUSIONS/RECOMMENDATIONS

Principal Conclusions/Recommendations

[REDACTED]

[REDACTED]

Recommendation – The Services should prepare a detailed joint plan for the organization and management of the Counter-C³ program.

[REDACTED]

[REDACTED]

[REDACTED] e

[REDACTED] y

[REDACTED]

[REDACTED]

[REDACTED]



[REDACTED]

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Tactical Counter-C3

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Test and Evaluation

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UNCLASSIFIED

APPENDIX A
TERMS OF REFERENCE

UNCLASSIFIED

UNCLASSIFIED



DIRECTOR OF DEFENSE RESEARCH AND ENGINEERING
WASHINGTON, D C 20301

MEMORANDUM FOR THE CHAIRMAN, DEFENSE SCIENCE BOARD

SUBJECT: Defense Science Board (DSB) Task Force on Counter-C³

The Defense Science Board Summer Study highlighted the need to emphasize means to counter the enemy's command, control and communications (C³) capabilities as a form of area weapon in land and sea warfare. Within ODDR&E, we have reorganized our activities to give Counter-C³ the necessary stature. As a result, a new mission area, Electronic Warfare and Counter-C³, has been formed.

In order to provide initial inputs and guidance to this new warfare area, I would like to see a DSB task force on Counter-C³ formed. Proposed Terms of Reference for the task force are attached.

A handwritten signature in black ink, appearing to read "Malcolm R. Currie".

Malcolm R. Currie

Attachment



UNCLASSIFIED

PROPOSED TERMS OF REFERENCE
DEFENSE SCIENCE BOARD TASK FORCE ON COUNTER-C³

Objective: The DSB task force on Counter-C³ is to provide the basis for a development and acquisition program commensurate with the force multiplier potential of this warfare area. An assessment of present programs in this area will be made and will be the basis for recommending future programs, content, funding, and priority.

Scope: The task force on Counter-C³ will include the following activities:

- o Review and analysis of enemy C³ capabilities as identified and defined by DIA and related agencies.
- o Review and assessment of present US programs that may be classified as counter-C³ or used in that mode of operation.
- o Analysis of our present and projected force capabilities to counter the enemy's C³.
- o Development of recommendations to strengthen our Counter-C³ capabilities in all warfare areas. Results should be reflected ASAP.

The following questions should be addressed during this effort:

1. How much of the enemy's C³ capability must we disrupt to be effective? What type(s) of exercises would need to be conducted to determine our probable EW-counter-C³ effectiveness empirically in contrast to the theoretical calculations made during previous studies?
2. What techniques/equipment are now available to counter enemy C³?
3. What changes must be introduced into our operational-technical procedures to permit our forces to successfully counter the enemy C³ capabilities?
4. What programs (development and production) should be pursued to enhance our counter-C³ capabilities?
5. To what degree must our counter-C³ developments be guided by our own (including allies) C³ plans and programs?
6. What can we expect to gain in operational advantages through emphasis of this new initiative?

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Schedules/Reports: Establish task force and commence meeting by 1 February 1977. An interim report should be provided informally to the DSB and DDR&E during the 1977 Summer Study. Final report by 1 February 1978.

Cognizance: DD(TWP) will be cognizant deputy. All ADe in ODD(TWP) will be represented on the task force. Mr. John M. Porter, OAD(CS), will act as Executive Secretary of the task force.

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APPENDIX B LIST OF PARTICIPANTS

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Mr. Charles A. Fowler, The MITRE Corporation *Chairman*
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Mr. Edwin L. Key, The MITRE Corporation
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could not go to Monterey*
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