DEPARTMENT OF THE ARMY
U.S. ARMY MEDICAL RESEARCH AND DEVELOPMENT COMMAND
FORT DETRICK, FREDERICK, MD. 21701-5012

REPLY TO
ATTENTION OF

SGRD-PLC (70)

13 June 1988

COL Richard Entlich
Army Science Board
The Pentagon
Washington, DC 20310-0103

Dear COL Entlich:

Enclosed is the final report on the Ad Hoc Study Group on the Efficacy of the U.S. Army Aeromedical Research Laboratory, Fort Rucker, Alabama.

Sincerely,

David M. Lam

David M. Lam
Colonel, MC
Director, Army Systems Hazards
Research Program

Enclosure

Copy Furnished: Dr. Barth

EFFECTIVENESS REVIEW OF USAARL, FORT RUCKER, ALABAMA

Table of Contents

EXECUTIVE SUMMARY

TERMS OF REFERENCE

The Terms of Reference (TOR) for our panel suggested that during our effectiveness review of USAARL we address the following five questions:

a. What is the quality of staff, facility, and technical program?

b. How productive is the laboratory in accomplishing its mission?

c. How relevant is the laboratory's work to important Army problems?

d. How can we improve the assessment methodology and procedures?

e. What are the lessons learned from conducting the review?

Although the organization of our report does not bear a one-to-one relationship to our TOR, the report does address the questions raised. This summary presents major findings and principal conclusions.

OVERVIEW

USAARL is a well managed, productive research and development laboratory with excellent facilities and equipment. It has a history of delivering quality products in a timely fashion and is viewed by users of its products as being responsive to their needs. USAARL is doing a particularly exceptional job of coordinating the programs with other Army and other Service medical research and development programs. We wish to emphasize these positive aspects so that our findings and conclusions will be viewed in the proper light as efforts to make a good laboratory better.

MISSION, ORGANIZATION, FACILITIES, AND EQUIPMENT

The mission is clearly defined and very relevant to important Army research and development requirements. The organization seems reasonable and there are clear lines of authority and responsibility. The facilities are outstanding in terms of available space and layout. The equipment is modern and well maintained, supplies are adequate and the laboratories are neat and orderly.

STAFF

There is an appropriate mix of scientific skills for the programs now being executed. We conclude that USAARL might take some actions to obtain more flexibility to change available scientific skill mixes to address more effectively new or emerging research and development problems of high priority. These include:

1) Developing and implementing cooperative agreements with one or more universities.

2) Promoting cooperative efforts between USAARL and university and industrial research scientists under memoranda of agreement.

3) Seeking and obtaining some relief from civilian personnel procedures which count part-time employees, Cooperative Education Students, and consultants against personnel ceilings.

We also conclude that:

4) USAARL should move in an orderly manner toward a combined military and civilian senior management team that includes at least one authorized civilian scientist at the SES level.

5) DA should ensure that the Army soldier/scientist program is meeting its objectives and that people in this program are treated equitably in terms of career progression and promotion.

PROGRAM AND BUDGET

Presently extramural funds for all USAMRDC laboratories are held by the Research Area Director in Headquarters. This process creates major uncertainties during the planning process since USAARL scientists cannot be sure that extramural funds will be allocated when desired. We conclude that:

6) USAMRDC should decentralize to the field laboratories program planning as well as program execution for the majority of extramural funds.

Beginning with FY 88, Base Operations/Real Property Maintenance Activities (BASOPS/RPMA) funds have been transferred from the RDT&E appropriation to the OMA appropriation. In FY 88 only 80 percent of the required support funds for USAARL arrived at Fort Rucker. The balance, $260,600 had to be supplied by USAARL from its operational RDT&E funds. We conclude that:

7) ASARDA should take steps to assure that required support funds for research and development laboratories not be deleted from the budget of host organizations without consultation and concurrence of the tenant laboratories.

The removal of independent laboratory in-house research (ILIR) funds from the budgets of all Army research and development laboratories has had an adverse affect on the flexibility of programs far beyond the value of the money saved. We conclude:

8) ASARDA should restore ILIR funds to the budgets of Army research and development laboratories.

INFORMATION FLOW

The overall preparation and presentation of USAARL research results is commendable. On the other hand, the number of papers that are being prepared for publication in professional (refereed) journals has remained at a relatively low level. Encouraging additional publications in professional journals would tend to enhance the professional reputation of the laboratory and of its scientists. We conclude:

9) USAARL management should encourage the publication of research results in professional journals by considering this an important factor in efficiency reports of military scientists and merit pay for civilian scientists.

LESSONS LEARNED

We feel that small groups and individual discussions with laboratory personnel were much more productive than formal briefings. For future reviews more time should be devoted to obtaining opinions of users with regard to the laboratory's cooperativeness and the quality and usefulness of its products. Reviews of additional USAMRDC laboratories should be conducted using a similar format with some overlap of reviewers.

1. OVERVIEW. USAARL is a well managed, productive research and development laboratory with excellent facilities and equipment. It has a history of delivering quality products in a timely fashion and is viewed by users of its products as being responsive to their needs. USAARL is doing a particularly exceptional job of coordinating its programs with other Army and other Service medical research and development programs. We wish to emphasize these positive aspects initially so that our findings and conclusions will be viewed in the proper light as efforts to make a good laboratory better.

2. BACKGROUND. The terms of reference for this study are given in Appendix A. Appendix B lists the participants and Appendix C contains trip reports for our two meetings at USAARL. Although the organization of our report does not bear a one-to-one relationship to our Terms of Reference (TOR), the report does address the questions raised in the TOR.

The following information concerning USAARL's organization, role and mission, organization, and program content has been extracted from the Annual Progress Report for FY 87.

ORGANIZATION AND MISSION

The present organization of USAARL is shown on page 2. The mission of the U.S. Army Aeromedical Research Laboratory (USAARL) is to:

- Conduct research and development on health hazards of Army aviation, tactical combat vehicles, and selected weapon systems. Assess the health hazards from noise, vibration, acceleration impact, and visual demands of such systems, and define measures to offset hazards.

- Assess stress and fatigue in personnel operating these systems and develop countermeasures.

- Assist in development of criteria upon which to base standards for entry and retention in Army aviation specialties.

- Assist other U.S. Army Medical Research and Development Command (USAMRDC) laboratories and institutes in research on the bioeffects of laser systems, medical defense against chemical agents, impact of continuous operations on individual and dress performance, and development of improved means of patient evacuation.

- Assess current life support equipment to identify causes of failure and devise improved design.

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Deputy Commander for Science
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Deputy Commander for Administration
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Dr. E. Kimball B-1 6861

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DET CDR/ADJUTANT
(SGRD-UAX-AJ)
CPT D. Brunc R-23 6911

FIRST SERGEANT
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SFC R. Carson R-3 6909

SCIENTIFIC INFO CTR
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VISUAL SCIENCES BR
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ACOUSTICAL SCIENCES BR
(SGRD-UAS-AS)
Dr. J. Patterson N-15 6871

SENSORY NEUROSCIENCES BR
(SGRD-UAS-NS)
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BIOMEDICAL APPLICATIONS RSCH DIV
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CREW STRESS & WORKLOAD BR
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CREW BIOTECHNOLOGY BR
(SGRD-UAR-CB)
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BIODYNAMICS RESEARCH DIV
(SGRD-UAD)
MAJ D. Gower M-9 6943

BIOMECHANICS BR
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LIFE SUPPORT EQUIPMENT/ CREW INJURY & EPIDEMIOLOGY BR
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Building Engineer	6922
EEO Coordinator	6907
FWPM Coordinator	6861
Automation Mgt Officer	6839
Library (Research)	6936
Manpower Office	6905
Budget Office	6919
PSNCO	6912
Safety Officer	6943
Scientific Editor	6906
Training NCO	6928
Acoustical Sciences Annex	6948
Highfalls Field Site	624 2915

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BUILDING 6901

- Assist the combat developers and materiel developers of new Army aviation and tactical combat vehicle systems to recognize and eliminate health hazards as early as possible in the developmental cycle.

- Conduct collaborative research with other Department of Defense (DOD) and Federal agencies on medical research and development issues of common concern.

The role of USAARL in military relevant medical research has been an evolutionary process. From its inception in 1962 through 1976, the program emphasis was focused primarily on aviation research. It was becoming evident with the introduction of new weapon systems, armored vehicles, and individual equipment that USAARL's research capabilities were applicable to the solution of operational problems in other military settings.

Starting in late 1977, an analysis of psychophysiologic requirements and performance of combat vehicle crews began. Research of blast overpressure and impulse noise from individual and crew-served weapons was initiated. Knowledge obtained through this research was instrumental in establishing requirements for health hazard assessments for all emerging military systems. Today USAARL is an important contributor to the Surgeon General's (TSG) Health Hazard Assessment (HHA) program (AR 40-10); the Office of the Deputy Chief of Staff for Personnel's (ODCSPER) Manpower and Personnel Integration (MANPRINT) program (AR 602-2); and the Human Engineering Laboratory's Human Factors Engineering Analysis (HFEA) effort (AR 602-1).

USAARL is one of eleven subordinate elements which come under the command of the USAMRDC. To place USAARL in perspective and to indicate superficially apparent overlaps in mission, mission statements are provided in Appendix D for the other ten elements and for the USAMRDC. But we have identified no important examples of uncoordinated overlaps.

USAARL's research encompasses six major areas: acoustics, vision, crew workload and stress, vibration, impact, and life support technology. Each of these areas has separate, yet related projects. Appendix E gives additional information on research program content.

New directions are constantly under consideration by the laboratory and are based on Department of the Army Research and Development (R&D) priorities, directives from the Medical R&D Command, systems health hazard assessment requirements, tri-

service coordination, Mission Area Analyses (MAA), enemy threat intelligence, and most importantly, on information from the soldier--the user and benefactor of all the research.

3. MISSION, ORGANIZATION, FACILITIES, AND EQUIPMENT

3.1 Findings

3.11 Mission - The mission is clearly defined and without question is very relevant to important Army research and development requirements. The Mission Statement clearly recognizes that while there are some research and development overlap areas with other USAMRDC laboratories, there is appropriate coordination to assist these other laboratories in carrying out their missions. The mission also calls for the performance of collaborative research with other Department of Defense (DOD) and Federal agencies on medical research and development issues of common concern.

One subject area about which we had some discussion but which is only partly germane to USAARL relates to the need for improving the availability of medical advice on systems and engineering design early in RDT&E cycles of major Army material systems. Since this is somewhat outside the scope of this study we mention it here only and suggest further consideration in an appropriate future ASB study. However, we should note that USAARL's research would be a major basis for such advice. The question is how it is applied (see Appendix F).

3.12 Organization - The organization seems reasonable. There are clear lines of authority and responsibility. There does not appear to be an overlap of functions, and in general the research divisions are satisfied with the support they receive from the support division. In the time we had to devote to this study no problems came to our attention with regard to the organization and how it is functioning.

3.13 Facilities and Equipment - The facilities are outstanding in terms of available space and layout. The equipment is modern and well-maintained, supplies are adequate, and the laboratories are orderly and neat. The Scientific Information Center (library) has a wide range of periodicals and books and is well staffed. The in-flight monitoring system (instrumented pilots, flight parameter recording, and the associated real-time ground monitoring and data collection stations) is an impressive technical achievement for data quality and apparent reliability. We believe that the available facilities and equipment are pertinent to ongoing projects and are being appropriately utilized.

4. STAFF

4.1 Findings

4.11 Mix of Skills - In general there is an appropriate mix of scientific skills for the programs now being executed. There are one or two exceptions to the previous statement, but these few deficiencies in specific skills are recognized by management and steps are being taken to remedy the situation. A major problem for USAARL management and for the management of any Army research and development laboratory relates to how to obtain the flexibility to change scientific skill mixes to address more effectively new or emerging research and development problems of high priority. Stringent and inflexible personnel ceilings together with employee's rights for both civilian and military personnel make it difficult to alter skill mixes on any reasonable time scale. In order of increasing complexity, possible solutions to this difficulty include:

(1) Obtaining task-order contractual agreements

(2) Developing and implementing cooperative agreements with one or more universities

(3) Promoting cooperative efforts between USAARL and university and industrial research scientists under memoranda of agreement. Such agreements will involve joint use of facilities and equipment on projects of common interest, but will not require formal contractual relationships and funding.

(4) Obtaining on-site contractor support.

(5) Converting the laboratory to a Government owned, contractor operated (GOCO) laboratory.

(6) Obtaining some relief from civilian personnel procedures which count part-time employees, Cooperative Education Students, and consultants against personnel ceilings. (The practice of charging part-time employees, Cooperative Education Students, and consultants against personnel ceilings is an important policy issue that should be resolved. It is especially unfortunate that this policy has led to the demise of the Cooperative Education Program at USAARL. This program provided an infusion of university students into the laboratory with an accompanying improvement in the technical level of the laboratory as well as an introduction of these students to Army research an development activities. The program had the added benefit of serving as a recruitment mechanism for future USAARL scientists.)

We recommend strongly options 2, 3, and 6 only. USAARL is already using task-order contractual agreements effectively. Utilizing cooperative agreements with one or more universities or industrial research laboratories is an attractive option since this approach has additional advantages. For example each university has to contribute some matching funds (or equivalents such as facilities or equipment). Also closer ties with universities will tend to build at those universities additional research and development programs relevant to those of USAARL. Such an arrangement also serves as an excellent training vehicle for graduate students who may eventually decide to pursue careers as employees of USAARL.

We believe it would be worth the effort to attempt to obtain relief from the appropriate officials so that consultants and part-time hires do not count against personnel ceilings. We believe such a change would be actively supported by all Federal research and development laboratories.

4.12 Mix of Military and Civilian Personnel and Grade Structure - The approximately fifty-fifty percent mix of military and civilian personnel is considered to be appropriate for the mission and program of USAARL. The utilization of enlisted personnel with special training in biosciences, category 01H, is exemplary.

The opportunity for promotion of senior civilian scientists is severely limited. With the exceptions of the position of Director, Program and Plans, and Director, Biomedical Applications Research Division, which is vacant, the highest possible civilian grade is GM-14 and almost all of the senior civilian scientists (6 out of 8) on board are already at the GM-14 level (the other two are GM-13). Part of this problem is the prevalent view among Army civilian personnel classifiers that scientists, as well as other categories of employees, must assume management functions in order to achieve higher ranks. Little credit, if any, is given for the quality and quantity of research results and publications. Another contributing factor to the civilian grade structure problem is the fact that almost all senior management jobs at USAARL are occupied by military officers.

We do not agree with the current thinking of some Army management principals that Senior (SES-level) civilian scientists may undercut or weaken normal military command channels. We note that almost all military laboratories conducting basic research of excellence have in their T.O. in addition to other authorized civilians at least one or two SES scientists to complement the military staff.

4.13 The Civilian Merit Pay System. When properly utilized, this tends to provide added incentives for improved performance by civilian scientists. We suggest that the present system for distribution of merit pay at USAARL be reevaluated by management with a view to making it a more effective incentive system.

4.14 Promotion and Concomitant Pay Problem for Military Scientist Officers who are Members of the Medical Service Corps. - Such officers do not receive incentive pay as do officers in the Medical Corps or Veterinary Corps. Furthermore Medical Service Corps officers who remain in research and development assignments for long periods of time jeopardize their chances for normal promotion. because promotion boards tend to look for diversity of assignments and particularly credit for service schools such as the Command and General Staff College, command experience, and assignment to TO&E units.

4.2 Conclusions

4.21 USAARL, with the concurrence of USAMRDC, should develop and implement cooperative agreements with one or more universities.

4.22 ASARDA should seek a variance, for all U.S. Army Research and Development Laboratories, from present rules requiring the counting of consultants and part-time employees against personnel ceilings.

4.23 USAARL with the concurrence of USAMRDC, should move in an orderly manner toward a combined military and civilian senior management team that includes at least one authorized civilian scientist at the SES level.

4.24 Department of the Army (DA) should ensure that the Army soldier/scientist program is meeting its objectives and that people in this program are treated equitably in terms of career progression and promotion. This question of the soldier/scientist has been long standing. The Army must collectively establish a requirement, determine a program and maintain the commitment over sufficient time to make the program work.

4.25 USAMRDC and USAARL should consider additional establishment of programs to exchange officers between USAARL and other commands to enhance liaison and understanding of programs.

5. PROGRAM AND BUDGET

5.1 Findings

5.11 Program Planning - Program planning seems to be accomplished by a proper mix of top down and bottom up processes. Effective coordination is carried out with other USAMRDC laboratories having common interests. The Tri-service Aeromedical Research Panel (TARP), which has been chartered by formal agreement between The Surgeons General of the Army, Navy, and Air Force, is responsible for reviewing the overall joint research program and submitting recommendations to the respective Service headquarters annually. Technical Working Groups (TWG) are appointed for specific subject areas of common interest. There also is an Armed Services Biomedical Research Evaluation and Management Committee (ASBREM) which coordinates medical, including aeromedical, research across the three services. We believe these approaches should be considered as a model for coordinating other research and development program areas of common interest to more than one Service.

Presently extramural funds for all USAMRDC laboratories are held by the Research Area Directors in Headquarters rather than being released to individual laboratory directors. When a laboratory director wishes to initiate an extramural contract, he must either prepare a RFP and obtain an allocation of funds from USAMRDC Headquarters or be the recipient of a proposal submitted under the Broad Agency Announcement (BAA). Although this process seems to be working well for USAARL, it creates major uncertainties during the planning process since USAARL scientists cannot be sure that the extramural funds will be allocated when desired. We believe extramural funds could be more efficiently planned for and then utilized if a significant portion of them were to be allocated directly to the field laboratories together with signature authority for commitment of funds.

5.12 Program Execution - As mentioned in the previous section, altering the procedures for commitment of extramural funds has the potential for speeding up the process and for assuring that the extramural funds are available when required.

5.13 Program Review and Evaluation - The computerized system in use at USAARL for keeping track of the status of ongoing research and development projects is outstanding and produces timely, short, and informative progress reports. Other Army research and development laboratories should consider the adoption of this, or a similar system, if they do not presently have one.

5.14 Budget - Beginning with FY 88, Base Operations/Real Property Maintenance Activities (BASOPS/RPMA) funds have been transferred from the RDT&E appropriation to the OMA appropriation. An appropriate sum of money was identified to DA to reprogram from RDT&E to OMA to be given to TRADOC and thence to the U.S. Army Aviation Center (USAAVNC) for support of USAARL. Unfortunately for reasons unknown to USAARL only 80 percent of the required support funds was provided to USAAVNC by TRADOC. This shortage of 20 percent of $1,303,000 amounts to $260,600 which was removed from the RDT&E budget. USAARL will have to provide this shortage from RDT&E funds, so in terms of actual research and development studies possible, available funds will drop by $260,600. Surely this sort of situation was not contemplated when the original decision was made.

The removal of independent laboratory in-house research (ILIR) funds from the budgets of all U.S. Army Research and Development Laboratories has had an adverse effect on Army research and development programs far beyond the value of the money saved. The present situation, with the laboratory directors having no discretionary funds, tends to destroy incentives for the scientific staff to address an innovative idea or opportunity that arises from within or without. It also limits any laboratory's flexibility to do those first pilot investigations that allow a new idea to be tested at the concept phase. Such discretionary latitude is essential unless one wants to destroy the initiatives of a young and bright staff and to miss opportunities that need some preliminary work to permit an idea to be defined sufficiently to enter the regular research program cycle.

5.2 Conclusions

5.21 USAMRDC should decentralize to the field program planning as well as program execution for the majority of extramural funds.

5.22 ASARDA should take steps to assure that required support funds for research and development laboratories not be deleted from the budget of host organizations without consultation and concurrence of the tenant laboratories.

5.23 ASARDA should restore ILIR funds to the budgets of Army research and development laboratories.

6. INFORMATION FLOW

6.1 Findings

6.11 Scientific Publications - The preparation and presentation of results of research and development is quite commendable. The number of presentations has been increasing yearly as have the number of in-house reports.

On the other hand, the number of papers that are being prepared for publication in professional (refereed) journals has remained at a relatively low level (5-7/year). For a program of continuing research that has been active for over 20 years, with a present professional staff of 55, this aspect of professional productivity needs attention and stimulation. It is recognized that a contributing factor to this situation is the low priority placed by laboratory management on publication in professional journals. The emphasis of management is quite properly placed on getting research and development results out rapidly and into the hands of users through oral presentations and in-house reports. Once that has been done, however, there is no reason why a scientific report for the professional literature could not be prepared and published. Encouraging this sequence of events would tend to maintain USAARL's reputation for turning out quality research and development reports in a timely fashion and at the same time enhance the professional reputation of the laboratory and of its scientists.

6.12 Communications Within and Outside USAARL - We saw no evidence or barriers to limit the flow of technical information at any levels. In fact, we believe technical communications to, and coordination with, other USAMRDC labs with common interests to be exemplary. The same statement applies equally well to technical interchanges with other Army labs and other Service labs.

6.2 Conclusions

6.21 USAARL management, with the concurrence of USAMRDC, should encourage the publication of research and development results in professional journals by announcing their intention to consider this a matter of importance for merit pay for civilian scientists and for efficiency reports and awards of military scientists.

7. USER'S PERSPECTIVES OF VALUE OF PRODUCTS

7.1 Findings

7.11 Aviation Community Users - Generally the users we contacted had praise for USAARL, its responsiveness, and the quality of its products. For both 1985 and 1986 TRADOC awarded USAARL the Commander's Award for Excellence as the Best Non

TRADOC Facility. One of us, Dr. E. R. Jones, made a visit to the Aeromedical Research Liaison Office (AMRLO) at the Aviation Systems Command (AVSCOM), St. Louis, MO. The summary of Dr. Jones trip report states that the AMRLO is a cost-effective mechanism for representing the interests of the medical community, and serves as a conduit for inserting its products into aviation materiel acquisition. The full text of his report is given in Appendix F. We believe the structure and operation of AMRLO to be a model of how liaison offices should work and of how successful they can be.

7.12 Non Aviation Community Users - While the aviation community is profuse in its support for the professionalism and responsiveness of USAARL, it was difficult to determine user satisfaction outside of aviation. It may well be that USAARL was in a supporting role and it efforts were incorporated in other laboratory programs. However, based upon its mission, USAARL should ensure that their efforts outside of aviation are given emphasis and recognition

8. LESSONS LEARNED

8.1 Findings

8.11 Activities of the Group - This review involved the following activities:

- Formal briefings,
- Question and answer group discussion,
- Visits to users of USAARL products,
- Small group and individual discussions with laboratory personnel,
- Laboratory tour, and
- Executive sessions

Of all these activities we believe formal briefings to be the least helpful. Summary materials extracted from the briefings could be sent to the Panel for review, and the formal briefings eliminated with little loss. All of the other activities were more useful to varying degrees with the individual or small group discussions the most useful. More group and individual time would have permitted a more detailed review and analysis of USAARL's operation than did the structure of the review as conducted.

8.12 Executive Sessions - We made the decision to include the Commander and Deputy Commander, USAARL, in our Executive Sessions along with MG Russell when he was available. In retrospect we believe this decision contributed significantly to

dispelling any fears that we were on a witch hunt and led to candid, productive discussions of many important matters. This approach tends to ensure that Panel findings and recommendations will be based more on facts than on misconceptions.

8.13 Visits to Users - In the time we had to devote to this study we were unable to include visits to more than a few users of USAARL products. This is an aspect which undoubtedly deserved more time than we were able to devote to it.

8.14 Other USAMRDC Laboratory Reviews - For comparison across labs, there should be a comparable set of evaluation objectives and review methods. There should also be some continuity in the composition of review groups to avoid major repetitions of common material. Reviews of additional laboratories should be conducted on as timely a schedule as possible, so that a comprehensive effectiveness evaluation of the total USAMRDC effort will be available.

8.15 Future Improvements in the Review Process - The question of how the assessment methodology and procedures can be improved can be approached from a number of perspectives. With respect to effectiveness evaluations of Army laboratories, for example, we have provided some observations and suggestions based on the USAARL study for ways to strengthen an effectiveness review. More broadly, the question also can be approached with reference to how the laboratory's products, or any other technology based products, are, can be, or should be assessed. Here, we can only note that technology assessment is a complicated and needed activity, which various studies within and without the military have addressed for many years, and which is being examined, again, by the 1988 ASB Summer Study on Technology Insertion. With respect to the operation and products of USAARL, this Ad Hoc Study Group relied essentially on the individual and collective assessments of its members, based on their observations, briefings, and discussions, and knowledge of related DOD activities. In this regard we concur with the findings of the 1987 DSB Summer Study, "Technology Base Management" Statement 2.3: "Quantitative, objective, output-oriented measures of performance of Technology Base Systems simply do not exist. Instead The Study Group relied upon the judgment of its members".

DEPARTMENT OF THE ARMY
OFFICE OF THE ASSISTANT SECRETARY
WASHINGTON, DC 20310-0103

APPENDIX A

30 OCT 1987

Mr. Gilbert F. Decker
Chair, Army Science Board
Penn Central Federal Systems Company
1800 Diagonal Road, Suite 500
Alexandria, VA 22314-2840

Dear Mr. Decker:

A number of recent studies of Federal Laboratories have pointed out the importance of external effectiveness reviews as a means of assuring their continuing excellence. Accordingly, I ask that you appoint an Army Science Board panel of four to eight members to conduct an effectiveness review of the U.S. Army Aeromedical Research Laboratory, Fort Rucker, Alabama. The panel should provide independent observations on potential and actual performance of the laboratory, including professional judgment on the cause of deficiencies, if any. A proposed framework for the assessment is enclosed. Specifically, the panel should address the following five questions:

a. What is the quality of staff, facility and technical program?

b. How productive is the lab in accomplishing its mission?

c. How relevant is the lab's work to important Army problems?

d. How can we improve the assessment methodology and procedures?

e. What are the lessons learned from conducting the review?

MG Philip K. Russell, Commander, Medical Research and Development Command, Fort Detrick, Maryland is the sponsor. Dr. Joseph Osterman, Chief Scientist of the Medical Research and Development Command, will serve as the Cognizant Deputy. COL David Lam, Research Area Director for Army Systems Hazards, will serve as the Department of Army Staff Assistant.

It is not anticipated that your inquiry will go into any "particular matters" within the meaning of Section 208 of Title 18, United States Code.

The panel should begin as soon as possible and complete its review by 1 May 1988.

Sincerely,

J. R. Sculley
Assistant Secretary of the Army
(Research, Development and Acquisition)

Enclosure

APPENDIX B

PARTICIPANTS LIST
Army Science Board Ad Hoc Subgroup
on
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Fort Rucker, Alabama

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OASA(RDA) COGNIZANT DEPUTY
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HQDA STAFF ASSISTANT
COL David M. Lam
Director, Army Systems Hazards Research Program
U.S. Army Medical Research and Development Command
Fort Detrick, MD 21701-5012 425
301-663-7301

APPENDIX C

DEPARTMENT OF THE ARMY
U.S. ARMY MEDICAL RESEARCH AND DEVELOPMENT COMMAND
FORT DETRICK, FREDERICK, MD. 21701-5012

REPLY TO
ATTENTION OF
SGRD-PLC §15)

17 February 1988

MEMORANDUM FOR: SEE DISTRIBUTION

SUBJECT: Army Science Board Ad Hoc Study Group Visit To USAARL

1. On 12 and 13 January 1988, the Army Science Board Ad Hoc Study Group (AHSG) visited the U.S. Army Aeromedical Research Laboratory (USAARL) at Fort Rucker, Alabama, for the purpose of carrying out the first portion of an efficacy/efficiency review. The members of the AHSG are as listed on the attached membership list (Atch 1).

2. Prior to the meeting, all members had been sent a read-ahead package which included the most recent laboratory historical/progress report, the TDA, a current manpower voucher report, and the Command Organization and Structure Regulation (10-1), so as to give them a basic understanding of the laboratory's structure and mission. An agenda for the meeting was also included (Atch 2).

3. After a welcome from COL Price and COL Lam, the AHSG went into an executive session, in which Dr. Barth set forth his concept of the mission of the AHSG, and proposed a mechanism for handling this mission in the most effective way. The terms of reference for this AHSG were reviewed and discussed. He reviewed the contents and format of the reports of several recent similar visits by other AHSGS (Atchs 3, 4, 5), and proposed a modification of these structured visits to meet the needs of the ASB and the USAMRDC.

4. He suggested that the AHSG utilize the following outline in their consideration of the effectiveness of. the USAARL:

I. Mission

A. Is the mission clearly defined?
B. Is the mission statement appropriate, reasonable, and complete?
C. Is there any overlap in mission with other U.S. laboratories?

II. Organization

A. Are there clear lines of authority and responsibility?
B. Is there any overlap of functions?
C. Are support functions appropriately handled?

III. Staff

A. Is there an appropriate skill mix?

B. Is there an appropriate mix of military and civilians?

C. Are there any recruiting or retention problems?

D. Are rewards for excellence appropriately utilized?

E. Is the grade structure appropriate?

F. Are the leadership and managerial skills of the senior staff adequate and appropriate?

G. Are there appropriate/available educational opportunities for the staff?

IV. Facilities and Equipment

A. Are Facilities and Equipment Adequate and Appropriate?

B. Are assignments of facilities and equipment appropriate?

C. Is utilization adequate?

V. Budget

A. Is the budget adequate and appropriate?

B. Is there appropriate distribution by budget categories and program elements.

C. What are the budgetary trends in the past and predicted for the foreseeable future?

VI. Program

A. Is the planning, both long and short-term, appropriate? How is it accomplished?

B. Is implementation appropriate? What is the breakout of contract vs. in-house, and how is this determined?

C. What is the mechanism for program evaluation, both internal and external?

D. Is the research program driven from the top down or the bottom up? How are projects directed/started?

E. Are priorities and resource distributions appropriate within the across program elements? How is this distribution determined?

F. What are the mechanisms for inputs to the program from users, other services, and other Army laboratories?

VIII Information Flow

A. Within the lab, is the information flow appropriate and adequate, whether top down, bottom up, or lateral?

B. Is the flow of information to and from the higher headquarters adequate and appropriate?

C. What is the mechanism for, and adequacy of, scientific exchange?

D. What is the mechanism for, and adequacy of, information flow to and from the users?

VIII. Users' Perspectives of the Value of Lab Products

A. Quality
B. Quantity
C. Timeliness
D. Length of time from R&D to fielded product
E. Value received for resources invested

5. It was agreed by the AHSG members that this outline would form the basis for their evaluation and for the final report. The need for additional meetings to carry out the work of the committee was discussed, and it has determined that the second meeting should take place at USAARL on 30 March and 1 April 1988. The third meeting is presently scheduled to take place at the Pentagon on 19, 20 April 1988. This date has been changed from 5, 6 April 1988 because of change in date of March meeting. Please notify COL Lam NLT 1 March 1988 if you would prefer a change in April meeting date.

6. Following the executive session, the agenda was followed as presented. Excellent command and research area presentations were made, and much discussion ensued. Much interest was evinced on the part of the AHSG members in the whole question of how the program is managed, with particular reference to the relationship between the lab and the Research Area Director at HQ. Specific questions were related to the lab's involvement in (and lack of control of) the extramural research program budget. It was requested that a full review of the Planning, Programming, and Budgeting (PPB) process be presented at the next meeting by Dr. Kimball.

7. The final executive session, at which COL Price, Dr. Kimball, and COL LaMothe were all present, was spent primarily in reviewing the material presented, and in formulating questions on

which to build the next visit. Much attention was paid to the questions of PPB process, as referred to above in para 6.

8. It was determined that at the next meeting, the AHSG members would be split into subcommittees, thus allowing them to spend time at the Research Divisions of their choice. There are to be no formal briefings, with the exception of the one on PPB requested of Dr. Kimball. As at this meeting, the second one will start and end with an executive session. The majority of the first day will be spent in small group sessions with USAARL personnel, and the majority of the second day will be spent in starting to write the AHSG'S report. In the interval between meetings, several individual members of the AHSG will be visiting such user's of USAARL'S products as Aviation Systems Command to obtain the user's viewpoints. It is requested by Dr. Barth that AHSG members bring with them to next meeting their recommendations for at least two or three highest priority items for inclusion in final report.

9. Actions Pending.

A. Arrange for next meeting. Action: Lam/Price
B. Send to AHSG members a breakdown of the past 5 year's USAMRDC budgets broken down by Research Areas and Laboratories. Action: Lam
C. Send AHSG members copies of the "word" and "graph" slides from the USAMRDC command briefing. Action: Lam
D. Plan to present USAARL'S viewpoint on the PPB process at the next meeting. Action: Kimball
E. At next meeting, have available for review copies of all publications resulting from USAARL work, not only Technical Reports--specifically include copies of peer reviewed articles. Action: Price/LaMothe

5 Atchs

DAVID M. LAM
Colonel, MC
Director, Army Systems Hazards
Research Program

DISTRIBUTION:
Commander, USAMRDC
Commander, USAARL
Mr. William M. Brogan
Mr. William W. Bumpus
Dr. Delbert S. Barth
Dr. Edward R. Jones
Dr. Paul F. Parks
GEN Robert W. Sennewald (USA Ret)
Dr. Judith P. Swazey
Dr. Stanley C. White
Dr. Joseph V. Osterman
Dr. Christopher C. Green

DEPARTMENT OF THE ARMY
U.S. ARMY MEDICAL RESEARCH AND DEVELOPMENT COMMAND
FORT DETRICK, FREDERICK, MD. 21701-5012

REPLY TO
ATTENTION OF

SGRD-PLC (70)

4 April 1988

MEMORANDUM FOR: SEE DISTRIBUTION

SUBJECT: Army Science Board Ad Hoc Study Group Visit to USAARL

1. On 30 March and 1 April 1988, the Army Science Board Ad Hoc Study Group (AHSG) visited the U.S. Army Aeromedical Laboratory (USAARL) at Fort Rucker, Alabama. The purpose of the visit was to continue their efficacy/effectiveness review.

2. Attendees were as noted on the attached "Time and Attendance Sheet", plus MG Russell, SES4 Osterman, COL Lam, and the Command Staff of USAARL.

3. The primary purpose of this visit was to allow the ASB members to discuss issues with various elements of the laboratory. After the AHSG broke into smaller groups to facilitate having the opportunity to discuss issues with each element of the laboratory, this was accomplished. The only formal presentation was by COL Price, CDR USAARL, who presented an overview of the accomplishments of the laboratory during the past three years. MG Russell and the AHSG members discussed his viewpoint on this visit at some length. The one point he made which needs to be noted here is that he wishes future AHSGs which visit USAMRDC laboratories to have some carry-over in membership (and thus institutional memory) from this particular AHSG.

4. The next, and final, meeting of this AHSG will take place in the Pentagon on 19-20 April 1988. The room reserved for the meeting is 2E715B, and Dr. Barth determined that the meeting would start at 0800. Since this meeting is at the Pentagon, rather than at Fort Rucker or Fort Detrick, it will be difficult for me to offer much in the way of assistance regarding accommodations or transportation. If there are any problems I can assist with, I will be glad to try, but transportation to and from the airport as well as room reservations will remain an individual responsibility for this meeting.

5. The purpose of the final meeting is to write a AHSG report. Dr. Barth will prepare a "strawman" for discussion. If any member wishes to ensure that input is brought before the AHSG for discussion, but will not be able to attend the meeting, please send me the input and I will ensure it is presented.

6. Comments prepared by Dr. White and Dr. Jones as a result of the first meeting, and which were discussed at this meeting, are attached for information.

SGRD-PLC (70)
SUBJECT: Army Science Board Ad Hoc Study Group Visit to USAARL

7. I look forward to seeing each of you on the 19th. If you are unable to attend, I would appreciate your informing me, so that I can inform Dr. Barth

3 Atchs

ROY K. SEDGE, Ph.D.
Colonel, MS
Senior Staff Officer
Army Systems Hazards Research Program

DISTRIBUTION:
Cdr, USAMRDC
Cdr, USAARL
Dr. Delbert S. Barth
Mr. William M. Brogan
Mr. William W. Bumpus
COL Richard Entlick
Dr. Christopher C. Green
Dr. Edward R. Jones
Dr. Joseph V. Osterman
Dr. Paul F. Parks
GEN. Robert W. Sennewald (USA RET)
Dr. Judith P. Swazey
Dr. Stanley C. White

16 March 1988

SGRD-UAC (70)

SUBJECT: Itinerary for Follow-up Visit

Party: Army Science Board Ad Hoc Subgroup

Purpose: Conduct Effectiveness Review

Escorts: Colonel Dudley R. Price, MC
Commander, USAARL; and
Colonel J. D. LaMothe, MS
Deputy Commander for Science,
USAARL

30 March 1988 (Wednesday)

Afternoon and Evening	Individual Transport to the Colony Inn from Dothan Airport

31 March 1988 (Thursday)

0810 - 0830	Pickup at Colony Inn; Arrive USAARL (Bldg 6901)
0830 - 0845	Welcome by Colonel Price (By Major General Russell, if available)
0845 - 1145	Review of USAARL Documents/Research Publications
1145 - 1150	En Route to Ft. Rucker Officers' Club
1150 - 1300	No Host Lunch (With Dr. Osterman, Colonel Lam, Colonel Price, Colonel LaMothe, Lieutenant Colonel Enloe, Dr. Kimball, and Division Directors)
1300 - 1310	En Route to USAARL (Bldg 6901)
1310 - 1600	Dispersement of Board Members to: Research and Support Divisions and Headquarters (Resources Management Branch, Programs and Plans, and Office of Commander/Deputy Commander)
1600 - 1615	En Route to Colony Inn
1615 - 1830	Open Time
1830 - 1840	En Route to The Local Restaurant in Enterprise

SGRD-UAC
SUBJECT: Itinerary for Follow-up Visit

31 March 1988 (Thursday) (cont'd)

1840 - 2100	Social/Dinner (No host with Major [illegible] Russell, Dr. Osterman, Colonel Lam, USAA[illegible]der, Dep. Commanders, Director, Programs [illegible] and Divi. Directors)
2100	En Route to Colony Inn

1 April 1988 (Friday)

0810 - 0830	Depart Colony Inn for USAARL (Bldg 6901)
0830 - 0850	Remarks by Major General Russell
0850 - 0945	Executive Session with Major General Russell, Dr. Osterman, Colonel Lam, Colonel Price, and Colonel LaMothe
0945 - 1000	Break
1000 - 1130	Executive Session with Major General Russell, Dr. Osterman, Colonel Lam, Colonel Price, and Colonel LaMothe
1130 - 1140	En Route to McLin's Restaurant in Daleville
1140 - 1250	Lunch at McLin's Restaurant in Daleville (With Major General Russell, Dr. Osterman, Colonel Lam, Colonel Price, Colonel LaMothe, Lieutenant Colonel Enloe, and Dr. Kimball)
1250 - 1300	En Route to USAARL (Bldg 6901)
1300 -	Additional Information Gathering at the Discretion of Dr. Barth

DUDLEY R. PRICE
Colonel, MC
Commanding

DISTRIBUTION:
DCS
DCA
Dir, Programs & Plans
Ch, Res Mgmt Br
Ch, SIC
Adj/Det Cdr
Ea Div Dir

DEPARTMENT OF THE ARMY
U.S. ARMY MEDICAL RESEARCH AND DEVELOPMENT COMMAND
FORT DETRICK, FREDERICK, MD. 21701-5012

REPLY TO
ATTENTION OF

22 April 1988

SGRD-PLC (70)

MEMORANDUM FOR: SEE DISTRIBUTION

SUBJECT: Army Science Board Ad Hoc Study Group/Army Aeromedical Laboratory

1. On 19 and 20 April 1988, the Army Science Board Ad Hoc Study Group (AHSG) met in room 2E715B at the Pentagon. The purpose of this meeting was to finalize the first draft of the AHSG's report on the efficacy and efficiency of the U.S. Army Aeromedical Research Laboratory (USAARL), Fort Rucker, Alabama.

2. Attendance was as shown on the attached Time and Attendance Sheet, plus Dr. Osterman and COL Lam. Drs. White and Jones were unable to attend.

3. The Defense Science Board Summer Study on Technology Base Management was reviewed, and copies distributed. Copies for Dr. White and Dr. Jones are included with this mailing.

4. After much spirited discussion, the first draft of the AHSG's report was completed. It has since been retyped, and is enclosed for your information and review. Dr. Barth would appreciate your considered criticism and comments in an expeditious manner, so that the final report can be finished within our allotted time frame. He requests that all comments be mailed to reach him NLT 6 May, so that comments can be collated and a final copy produced by the end of May.

5. Dr. Barth's address is:

Dr. Delbert S. Barth
Senior Scientist
Environmental Research Center
University of Nevada
Las Vegas, Nevada 89154-0001

SGRD-PLC (70)
SUBJECT: Army Science Board Ad Hoc Study Group/Army Aeromedical

6. If I may be of any further assistance, please don't hesitate to call.

David M. Lam

DAVID M. LAM
Colonel, MC
Director, Army Systems Hazards
Research Program

Atchs

DISTRIBUTION:
CDR, USAMRDC
SGRD-ZB, BG Travis
CDR, USAARL
Dr. Delbert S. Barth
Mr. William M. Brogan
Mr. William W. Bumpus
COL Richard Entlick
Dr. Christopher C. Green
Dr. Edward R. Jones
Dr. Joseph V. Osterman
Dr. Paul F. Parks
GEN Robert W. Sennewald (USA RET)
Dr. Judith P. Swazey
Dr. Stanley C. White

APPENDIX D

MISSION STATEMENTS FOR USAMRDC AND SUBORDINATE ELEMENTS

U. S. Army Medical Research and Development Command, Fort Detrick, Frederick, MD

MISSION. The Commander and staff of the Headquarters plan, program, coordinate, direct, and review the United States Army Medical Department Research Development. Test and Evaluation (AMEDD RDTE) Program in accordance with public law and the general provisions of Ar 10-77. Program review includes staff oversight of program execution.

Letterman Army Institute of Research (LAIR) The Presidio, San Francisco, CA

MISSION. LAIR provides general military medical research and conducts research in the areas of dermal protection against biological chemical and radiological hazards, battlefield casualty management, effects of military lasers, experimental psychology, military trauma and resuscitation, blood preservation, chronic mammalian toxicology, and within available resources and capabilities, supports clinical investigation projects recommended by Commander, Letterman Army Medical Center. Performs other medical research activities as directed by the Commanding General, USAMRDC.

U.S. Army Institute of Surgical Research (USAISR)

MISSION. The USAISR investigates problems of technical and thermal injury and the complications arising from such trauma. Cares for patients with such injuries. Conducts investigative studies at both the basic and clinical levels; teaches and trains physicians and ancillary medical personnel in the principles of management of injured patients.

U.S. Army Institute of Dental Research (USAIDR)

MISSION. The USAIDR conducts research and development on the treatment of combat maxillofacial injuries and on prevention and treatment of field dental emergencies. This includes research to devise new and improved methods of emergency surgical management of wounds on the battlefield and, subsequent, definitive surgical restoration of the maxillofacial area to full function; research and development of biocompatible and biodegradable materials for use as implants to replace lost soft tissue and/or base in wounded personnel; research to devise new and improved methods of treating oral and maxillofacial wound infections; epidemiological

investigations of field dental emergencies; development of dental materials capable of reliable permanence under all field operational conditions; and assisting in the development of dental equipment capable of reliable performance and easy maintenance under all field operational conditions. Included in the mission of USAIDR are research and development of improved methods for the rapid diagnosis on the battlefield of chemical casualties and assisting in the development of an improved chemical casualty management system.

U.S. Army Medical Materiel Development Activity (USAMMDA)

MISSION. To manage execution of the development component of the AMEDD RDT&E materiel developer responsibility to achieve DA and Joint Service materiel system performance schedule, cost and logistic objectives. This includes responsibility for centralized planning, direction, control, management, and focus of the Medical Materiel Developer's Program; achieving Army unique and Joint Service operational performance, schedule, cost and logistics objectives for each system and subsystem; acquisition strategy development; resource planning, execution and accounting; Joint Service Program Planning; Combat Developer and Trainer Coordination; readiness planning and coordination; industrial preparedness planning, production base support, manufacturing technology, and facilities; Medical Materiel Acquisition Management (MEDMAM) career development proponency and training.

Walter Reed Army Institute of Research (WRAIR)

MISSION. The mission of this institute is to provide general military medicine research capability and conduct research in the areas of communicable diseases and immunology, combat surgery, combat psychiatry, drug development, medicine, military hazards of blast overpressure, chemical and nucleus warfare defense, and the biological effects of microwave irradiation; plan and conduct graduate education programs as directed by The Surgeon General and conduct undergraduate level training programs to provide to the Army Medical Department personnel experienced and trained in military medical research capabilities; conduct undergraduate level training of Animal Care Specialists to support all branches of the Department of Defense.

Under the provisions of AR 40-5 and AR 40-411, WRAIR will:

a. Provide epidemiologic consultation services for the Office of the Surgeon General (OTSG) and other agencies.

b. Provide advisory services on problems in procedures or techniques in military medicine.

c. Provide special technical quality control where required, and conduct development studies in relation to biological products presenting problems of military importance.

d. Act as a diagnostic reference source for difficult medical service problems and evaluations that require complicated analyses or tests not available in other Army installations.

e. Provide technical supervision of extramural contracts and grants sponsored by the USAMRDC that are specifically related to WRAIR in-house programs.

f. Provide command, control, technical supervision and support for the collaborative research studies performed by the WRAIR Field Activities. The WRAIR Special Field Activities conduct medical research in CONUS and in areas outside the continental United States in direct support of the parent unit, the WRAIR.

U.S. Army Bioengineering Research and Development Laboratory (USABRDL)

MISSION. The USABRDL conducts basic research in the areas of field medical materiel, vector control systems, health hazard assessments, and environmental health effects. It also develops or modifies, tests and evaluates field medical, dental, and water treatment equipment and technologies, as well as develops vector and field sanitation methods, materials, and equipment to meet military needs. The laboratory establishes atmospheric and water related health hazard data bases for occupational and field exposures to chemicals and microorganisms and provides exposure guidance and recommends environmental criteria and pollution abatement procedures for chemical substance from Army industrial and field operations. In addition USABRDL provides research, consultation, and technical services to the Army and other federal agencies as requested.

U.S. Army Medical Research Acquisition Activity (USAMRAA)

MISSION. USAMRAA supports the Command and Headquarters staff, USAMRDC, and subordinate units concerning acquisition policies, procedures, and rules pertaining to the extramural research program to include training of project officers on the contract process. Responsible for all research and development contract actions for subordinate units. Responsible for all procurement support of: HQ, USAMRDC; U.S. Army Garrison, Fort Detrick and tenant units; selected actions as directed by USAMRDC; WRAIR; and USAIDR. Provides comprehensive and responsible procurement support for laboratories outside of the continental United States.

U.S. Army Medical Research Institute of Chemical Defense (USAMRICD)

MISSION. The USAMRICD is the USAMRDC lead laboratory for conduct of research, development test, and evaluation (RDTE) as it relates to medical defense against chemical warfare. This mission includes: fundamental and applied research on mechanisms of action of CW threat agents, candidate pretreatment, treatment and decontamination compounds in order to establish a scientific and technical base from which to plan and formulate enhanced medical countermeasures to CW threats and improved prevention and treatment modalities for CW casualties; test and evaluation of drugs, decontaminants, and medical equipment in development for the prevention, resuscitation, treatment, and management of chemical casualties; assistance in the integration of the concepts and products from these RDTE mission activities into the logistical system, doctrine and organizational development, and training; and training of both medical and non-medical personnel in the prevention and management of chemical casualties.

U.S. Army Research Institute of Environmental Medicine (USARIEM)

MISSION. Conducts research on the effects of temperature, altitude, work and nutrition on the health and performance of the individual soldier and combat crews operating Army systems. Assesses decrements to soldier or combat crew performance caused by the synergy of environmental extremes protective measures used in NBC sustained operations. Conducts research on the biomedical processes limiting physical performance to determine physical fitness requirements and seek solutions to medical problems related to physical training and exercise. Defines the complex interaction of environmental/operational stress and Army systems and develops, evaluates and assists in the implementation of strategies designed to protect the soldier and enhance performance. In coordination with the Natick Research, Development, and Engineering Center (Natick and through liaison with other Federal agencies, conducts research to develop the technology base required to evaluate feeding strategies for operational rations and supplements to minimize soldier performance decrements under sustained combat conditions and discharge the Army Surgeon General's responsibilities as DOD executive agent for nutrition. Assists Natick in the development of personal clothing and equipment by assessing the physiological impact of these items under all climate conditions. Provide technical advice and consultant services to Army commanders, installations and activities in support of the Army Preventive Medicine Program and, on request to other Federal agencies.

U.S. Army Medical Research Institute of Infectious Disease (USAMRIID)

MISSION. Develops strategies, products, information, procedures, and training for medical defense against biological warfare agents and naturally occurring infectious agents of military importance that require special containment.

a. Under the supervision of Walter Reed Army Medical Center, operates a medical treatment facility (Ward 200) to provide hospitalization and medical support o human-use protocol patients and to individuals contracting or suspected of having been exposed to work-related infectious disease. Support of protocol patients and other entitled military and civilian personnel is on a reimbursable basis in accordance with current support agreements and within the professional capabilities of the institute.

b. Provides administrative, logistical and ancillary services support to the U.S. Army Health Clinic and U.S. Army Dental Clinic, Fort Detrick, in accordance with current support agreements.

c. Additional functions based on interagency and interservice support agreements.

(1) Conduct a course on medical management of biological warfare casualties.

(2) Assist in terrorist biological threat assessment for DOD and other government agencies.

(3) Operate Medical Biological Reaction Teams for potential worldwide deployment.

(4) Provide high containment evacuation capability for persons exposed to high-hazard infectious agents.

(5) Provide a high containment treatment and hospitalization area for the DOD.

(6) Provide a high containment postmortem laboratory to support DOD needs including those of the Armed Forces Institute of Pathology.

APPENDIX E

USARRL'S RESEARCH PROGRAM CONTENT

Hearing Protection

Noise is the military environment hazard to hearing. Turbine engines produce high frequency noise; helicopters and tracked vehicles create both high frequency and low frequency noise; and ballistic weapons produce impulse noise.

Investigators at USAARL are studying the effects these various noise threats have on hearing and communication, and seek ways to reduce the noise or to protect the exposed soldier. Our bioacoustics program develops noise exposure limits and validates the hearing protection afforded by helmets and other protection devices to assure that the soldier receives adequate noise protection.

Visual Enhancement and Protection

The military operational environment demands heavily on visual information. Computers, aircraft, tanks, weapons--all must have methods of displaying and transferring visual information rapidly and efficiently to the human operators. USAARL conducts laboratory and field experiments to evaluate mission-related visual requirements, seeking to optimize visual enhancement and protection systems design to visual physiologic capabilities of the soldier. This ensures that visual function is not compromised in helmet mounted displays, CRTS, and sophisticated night vision-enhancement technology. This work also involves development of system specific visual selection standards for the soldier.

Investigators at USAARL are determining the effects of nerve agent antidotes and pretreatment therapies on the visual system and providing models of visual performance under conditions likely to occur on a chemically contaminated battlefield

Spectacles and protective masks have long been worrisome for the soldier, in the field and in the air. Mask-compatible spectacles and contact lense currently are being tested to address this problem. In addition, USAARL actively is involved in the test and evaluation of all protective eyewear, to include items for impact protection as well as those against directed energy and flash blindness.

Workload Stress and Fatigue

One of the main problems facing Army aviators and ground based troops is fatigue. Man has very definite limits. Exceeding these limits result in decrements in performance and potential safety hazards.

USAARL scientists are studying workload and fatigue relative to various operational and training requirements such as terrain flight, night vision goggle flight, air-to-air combat maneuvering, and flying in chemical protective gear. In-flight assessment of aviator performance and analysis of human performance data provide information upon which to base aircrew flight time and crew rest guidelines.

In addition to the stress and fatigue of sustained operations, soldiers now face exposure to the effects of various antidotes and pretreatment drugs because of the threat of chemical weapons. Investigators at USAARL are engaged in the study of the effects of these and other drugs on aviator performance both in flight simulators and actual aircraft.

Physiological Life Support

This research program is designed to identify, evaluate, and develop countermeasures for those health hazards resulting from the mismatch between the soldier's physiologic requirements and the operational environment. Current research thrusts include: the application of molecular sieve technology to aircraft and medical oxygen systems; the test and evaluation of physiologic life support equipment aboard MEDEVAC aircraft; the use of biotelemetry and artificial intelligence to capture physiologic data from combat crews during extended operations in NBC environments; the development of physiologic sensors and recording techniques; the development and optimization of predictive response models for specific environmental and physiologic threats; and the development of an aviation physiologic and epidemiologic database to track the health status of all Army aviators throughout their careers.

Protective Life Support Systems

USAARL has been designated as the agency to evaluate and analyze tri-service helicopter life support equipment involved in aircraft accidents. This Aviation Life Support Equipment Retrieval Program (ALSERP) operates whenever there is an aircraft accident in which life support equipment either prevents an injury or allows an injury to occur. This analysis includes items such as helmets, crashworthy seats, and thermal protective clothing.

Impact Injury

Studies indicate that approximately one in three aviator fatalities is due to head and/or neck injuries. Much remains to be known regarding head and neck injury mechanisms relative to force magnitude and vector. Work is ongoing at USAARL to widen the database on such injury, to ensure adequate protection through systems improvement and design changes for new systems. USAARL is active in design criteria and testing for all new aviation and combat vehicle protection helmets, to include weight, center-of-gravity, anthropometric fit, acoustics, and impact protection. In addition, current studies are evaluating the tolerance of impact force from enemy projectiles defeated by personal body armor.

Vibration Hazards

USAARL's efforts in performing vibration health hazard research are addressing inadequacies in current vibration exposure standards. These efforts will expand the database of vibration exposure hazards in two primary areas; mission performance and long-term health effects. Vibration exposure standards will become more tailored to the unique military environment. Special interest is being directed to vibration levels and operator task complexity found in new high-speed tracked and wheeled vehicles as well as aircraft. The general goals of the program are to define vibration effects and where possible, recommend a means to alleviate the detrimental influences of exposure.

APPENDIX F

TRIP REPORT OF DR. E. R. JONES VISIT TO AMRLO

AVSCOM/USAMRDC LIAISON

A visit was made on 4 February 1988 to the Aeromedical Research Liaison Office (AMRLO) at AVSCOM, St. Louis. The purpose was to review the USAARL interface with the aviation hardware community to encompass AMRLO functions, organizational relationships, and specific contributions.

RESPONSIBILITIES

The functions of the AMRLO are outlined in an MOU between the commander of USAMRDC and AVSCOM (Attachment 1). The primary function is coordination of life sciences R and D and health hazard considerations in aviation materiel acquisition. AMRLO also provides a point of contact for the Academy of Health Sciences and The Office of the Surgeon General regarding aviation requirements.

AMRLO STAFFING

MAJ Danny E. Lacy, MSC, is the liaison officer. He has held the position since AMRLO was established in August 1983. Until recently he was supported by a secretary/administrator who probably will not be replaced.

MAJ Lacy is an aeromedical evacuation pilot who is current in helicopters and had a combat tour in Vietnam where he was awarded the DFC. He has a BS in psychology/sociology and, more important, was a staff assistant to the Commander, USAMRDC prior to the AVSCOM Assignment. He is knowledgeable regarding R and D in the DOD medical community and has attended a number of service schools but none for materiel acquisition or MANPRINT.

MAJ Lacy reports to COL J. D. LaMothe, Deputy Commander for Sciences, USAARL.

LIAISON FUNCTION

Process - The AMRLO has full staff privileges at AVSCOM and is considered an operating team member of the staff. Cognizance of activities is provided through a number of mechanisms:

- Electronic AVSCOM data bases reflecting events, visitors, TDY, meetings, etc.

- Working relationships/contacts provided by past activities.

- "Shoe leather" coordination through regular visits to key functions at AVSCOM as well as visits to USAARL (3-4 times/year), Office of The Surgeon General (3 times/year), and USAMRDC (2 times/year) along with multiple visits to contractor activities.

MAJ Lacy demonstrated he is knowledgeable about relevant activities in AVSCOM and his own command and that he draws on the capabilities of USAMRDC in supporting AVSCOM.

INTERFACES

The primary interaction is with the AVSCOM Life Support Equipment Program Manager. A secondary but important interface is with the liaison offices for HEL (3 person) and ARI (2 person plus support contractor) where considerable collaboration appears to exist especially for MANPRINT issues. Information also is obtained from USAF and USN counterparts for areas such a laser protection devices and techniques.

A considerable amount of effort is spent in identifying for AVSCOM responsible Army organizations and individuals in biomedical related areas such as CBR protection.

SPECIFICS

Health Hazard Assessments (HHA) and now MANPRINT appear to be the primary vehicles for participation. Mechanisms include writing SOW's, participation in SSB proceedings, attending design reviews, and defining test requirements. Attachment 2 has an outline of some of the activities performed from June 1986 to January 1988 for The Surgeon General, USAARL, and others. A series of messages between USAARL and the AMRLO were examined which showed their interaction.

ASSESSMENT OF THE VALUE OF THE AMRLO FUNCTION

AMRLO seems to be of considerable importance for the medical R and D community and will become more so as MANPRINT continues to be implemented. AVSCOM personnel tend not to know Army sources of research or expert advice that relate to their equipment. AMRLO identifies these sources and becomes a conduit for data. This is not an easy role considering the size of AVSCOM and the frequent reorganizations.

The Liaison function is highly personal. MAJ Lacy recognizes that a 'reference' book probably should be prepared documenting

the process, contacts, and specifics and that an OJT period of about three months should be considered in transitioning any replacement. Training in systems acquisition management and MANPRINT (Fort Belvoir) would be desirable.

The AMRLO function and its effectiveness should be examined in considering the possibility of establishing liaison offices at other commodity commands such as TACOM.

SUMMARY

The AMRLO is a cost-effective mechanism for representing the interests of the medical community and as a conduit for its products into aviation materiel acquisition.

MAJ Lacy was very cooperative during my visit and showed knowledge of a wide range of relevant aviation issues.

APPENDIX F
ATTACHMENT 1

MEMORANDUM OF UNDERSTANDING

BETWEEN

COMMANDING GENERAL

U.S. ARMY AVIATION SYSTEMS COMMAND (AVSCOM)

AND

COMMANDING GENERAL

U.S. ARMY MEDICAL RESEARCH AND DEVELOPMENT COMMAND (AMRDC)

PHILIP K. RUSSELL
Major General, MC
U.S. Army Medical Research and
Development Command

18 NOV 1986
DATE

RICHARD E. STEPHENSON
Major General, USA
U.S. Army Aviation Systems Command

30 OCT 1986
DATE

DEPARTMENT OF THE ARMY
PRODUCT MANAGER AVIATION LIFE SUPPORT EQUIPMENT
4300 GOODFELLOW BOULEVARD, ST. LOUIS, MO 63120-1798

REPLY TO
ATTENTION OF

MEMORANDUM OF UNDERSTANDING
BETWEEN
COMMANDER, U.S. ARMY MEDICAL RESEARCH AND DEVELOPMENT COMMAND
AND
COMMANDER, U.S. ARMY AVIATION SYSTEMS COMMAND

SUBJECT: Provisions for the Continuation of an Aeromedical Research Liaison Office, Provided by the U.S. Army Medical Research and Development Command (USAMRDC), Located at the U.S. Army Aviation Systems Command (AVSCOM)

1. PURPOSE: This Memorandum of Understanding (MOU) is to provide a set of circumstances under which the maintenance of an Aeromedical Research Liaison Office, provided by USAMRDC, located at AVSCOM, may be continued.

2. REFERENCES:

a. AR 70-1, System Acquisition Policy and Procedures, 1 Feb 84.

b. AR 40-10, Health Hazard Assessment Program in Support of the Army Materiel Acquisition Decision Process, 15 Oct 83.

c. AR 40-60, Policies and Procedures for the Acquisition of Medical Materiel, 15 Apr 83.

3. PROBLEM: A need exists for the USAMRDC to provide input into and promote the coordination of life sciences research and development and health hazards considerations in the Army aviation materiel acquisition cycle. This is best accomplished by the continued maintenance of an Aeromedical Research Liaison Office (AMRLO) at the U.S. Army Aviation Systems Command to provide readily available biomedical consultation and input on Army aviation systems development.

4. SCOPE: This agreement provides a set of circumstances which enables the AMRLO to provide mutually beneficial functions for both USAMRDC and AVSCOM.

5. AGREEMENTS:

a. The Commander, USAMRDC will:

(1) Execute his responsibilities through the Commander, U.S. Army Aeromedical Research Laboratory (USAARL), Fort Rucker, Alabama.

(2) Provide a biomedical research consultant, with background in aeromedical research, development, test and engineering (RDTE) processes to serve at HQ, AVSCOM. The consultant, hereafter known as the AMRLO, will:

(a) Review aviation materiel requirements documents and participate in developing the documents as appropriate.

(b) Assist in administrative processes and coordination of health hazard assessment processes and issues.

(c) Provide a point of contact to be available for consultation in coordination of medical issues of aviation materiel requirements and developmental systems between AVSCOM and the Army medical developer and user communities.

(d) Provide a point of contact to work closely with the Academy of Health Sciences and the Office of The Surgeon General to foster enhanced communication with AVSCOM concerning Army Medical Department (AMEDD) aviation requirements.

(e) Serve as a participating action officer in development and staffing actions including Source Selection Evaluation Boards, In Process Reviews, mock-up reviews and design reviews for aviation systems.

(f) Initiate coordination with lateral liaison offices and agencies as required when a materiel development program incorporates materiel or technology of other commands and agencies to ensure that overall system effectiveness and soldier health is not compromised, i.e., coordinate medical and health aspects of laser optical and guidance systems, aviation clothing and equipment, chemical and biological warfare protection for aviation personnel, and life support equipment and crashworthiness.

(g) Monitor test and evaluation of AMEDD aviation materiel systems and selected non-AMEDD aviation systems.

(h) Provide a point of contact to be available for help in coordination of medical issues for aviation RDTE with the U.S. Army Training and Doctrine Command combat development agencies.

(i) Alert USAMRDC to requirements for biomedical RDTE, anticipate unique requirements impacting training, personnel selection, and personnel safety and health, to assure that appropriate AMEDD agencies are cognizant of these requirements, and inform USAARL of anticipated in-house AVSCOM studies to support the command's research and development effort.

Life Support Equipment.

(2) Provide the AMRLO with full staff privileges as an operating team member on the AVSCOM staff.

(3) Authorize the AMRLO to serve routinely as a nonvoting attendee at Source Selection Evaluation Boards, research and development program reviews, In Process Reviews, and other management and coordinating meetings. The AMRLO may be requested to serve as a voting member when appropriate and the individual case warrants such action.

(4) Encourage visitors to AVSCOM to contact the AMRLO, as appropriate and deemed necessary.

c. The parties agree that the AMRLO will conduct frequent and periodic visits to AMEDD combat/materiel developer/RDTE activities. Also, the AMRLO will provide AVSCOM, upon request, biomedical/scientific information available through USMRDC's computer network. The parties further agree that, as a minimum, AMRLO attendance is required at:

(1) USAARL technical/program reviews.

(2) Aviation program reviews.

(3) Major Army Command and Development of the Army level aviation staff conferences.

(4) HQ, USAMRDC program reviews.

d. The parties agree to provide support as required to execute their responsibilities under this MOU.

e. The parties to this MOU agree that each shall fund the cost of travel they specifically invite on their behalf for the AMRLO in executing this MOU.

e: Provisions for the Continuation of an Aeromedical Research Liaison Office, Provided by the U.S. Army Medical Research and Development Command (USAMRDC), Located at the U.S. Army Aviation Systems Command (AVSCOM)

(1) The AMRLO will formulate a quarterly travel plan based upon input from USAMRDC and AVSCOM. The AMRLO will provide copies of the travel plan to AVSCOM as requested.

(2) USAARL will provide funds for AMRLO travel specifically directed by USAARL, and civilian pay.

f. The parties agree to the following Officer Efficiency Rating scheme:

(1) Rater - Deputy Commander for Science, USAARL

(2) Senior Rater - Commander, USAARL

g. Base operations support identified by AR 37-100 will be provided by AVSCOM on a nonreimbursable basis in accordance with AR 37-49, with the exception of TDY and civilian pay.

h. The AMRLO personnel and finance records will be maintained at the station at which the AMRLO is assigned. Provisions for base operations support are documented by separate DD Form 1144.

6. EFFECTIVE DATE: This MOU will become effective upon signature by both parties and expire six (6) years from the date of the last signature.

a. Each party will review the MOU 120 days prior to the new fiscal year, with a joint review taking place every two years.

b. Amendments to the MOU may be initiated at any time upon the written request of either party. Minor administrative amendments such as changes in acronyms or a change of raters may be accomplished with an exchange of letters; one party initiating the change, the other party acknowledging the change.

c. The MOU may be unilaterally terminated by providing the other party with 120 days written notice.

7. Administrative points of contact for AVSCOM and AMRDC are as follows:

Product Manager
Aviation Life Support Equipment
ATTN: AMCPM-ALSE-D
4300 Goodfellow Blvd.
St. Louis, MO. 63120-1798

Commander
U.S. Army Medical Research
and Development Command
ATTN: SGRD-RMC
Ft. Detrick
Frederick, MD 21701-5012

(j) Submit recommendation to the Commander, USAMRDC, on desired provement in AMEDD aviation RDTE management programs.

(k) Provide the Commander, AVSCOM, and his staff with access to appropriate biomedical research data repositories.

b. The Commander, AVSCOM will:

(1) Execute his responsibilities through the Product Manager Aviation Life Support Equipment.

(2) Provide the AMRLO with full staff privileges as an operating team member on the AVSCOM staff.

(3) Authorize the AMRLO to serve routinely as a nonvoting attendee at Source Selection Evaluation Boards, research and development program reviews, In Process Reviews, and other management and coordinating meetings. The AMRLO may be requested to serve as a voting member when appropriate and the individual case warrants such action.

(4) Encourage visitors to AVSCOM to contact the AMRLO, as appropriate and deemed necessary.

c. The parties agree that the AMRLO will conduct frequent and periodic visits to AMEDD combat/materiel developer/RDTE activities. Also, the AMRLO will provide AVSCOM, upon request, biomedical/scientific information available through USMRDC's computer network. The parties further agree that, as a minimum, AMRLO attendance is required at:

(1) USAARL technical/program reviews.

(2) Aviation program reviews.

(3) Major Army Command and Development of the Army level aviation staff conferences.

(4) HQ, USAMRDC program reviews.

d. The parties agree to provide support as required to execute their responsibilities under this MOU.

e. The parties to this MOU agree that each shall fund the cost of travel they specifically invite on their behalf for the AMRLO in executing this MOU.

APPENDIX F
ATTACHMENT 2

ACTION ITEMS - JUL 86 - JAN 88

ACTIONS PERFORMED BY THE ARMLO ON BEHALF OF OTSG:

BLACKHAWK FIELDING ISSUES

- 6 refurbished UH-60s for 498th Med Co (AA)
- 6 UH-60s for 247th Med Det
- Repair Program for UH-60 fleet for oil cooler spline - obtaining higher priority for repair in medical units
- 7 new UH-60s for 498th Med Co (AA) - New plus @ 4 months ahead of schedule
- Internal rescue hoist repair program (UH-60 and UH-1)
  - contract with Western Gear Corp. for repair of 15 hoists
  - CCAD in house repair program
  - hoist readiness survey of medevac units in CONUS
- Litter seat belt kit (110 kits)
- 6-litter configuration kits (30 initial kits)
- Auxillary heater kit for UH-60 medevac aircraft (135 kits)
- Action concerning special seats for UH-60 crew chief and medic in medical units; directed action to AHS, DCD after coordination with PM, Blackhawk, AVSCOM, and OTSG
- 1 UH-60 for USAARL
- Represented OTSG at various UH-60 fielding and distribution plan meetings
- Deployment kit (special tools) issue for 247th Med Det
- Loan of 3 APR 39s for operational test - 247th Med Det
- Serves as point of contact for all issues from AVSCOM and PMs for OTSG

ACTION ITEMS (cont'd)

ORMED BY THE AMRLO AS A REPRESENTATIVE OF USAARL:

rimental external hoist mounting brackets - AVSCOM SP Office

GU-56/P aircrew helmet program - ALSE-PM

Laser eye Protection (visor) - ALSE-PM, Engineering, and AAH-64-PM

- M-43 Mask Program - ALSE-PM, AAH-64-PM

- Corrective vision issue (M-43 Mask contact lenses) - ALSE-PM and AAH-64-PM

- Contact Lenses for CG, AVSCOM - AVSCOM

- IHADDS helmet visor (laser protection and quality/waiver issues) - AAH-64-PM

- LHX Manprint Working Group member - LHX-PM

- CH-47 Manprint Working Group Member - CH-47-PM

- T-800 engine Manprint Working Group Member - LHX-PM

- Blackhawk Systems Safety Working Group Member - Blackhawk-PM

- V-22 Manprint Working Group Member - CH-47-PM

- ECP for instrument modification (USAARL-UH-60) - Blackhawk-PM

- Externally mounted rescue hoist (USAARL-UH-60) program - Blackhawk-PM, USAMMDA

- Serves as a daily point of contact between AVSCOM and PMs to various USAARL disciplines on technical issues in aviation development systems

ACTION ITEMS (cont'd)

ACTIONS PERFORMED BY THE AMRLO AS A REPRESENTATIVE OF USAARL:

- Experimental external hoist mounting brackets - AVSCOM SP Ops Office
- HGU-56/P aircrew helmet program - ALSE-PM
- Laser eye Protection (visor) - ALSE-PM, Engineering, and AAH-64-PM
- M-43 Mask Program - ALSE-PM, AAH-64-PM
- Corrective vision issue (M-43 Mask contact lenses) - ALSE-PM and AAH-64-PM
- Contact Lenses for CG, AVSCOM - AVSCOM
- IHADDS helmet visor (laser protection and quality/waiver issues) - AAH-64-PM
- LHX Manprint Working Group member - LHX-PM
- CH-47 Manprint Working Group Member - CH-47-PM
- T-800 engine Manprint Working Group Member - LHX-PM
- Blackhawk Systems Safety Working Group Member - Blackhawk-PM
- V-22 Manprint Working Group Member - CH-47-PM
- ECP for instrument modification (USAARL-UH-60) - Blackhawk-PM
- Externally mounted rescue hoist (USAARL-UH-60) program - Blackhawk-PM, USAMMDA
- Serves as a daily point of contact between AVSCOM and PMs to various USAARL disciplines on technical issues in aviation development systems

ACTION ITEMS (cont'd)

OTHER ACTIONS REQUESTED BY OTHER AMEDD ACTIVITIES AND AVSCOM:

- Air Worthiness Releases for civilian radios for 247th Med Det, 229th Med Det, and D/326th Med Bn - Engineering, AVSCOM

- Survival radios for 507th Med Co (AA) - ALSE-PM

- Emergency Locater/Transmitters for 498th Med Co (AA) - ALSE-PM

- Medical items for aircrew survival vests - ALSE-PM and Readiness, AVSCOM

- ARNAV-40 (LORAN-C) navigational system for 431st Med Det - AVRADA, Engineering, AVSCOM

- Serves as a point of contact to aeromedical evacuation units concerning logistical and readiness issues (Active, Reserve, and National Guard)