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REPORT OF THE DEFENSE SCIENCE BOARD

July 1967

Report of the Panel
on
SOUTHEAST ASIA



Office of the Under Secretary of Defense
for Acquisition, Technology, and Logistics
Washington, D.C. 20301-3140

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on
SOUTHEAST ASIA

5-14 JULY 1967

Defense Science Board - National Academy of Sciences
Berkshire Summer Study
Williamstown, Massachusetts

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I. INTRODUCTION (Unclassified)

The Southeast Asia Panel was tasked with examining four problem areas in Southeast Asia wherein major improvements are necessary to improve efficiency and effectiveness. The complete task statement is attached as Appendix A. The Panel's recommendations regarding these points are detailed in the next four sections of this report.

The members of the SEA Panel are listed in Appendix B. The SEA Panel wishes to acknowledge gratefully the assistance of the other participants and presentors listed in Attachment B.

II. SEARCH AND RESCUE (Unclassified)

The U. S. has lost 1,900 aircraft in North Vietnam, South Vietnam and Laos in the last 23 months. This corresponds to about 2,700 crew members and of these about 1/3 to 1/2 have been rescued. This is a remarkable accomplishment but even more might have been recovered by an improved search and rescue system. The training investment alone averages close to 1/2 million dollars per crew member. This suggests that a very considerable R&D effort could go toward the problem and still be cost effective. However, there does not now appear to be either an adequate search and rescue system or a program to provide one. We do gather that there is considerable effort being directed toward a new rescue vehicle but other areas appear to have greater potential for improvement.

We recommend that the present rescue procedures be developed into a system to include compatible, cooperating equipment for the downed pilot and rescue forces. The pilot must be able to communicate his situation and position to the rescue forces in a way which can be readily authenticated. We believe that these tasks are compatible, in that relative range and bearing from rescue helicopters/planes to a downed pilot are easily provided. For instance, one could provide IFF-type coded radio transponders with individual enabling and disabling features. The need for voice communication to indicate status and environment should be filled in a more secure, unpredictable form than the present fixed frequency, single channel UHF equipment.

Our consideration is wider than radio alone and includes modulated radar corner reflectors, dye markers and smoke projectiles, etc. While some of these devices exist now, they do not form interlocking elements of an effective air rescue system.

We recommend that an ambitious joint Services system development program be awarded to a single laboratory or contractor to provide DoD with a prompt and evolving day and night capability in this area. Such a system must be usable interchangeably by pilots and rescue teams in any Service combination. Continuing independent analysis and evaluation of the performance of the system is essential.

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III. ILLINOIS CITY (~~Secret~~)

The Illinois City project has done an excellent job in planning and developing systems aimed at combating the infiltration of men and supplies from North Vietnam into South Vietnam in a focused and specific way. As will be shown in the Search and Destroy section to follow, the Panel believes that the importance of this project goes far beyond the concept of a deployable barrier. The Illinois City program will provide a wide range of components for detection, monitoring and interdiction of vehicle and personnel traffic in a variety of war situations.

The program has been ambitious in both scope and time scale. Certain problems remain and others are sure to emerge as the system becomes operational. Two of these will be discussed below.

We were unable to determine if sufficient provision has been made for technological ties between the developing groups and the operating agency after operations begin. The system will involve the combined work of many independent groups after a very short test period and the stakes are so important as to warrant special steps.

We are also concerned about, and feel additional emphasis should be placed on, improved target acquisition capability and munitions for specific attack against trucks. For example, the limited amount of truck traffic (estimated at 20 per night to continue the external support of the battle in South Vietnam) proves a great problem in target acquisition. An alternative to individual targeting may be large-scale deployment of earth penetration mines along the roadways determined to be in use by means of the IC sensors. These munitions have the capability of concealment, lessened vulnerability to sweeping and the attractive feature of the target seeking the munition. The Anti-Vehicle Land Mine (AVLM) now under development ought to substantially enhance our capability against trucks and should be accelerated.

We also recommend that land mines, effective against trucks, emplaceable by aircraft, and less expensive than the AVLM be developed. We believe that such weapons will be of great importance in many applications that are not related to the Illinois City project.

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IV. SEARCH AND DESTROY ~~(Secret)~~

The technology now being developed and to be deployed to prevent infiltration (Illinois City) can make a major contribution to Search and Destroy mission in country. We believe that the collection systems in themselves can enhance the capability of U. S. forces to close with Viet Cong/North Vietnam units. Specifically, we believe that it should be possible to:

- (a) Indicate the occupancy of known base camps in real time by caretaker sensors.
- (b) Provide intelligence on enemy movements by lines of sensors sown across trails and forest areas.
- (c) Identify enemy escape routes once search and destroy actions are begun by means of an encircling ring of sensors.

Such applications need not involve mining, since their principal effect is to focus friendly forces on an elusive enemy. The unpredictable loss of privacy of movement and assembly should cause the enemy substantial concern and affect his operations importantly.

Typical S&D operations seem to have a number of weaknesses for which technical cures are available. According to our information:

1. The enemy has many camps that are not usually occupied. Long-range patrols in addition to other intelligence are being used to keep accurate track of enemy movements. After enemy forces are detected by the long-range patrols the enemy forces still escape in 95 percent of the cases.

Acoubuoys and seismic sensors, such as those developed for Illinois City and other special operations, hand emplaced in known camps or air dropped along lines across the country could make the necessary information available in most cases.

2. The enemy often escapes across country when surrounded and our forces can then seldom engage his forces effectively.

If the acoubuoys and seismic sensors mentioned under 1. above are insufficient to achieve the desired result, mine

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fields using special developed ammunition can be laid behind the enemy lines so as to deter his escaping.

3. All the search and destroy missions require a timely display of the activity and location of our patrols, our main forces, and the movements and base occupancy of enemy forces.

The EC-121's now being planned by Illinois City have the capability of acting as airborne command posts and should be useful for this purpose with no change.

Alternatively, many other solutions exist that use a communication relay from the sensors to a ground control center or employ airborne devices to locate sensors.

4. There is a need for a simple, non-voice noiseless communication device for the long-range patrols.

The radio sets developed by CIA for the use of the road watch teams could provide a good first solution. An audio tone generator of the type already available for transforming a dial telephone into a touch-tone type would give the patrol a wider range of possible signals without adding another radio set to the PRC-25 already in use.

5. The long-range patrols frequently don't know their own position with precision when they locate new camps, enemy forces or when they need artillery fire or helicopter snatch.

A number of possible solutions are possible and test quantities could be available soon. For instance, a back pack Loran D receiver has been developed, capable of location accuracies of 850' (absolute) or 250' (relative) in Vietnam. Alternatively a VHF distance measuring system of similar or better accuracy operated from overhead aircraft could also be easily built and may even be available.

We understand that one or two EC-121 aircraft and several hundred seismic and acoustic sensors could be allocated by late summer without hindrance to the IC program for operational test of the improved Search and Destroy operations described above. (Appendix C)

It is urged that the Director, DCPG and MAC V be tasked to provide a system design and plan for use of these resources. The overall objective should be to deploy a usable system to a combat brigade in

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South Vietnam for test purposes by 1 October 1967. The system design and plan should include:

1. Definition of base areas to be put under surveillance
2. Numbers and types of sensors, monitoring aircraft, and Data Handling and Display Devices
3. Operational concept to be employed in detection, target evaluation and strike response or reaction.

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V. PACIFICATION (~~Secret~~)

Pacification includes at least three major aspects: (1) area defense against major military units, (2) control of insurgent activity, and (3) political and economic growth. Area defense and the corresponding relief of pressure on villages from battalion-sized enemy units is a vital first step, and ought to be improved by the technical support to search and destroy operations discussed previously. Control of insurgent activity can also be improved technologically by upgrading village defense and intervillage mutual support. General security is a necessary but not sufficient condition for pacification. We will suggest ways in which technology can contribute to political and economic growth of the country, but we do not believe that they substitute for effective government organization and honest political programs. A nation cannot be built with gadgets. The following suggestions are therefore a small contribution to the total needs of pacification and would have limited importance if implemented alone.

The technical measures we have suggested for enhancing the search and destroy mission can also serve to relieve the enormous local pressure represented by the threat of battalion-size VC attack on villages. Sensor arrays might be deployed in an area to monitor troop buildups and movements into an area. If such buildups can be repeatedly crushed by mixed US/ARVN forces, the VC may be discouraged from congregating and attacking in such strength. Even in the early stages, a sensor capability might introduce an important element of uncertainty into the long-range planning and buildup for such VC operations. Of course, if similar techniques are successful in improving the effectiveness of search and destroy missions, one would expect more of these troops to be available for crushing local buildups, and the two programs ought to work in harness.

Better local defenses, first, can be obtained by providing improved early warning intrusion detection sensors to alert local defense forces to a threat. While not a substitute for patrolling, sensors used by small forces in villages with responsive support by larger area defense forces, may usefully supplement present RF/PF tactics. Second, use of night vision devices (star-light scopes and goggles) by combined US/GVN forces may decrease the present tactical advantage of the enemy at night. Third, a simple and reliable communications net linking villages in pacified areas to province-level authority is needed to convert the warning into a call for reaction forces. The warning system and the communications network will be of value only

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if effective reaction forces are quickly available. The Southeast Asia Panel recommends that sensors, night vision devices and an inter-village communications net and the requisite reactive forces be packaged as a system and deployed to a selected area on an experimental basis as soon as possible.

Within the area of political and economic growth we have a few limited contributions to support. For example, better liaison between Saigon and the villages can be obtained from the present television transmitters and relays by simply providing more television sets. The Southeast Asia Panel recommends that each secure village should immediately be provided with a working TV set, making allowances for diversions to government and military officials and losses to the VC. The Panel also recommends that the plan of providing the villages with TV sets be accompanied by better planned schedules and selection of broadcast material. Educational and patriotic broadcasts should be well mixed with entertainment. In addition the Panel recommends that a plan be established to create regional and even provincial stations and programming (much as in the U. S.) as security is provided to larger areas of the country.

Similarly, the Southeast Asia Panel recommends that improved plans be created to exploit the present wide dispersion among both friendly and enemy personnel of cheap transistor radios. Better programming and even more widely dispersing radio receivers are both required.

The Southeast Asia Panel recommends that a fresh look be taken at the refugee program to see if technology can contribute in a meaningful way. As an example, the Panel recommends that the feasibility be determined of reclaiming some substantially uninhabited area for major refugee resettlement. If such an area can be reclaimed, the other recommendations of the Panel would be particularly appropriate for trial at the same time.

The present relationship between OCO and MAC V establishes a responsibility of the Department of Defense for the Pacification effort. The Panel views with concern the lack of a staff within the OSD whose primary concern is pacification and to whom the Director of OCO can look for staff support and liaison with other elements of DoD. The Panel recommends strongly that such an office be established without delay.

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APPENDIX A



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

July 3, 1967

MEMORANDUM FOR THE DEFENSE SCIENCE BOARD SOUTHEAST
ASIA WORKING GROUP

SUBJECT: Agenda for Williamstown Meeting

After a concentrated round of discussions with Mr. Haggerty, Dr. Fubini and Dr. Foster it has been suggested that the SEA group concentrate on three different but intimately related problems in Vietnam. These are:

1. the Pacification/ Revolutionary Development program;
2. the Infiltration problem and counter-infiltration effort; and
3. the Search and Destroy effort against VC and NVA main forces.

These problem areas apply almost totally to the "in-country" war and are those where major improvements are necessary to improve efficiency and effectiveness. Other subjects were considered but dropped because of the feeling that sufficient technical expertise was being applied. An example of this is the problem of Tactical Air Operations in SEA. However, due to its critical nature the problem of Search and Rescue of downed aircrews has been retained as the fourth topic. The attachment indicates the general approach Mr. Haggerty and Dr. Fubini have agreed should be taken for that portion of the meeting devoted to presentation and problem discussion.

Because of the interest in the pacification problem DDR&E has asked that Dr. Leon Goure of the RAND Corporation and Dr. Joshua Menkes of IDA participate as members of the SEA Working Group. Captain Peter F. Carpenter, ARPA/AGILE, will be the full time DDR&E and ARPA representative and will be present for the entire session. Mr. S. J. Deitchman, Director of ARPA/AGILE will also be present for a majority of the time. Mr. Leonard Sullivan, Deputy Director, Southeast Asia Matters, ODDR&E, will also be present for the initial days of the meeting to present our overview of RDT&E effort in SEA.

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Dr. Victor Heyman of OSD/Systems Analysis will also participate and can give an overview of where military effort is being expended in SEA and with what results.

/s/

Donald R. Cotter
Southeast Asia Matters
Special Assistant

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APPENDIX B

Southeast Asia Panel

Members: Mr. P. E. Haggerty, Chairman
Dr. E. G. Fubini, Vice Chairman
Dr. A. C. Hall
Mr. P. W. Pratt
Dr. A. S. Wheelon
Mr. L. Sullivan, Jr., ex officio

Other Participants: Capt. P. F. Carpenter, OSD/ARPA
(alphabetical) Mr. D. R. Cotter, OSD/DDR&E
Mr. S. J. Deitchman, OSD/ARPA
Dr. L. Goure, RAND
Dr. V. K. Heyman, OSD/SA
Dr. J. Menkes, IDA
Mr. R. M. Pearce, RAND

Presentors: Maj. Gen. W. E. de Puy, JCS
Col. A. Weidhas, DCPG
Mr. D. Israel, DCPG
Col. K. Cooper, DCPG
Mr. E. N. Myers, OSD/DDR&E

Schedule: 6 July - AM - General DSB meeting with
Dr. Foster
PM - Panel working session

7 July - Panel working session

8 July - Individual discussion periods

9 July - Individual discussion periods

10 July - Panel working session

11 July - Panel working session

12 July - AM - General DSB meeting
PM - Panel working session

13 July - Panel working session

14 July - General DSB meeting with
Dr. Foster

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APPENDIX C

Collection Resources Available for Augmented Search and
Destroy Operations

A. From Illinois City Test Program

• 1-2 EC-121 Monitoring and Control aircraft.

• 50-100 Hand Emplaced Seismic Intrusion Detectors

300 IC Acoustic Buoys (Hand Emplaced) 20-50 M range
w/o warning bomblet

B. Available from Other Sources

15-175 Sandia Seismic Intrusion Detectors

300 Sandia Patrol Seismic Intrusion Detectors

Helicopter or FAC monitoring on standard VHF channels.

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