THE GOODS ON AEL

Declassified by the April 3rd Movement

RECEIPT FOR CLASSIFIED MATERIAL

Original

FROM

STANFORD ELECTRONICS LABORATORIES
STANFORD UNIVERSITY
STANFORD, CALIFORNIA

And
THE APRIL 3RD MOVEMENT

ATTENTION: SECURITY OFFICER

TO

THE STANFORD COMMUNITY

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2. Duplicate to be retained by recipient.
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CLASSIFICATION	No. of Copies	No. of Pages (if not bound)	DESCRIPTION
NONE DECLASSIFIED BY ORDER OF THE PEOPLE			This project details the electronic warfare studies produced in the Systems Techniques Lab in the Applied Electronics Lab. These studies have had operational value in the electronic countermeasure applications in aerial reconnaissance and airborne delivery systems, in use in the counterinsurgency projects being carried out in Southeast Asia. This report also analyzes the low veracity quotient of the informational outputs of the Lab researchers and the University Committee on Research Policy. Changes in the informational structure are important in despecifying the countermeasure application to which STL research is put. If the informational dissonance is delegitimized, the existing elite may be challenged, and the electromagnetic applications may be halted by those dissident elements who do not accept the legitimate function of AEL's national security research.

CERTIFICATE

I have personally received from the sender the material, including enclosures and attachments, as indicated above. I assume full responsibility for the safe handling, storage and transmittal elsewhere of this material in full accordance with existing regulations.

The People

Signature of Recipient

4/14/69

Date

SEL No. 5

MILITARY ELECTRONICS AT AEL

Introduction

Stanford has been and remains extensively involved in defense contracting. The bulk of this work is concentrated in the Electrical Engineering Department which currently holds about 2.2 million dollars in classified contracts. The research division of the EE Department is the Stanford Electronics Lab (SEL). One branch of this is the Systems Techniques Lab (STL) located in the Applied Electronics Lab (AEL). STL at this time holds six classified contracts totalling over one million dollars. All of these contracts would seem to have direct military applications.

Most of this classified defense research is in the area of what is known as electronic warfare. Electronic warfare protects US electronics from the incursions of the enemy and attempts to deny the enemy his electronic capability. On the ground, EW is used to monitor and jam enemy radio communications. Electronic warfare is especially valuable to airborne operations. According to the January 1, 1968, issue of Aviation Week, ''...electronic warfare embraces all techniques for deceiving, jamming, evading, and in some instances physically destroying hostile radar threats, or contrarily, countering any of these techniques.'' These techniques, or electronic countermeasures, have been employed extensively by US planes over North Vietnam to pinpoint and jam enemy radar systems used to guide anti-aircraft fire and SAMs (Surface-to-Air Missiles). The same issue of Aviation Week reported that ''Electronic warfare is emerging from the air campaign over North Vietnam as a recognized ingredient of victory in war. Its crucial importance in limited wars is now being acknowledged even in those Air Force quarters where acceptance of its role in tactical combat was almost tragically slow in coming. Air Force doctrine now demands that aircraft leaving on missions over North Vietnam carry the necessary electronic countermeasure (ECM) equipment for countering hostile radars...'' In a recent speech, Air Force Lieutenant General Jack Catton stated that ''It turns out that not everybody is crawling around the jungle in black pajamas...EW is being employed more extensively today in Southeast Asia than in any previous conflict.'' Stanford has contributed significantly to the development of electronic warfare techniques.

An Electrical Engineering Department publication explains that STL is ''an on-campus research program whose objective is to offer a close and immediate coupling between the results of academic research programs and the most advanced needs of military electronics in such areas as countermeasures...'' In a paper entitled ''Systems Techniques Lab's Program in Electronic Research,'' concerning the source of STL support, it is stated that ''When STL was organized in the early 1950's, substantially all outside support of university research in electronics was provided by the Department of Defense. We made the decision to approach those agencies in the several services associated with exploratory research in what is broadly described as Electromagnetic Warfare. Simply described, EW is concerned with steps in electronics design and practice that can be taken to reduce the ability of an enemy to use electronics for his own purposes, and to improve the ability of our own electronic systems to operate in spite of such disruptive actions.''

Work done at STL in the late 1950's contributed directly to the present generation of highly sophisticated electronic equipment now being used on the ground and in the skies over Vietnam. William Rambo, director of the Electrical Engineering Department's research program has stated that ''if the electronic warfare research hadn't had some military impact over the past sixteen years, it would not have been refunded.'' Work being done now in the electronics labs will certainly add to the US military's electronic capabilities for waging counterinsurgency operations in the 1970's.

Areas of Research

Generally, all of the projects being done at the Systems Techniques Laboratory can be broken down into six subject areas. (The project samples listed below came from an STL publication of approximately six months ago.) These subject areas are constituted by the following:

1) Signal-Receiving Devices and Techniques. This is the area in which devices and techniques are developed to detect and pinpoint sources of radar transmission. All the electronic warfare contracts currently held by STL have at least one very innocuous-sounding project in this area, with names ranging from ''High-Data-Rate Processing Study'' through ''Wide-Open-Instantaneous-Frequency Measurement Techniques'' to the very blatant ''Application of Adaptive Components and Techniques to Electronic-Warfare Problems.''

2) Data Processing and Analysis. In this area, work is done on sorting out signals picked up by the processes in (1), on analyzing these signals, recording them, and recognizing patterns in them. Once again, the project names are not recognizably related to electronic warfare, yet once again each large project involving a large electronic warfare contract done at STL is represented in this category. ''Preprocessing of Microscan Receiver Output'', ''Simultaneous Signal Resolution Techniques for Frequency Discriminators,'' and ''Jamming Signal Analyzers'' are among the project headings which fall under this classification.

3) Electronic Countermeasures. Once the signals have been pinpointed and analyzed, the final step is sending out a jamming signal. These project titles are not so innocuous: ''Jamming Signal Analyzers,'' ''Surface-to-Air Missile Countermeasures,'' and ''Laser Countermeasures'' are among the project titles. Some of these projects have expired in the last six months, but the contract under which they were developed is still going on as is a new project on ''Advanced Systems Techniques and Electronic Devices Applicable to Electronic Countermeasures.''

4) Optical Electronics. This area has to do with constructing optical images through data processing and electronic equipment. In some cases (''Laser Countermeasures'' , ''OPtical Data-Processing Techniques'') this may be a vital link in an electronic warfare contract, while other projects under this heading are unclassified and purely theoretical.

5) Electromagnetic Propagation. In long range radar systems, such as those for ABM, the radar beams must somehow travel over the horizon. This area studies the effect of the atmosphere, the troposphere, and other media changes on the sending of radar and other electromagnetic waves. ''Trans-horizon Microwave Propagation,'' ''Atmospheric Refractivity,'' and ''Millimeter - Wave Propagation'' are among the project titles in this area.

6) General Techniques, Advanced Research, and Consultation. This category catches ''left - over'' projects and contracts. While the advanced projects vary from work on ''Advanced Electronic Warfare Engineering Research'' to theoretical analyses of microwave formation, the consultation done by this department for the Air Force and the Navy is almost entirely in the area of Electronic Countermeasures and Electronic Warfare.

Such a breakdown as this is not intended to show that all projects done in the Systems Techniques Laboratory or the Applied Electronics Laboratory are somehow war-related or even defense oriented. What it does imply, however, is that the art of electronic warfare and electronic countermeasures is a very sophisticated

one, and that it is very possible for a contract which may seem very theoretical to be a vital part in electronic warfare and radar jamming research. It implies that classified Defense Department research cannot be judged merely project by project, but that the interrelated and interlocking nature of electronic warfare research must be thoroughly understood before even the most theoretical Army Electronics Command or Naval Research contract can be accepted.

AEL Contracts

F33615-69-C-1414 or AF 33-615-3589

Professors Rambo and Turner are now hard at work on a contract which was renewed in February for 183,000 dollars--until July--and which they are planning to renew again in August for 1,042,000 dollars to run until December, 1972. While the contract is labeled ''Research in Electromagnetic Techniques'' in the Baxter Report, it is classified, sponsored by the Air Force Avionics Lab, and has all the earmarks of a definite electronic warfare contract. Its projects include ''Radar-Emitter Location-Finding Techniques'' to find the radar sources and a study of ''Pattern Recognition of Radar Signals.'' Once the source has been located, projects entitled ''Advanced Electrical Engineering Research Applicable to Countermeasures,'' ''Advanced Systems Techniques and Electron Devices Applicable to Electronic Countermeasures,'' and ''Laser Countermeasures'' (recently this title was officially changed to ''Laser Receiver and Transmitter Techniques'') would presumably be applied in jamming the radar. These would be made more effective by two projects on radio-frequency amplification and transmission. Finally, Mr. Turner is listed under a project entitled ''Laboratory Consultation on Air Force Electronic Systems and Electronic Techniques Problems,'' presumably advising them on how to use these measures. This project was originally entitled ''Consultation on Air Force Electronic Warfare Problems.'' It might also be noted that this is a long term, continuing contract. Since 1966, one electronic warfare project, two missile countermeasure projects, and two electronic jamming projects have been completed under this contract heading. Thus, while there has been a recent effort to remove the words ''Electronic Warfare'' and ''Countermeasures'' from project titles, the intent and probable uses of such projects seem to have changed very little.

Nonr 225-59

This is a 1,598,000 dollar project awarded by the Surface and Amphibious Warfare Branch of the Office of Naval Research to Professors Rambo and May. The contract expires in October, 1969, and it is expected to be renewed for one year at a cost of 250,000 dollars. When the original contract was awarded 75,000 dollars in additional funds last year, the reason was given that ''It is the desire of the Government and the Contractor that additional research on electronic warfare systems and circuits techniques be performed.'' The contract includes projects for detecting ''interpulse interval'' (a special type of) radar, applying voltage filters to accurately measure the radar signal, and ''Range-Finding Direction-Finding'' receiver techniques to locate the distance and direction of a radar source. Two of the final three projects have applications in radar jamming, one dealing with the synthesis of radio

waves and the other with transistorizing transmitters which could be used in jamming. In a final project, May does ''Laboratory Consultation on Navy Electronic Warfare Problems,'' although this title was recently replaced with ''Navy Consultation,'' presumably for public relations purposes.

DAAB07-68-C-0149

This is the contract to Professors Grace and Shoens in which the original title was ''Applied Research in Electronic Warfare Techniques,'' while the Baxter Committee saw fit to change the topic to ''Applied Research in Electromagnetics.'' Its latest two year contract for 420,000 dollars from the U.S. Army Electronics Command will expire in January, 1970, and it is expected to be renewed at that time for another two years at a cost of 440,000 dollars. The first project is entitled ''Study of Digital Spectrum Analysis,'' and apparently deals with classification of radar signals intercepted by reconnaissance receivers . The second project appears in a quarterly report as ''Parameter Selection in a multisignal Electronic Warfare Environment,'' although Stanford publications list it as ''Measurement Selection in Time Series Analysis.'' While the Stanford-released title may sound innocuous, inside the quarterly report, we find that ''the purpose of such a system would be to test critical hypotheses related to the threat of a general battle situation.'' This project concerns how our communications should be run in wartime and possibly how to detect enemy communications. Of the final three projects, two deal with the effect of the Troposphere on long range radar and radio signals (applicable to ballistic missile guidance and detection and satellite communications) and ''Solid State Microwave Investigation,'' apparently a very theoretical topic.

N00123-69-C-1406

Another classified contract of Professor Rambo is for 25,000 dollars from the Corona Naval Weapons Center for a study lasting from February, 1969 to February, 1970. It is entitled ''Study of Quiet Electromagnetic Signals'' and is apparently directed toward intercepting secret communications transmitted over a wide range of frequencies.

F04701-68-0110

Professor Grace has a 270,000 dollar per year contract with the Space and Missiles Systems Organization of the Air Force which is planned for renewal in November, 1969 for one year at a cost of 55,000 dollars. In general, the purpose of the study is the development of electronic circuits for missile systems. Its projects include ''Feasibility Studies of Operation in a Space Environment'' (how well certain components function while the missile is in space) and a project on the effect of the atmosphere on radio signals to the missile. This project might also have application in satellite communications.

DAAB07-69-C-0081

This is a 24,000 dollar contract awarded to Professor Grace which allows three engineers (headed by Mr. Hewitt) to go to the USA Electronic Proving Ground at Ft. Huachuca, Arizona, to test a Microwave Microscan Receiver developed under another AEL contract which has since expired. The receiver is able to detect and pinpoint fairly complex enemy radar units in addition to giving their ''pulse width, antenna scan, and antenna pattern measurement.'' In a letter requesting funds, this project was sai to ''represent the culmination of several years of research in the microscan field.''

Censorship and Misinformation

Clearly, the Applied Electronics Laboratory is deeply involved in electronic warfare. Those who work there have been aware of this, and have known that the Stanford community would find this kind of war research repugnant. Long before the issue of war research had been brought into the open, AEL staff were aware of the objectionable nature of their work. As the letter from D.C. Bacon to other staff (see appendix) indicates, they expected and were planning for a sit-in at AEL as early as November, 1967.

In addition to discussing sit-ins, AEL staff have tried to prevent them along with all other reformist measures by limiting the public information released, to purely general and theoretical formulations, and by deleting all references to the specific military applications. An excellent example of this censorship is the case of the paper written by lab assistants Herman F. Schmid and Raymond Black Jr. entitled, ''Nanosecond-Pulse Processing for a High-Data Rate Receiver.'' The original version of the paper (including military references) to be published was submitted for technical revision to Frank M. Turner, who was the STL contract monitor for this particular contract (AF33(615)-3589). Turner, who has been working as a laboratory consultant on Air Force electronics warfare problems, did more than merely make technical revisions in the original manuscript. He also made a concerted effort to delete all references which indicated that the researchers at Stanford understood the specific military consequences of the equipment being developed or the research done.

For example, a whole paragraph explaining that with the newly developed (by Stanford) SRI969-A Parasort Receiver it is possible to set up a simultaneous pulse radar receiver which can filter out the enemy countermeasure radar emissions, ''such as the Russian Fan Song SAM,'' was deleted. (STL director Charles Schoens had done a project on SAM countermeasures for this contract report.)

In the report's introduction (see appendix) concerning the direct military need for sophisticated electronic countermeasures, all specific military references have been deleted. Not surprisingly, the following note was scrawled in the margin of the page= ''ECM must be deleted - FMT.''

The result of the kind of deliberate censorship evidenced in Schmid and Black's paper is that members of the Stanford community are only vaguely aware of what type of research is done at AEL. Some believe that most of that research is non-military. But the unclassified information circulated among AEL staff (not to the public) indicates quite the contrary.

Another source of misinformation has been the Academic Council's own Committee on Research Policy. Commonly known as the Baxter Committee, it is responsible for reviewing all classified contract proposals submitted to the University, to insure the ''interests of the academic community''. Unfortunately the Baxter Committee has been inadequate in three main ways:

1) No project descriptions are listed in the Baxter Committee reports; only general contract descriptions are given.

2) Sponsors are listed in general teams as for example: ''Navy'', in the case of the sponsor ''Surface and amphibious warfare branch, office of Naval research

3) Contract descriptions are couched in broad scientific terms, in such a manner as to suggest systematic attempts to obscure the applied military nature of the projects.

Let us consider the following unabridged contract summary filed by the Baxter Committee.

Engineering Research Program in Non-Communication Naval Electronics Techniques

Contract No: Nonr 225(59) Sponsor: US Navy

School or Dept: Systems Techniques Laboratories

Principal Investigator: W. R. Rambo, Prof. of Electrical Engineering

"This program is involved in research in two major areas: first, techniques for reception, sorting, and processing of electromagnetic energy; and second, techniques for generation and control of electromagnetic energy.

In the first area, the research consists of the development of concepts for spectrum monitoring of signals, sorting of signals through a decomposition of the electromagnetic signal enviroment, and processing of these sorted signals to identify particular aspects of parameters of the signals.

The second major area involves the generation of electromagnetic signals with particular emphasis on the recent basic research in solid state microwave devices. Related aspects involve the modulation and tuning of these devices together with instrumentation to determine the physical character of the generated electromagnetic energy.

Security clearance is necessary because classified background data is received from the sponsor and because a part of the research findings applicable to existing problems of the sponsor are classified. The more general findings are unclassified."

Such a report reveals virtually nothing about the research it describes other than the fact that it has something to do with the control of electromagnetic energy. An effective contract description would require listing the specific projects involved and describing the nature and application of each. The project titles of this contract along with the areas of the Baxter summary applicable are listed below:

Project titles, with explanation (and area of Baxter summary applicable)

1723 Hunter: Development and applications of a technique for precision interpulse interval acquistion and tracking (1). (Explanation: 'interpulse interval' is a parameter of radar signals used to classify radars)
1969 Hunter: Application of self-adjusting voltage filters to adaptive signal sorting (1). Self-adjusting filters to adaptive signal characteristics so that the radar signal can be more accurately measured; signal sorting refers to the classificatic of radar emitters according to certain parameters).
1974 Kochis: RD-DF phase monopulse receiver techniques (1). (this refers to Range Finding-Direction Finding radar receivers, used to locate enemy radar emitters)
2033 May: Navy consulting (self explanatory)
2027 May: Waveform synthesis and special measurement instrumentation (2). (Waveform synthesis here refers to the production of special types of radio signals, presumably used to jam enemy radars).

2028 Wright: Solid-state microwave RF sources and companion elements (2). (Transistor radio transmitters and related systems, presumable for compact radar jamming systems).

Considering the specific projects enables us to rewrite the Baxter Summary in a more substantive manner:
(Suggested summary, in so far as we were able to determine the actual nature of this contract using the phraseology of the Baxter summary)

Contract: Nonr 225(59)

Sponsor: Office of Naval Research, Surface and Amphibious Warfare Branch

School or Dept: Systems Techniques Laboratory

Principle Investigator: B. May, Research Engineer

This program is involved in research in two major areas: first, techniques for interception, classification and display of radar signals; and second, techniques for generation and control of radar jamming signals.

In the first area, the re earch consists of the development of techniques for the intercept of all radar signals present, separating the various radar signals, and identifying certain characteristics of the source of the signals.

The second major area involves the generation of radar jamming signals with particular emphasis on the recent developments in solid-state technology. Related aspects involve the modulation and tuning of these radar jamming devices together with the development of measurement techniques to determine the performance of the system.

Security clearance is necessary because classified background data is received from the sponsor and because a part of the research findings applicable to existing electronic warfare problems of the Navy are classified. The more general findings are unclassified.

No member of the academic council will be directly involved with this contract.

The case of the SR 1969 Microscan receiver developed by researcher Harry S. Hewitt provides a dramatic example of how the Baxter Committee's general contract descriptions have misled the community into believing that specific applied military projects were abstract and conceptual in nature.

The SR 1969 Microscan receiver was developed under three different contracts, two of which contributed directly to the invention of warfare equipment. These contracts are listed in chronological order below:

AF 33 (615)-3589, Projects 1822 and 1965

Harry S. Hewitt, Herman Schmid, Barbara Miller, and three others were co-workers in this phase. The receiver was physically constructed and successfully tested under this contract by April, 1968. Hewitt and Schmid presented a report to the August, 1968 Stanford University Research Review, in which they described the technical capabilities of the receiver, including the fact that it was to be used with a Parasort processor and PDP-8 computer. No mention was made of warfare applications. Yet Schmid, in the rough draft of his separate paper on co-project 1822 explained how the receiver, parasort processor, and PDP-8 computer could be used to detect enemy submarine and missile radar. Schmid deleted these references to espionage in the final report of project 1822.

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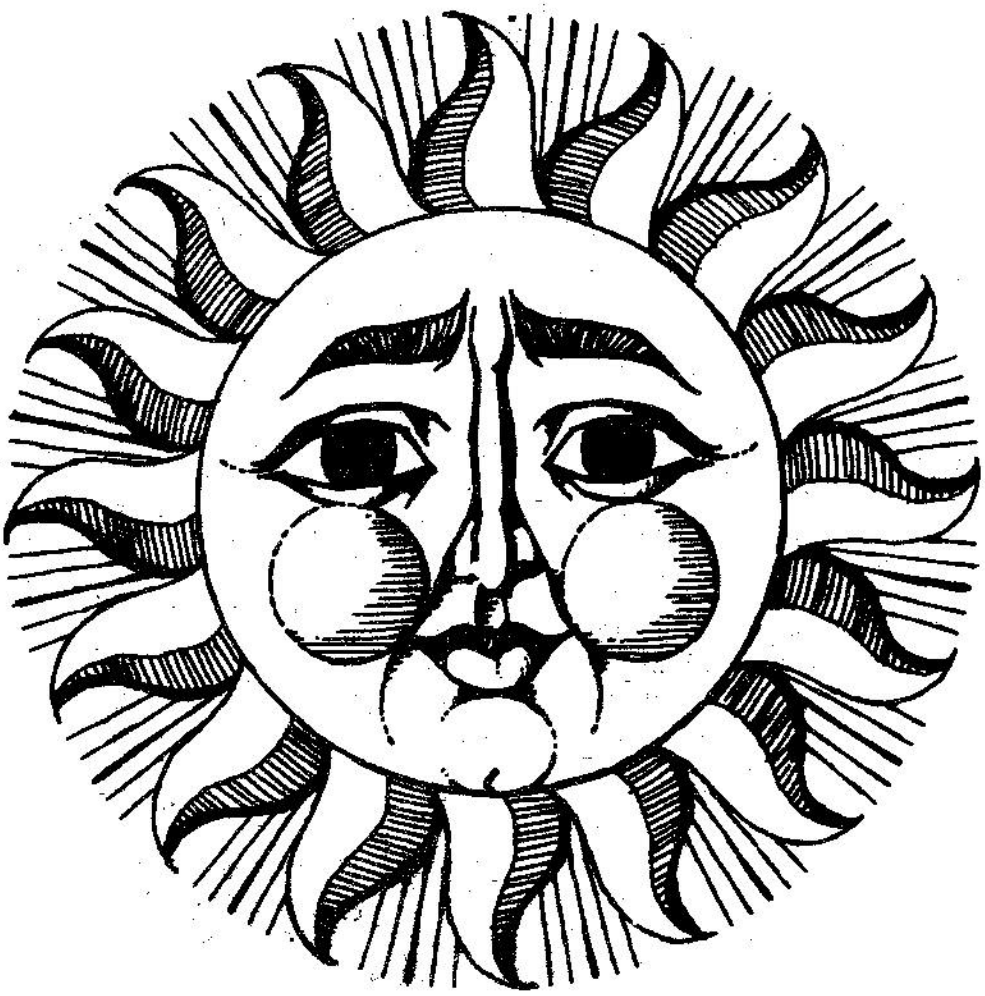
without the fault or negligence of the Contractor. If the failure to perform is caused by the default of a subcontractor, and if such default arises out of causes beyond the control of both the Contractor and subcontractor, and without the fault or negligence of either of them, the Contractor shall not be liable for any excess costs for failure to perform, unless the supplies or service to be furnished by the subcontractor were obtainable from other sources in sufficient time to permit the Contractor to meet the required delivery schedule or other performance requirements.''

The path is clear for terminating undesirable Electronic Warfare research on the Stanford campus.



Appendix

OTHER CURRENT STL PROJECTS

PROJECT #	TITLE
1807	Investigations of Advanced Aerospace Surveillance Concepts
1906	Studies on Optimization of Electronic Warfare Receivers
2018	Pulse-Compression-Radar Countermeasures Study
2020	Laboratory Consultation on Air Force Electronic-Warfare Problems
2023	Consultation of Performance Improvement Program for Surface Missile Systems in an ECM (Electronic Counter Measures) Environment
2024	Countermeasures to Ballistic Missile Defense Systems

GLOSSARY
(According to the EE caucus, April 3rd Movement)

Electromagnetic energy: enemy radar signals
Generation of electromagnetic energy: generation of jamming signals
Spectrum monitoring: ferret reconnaissance (searching for enemy radars)
Decomposition of electromagnetic signal environment: classification of enemy radars by characteristics
Signals: enemy radar signals, in particular
Devices: electronic jamming components and systems
Modulation and tuning: parameters to be optimized for most efficient jamming
Instrumentation: specialized radar analysis instrumentation
Problems of the sponsor: locating and jamming enemy radars

1. INTRODUCTION

In recent years, the need for spectrum surveillance with a higher probability of intercept than that possible with conventional scanning ~~superheterodyne~~ receivers has become apparent. This high intercept probability may be necessary to assure the interception of short-duration transmissions ~~like those of a surfacing submarine that emits only a few pulses before resubmerging~~. or it may be required to shorten the response time for initiation of ~~electronic countermeasures~~. a response.

~~In the case of operator-initiated ECM with a total response time in the order of several seconds, the desired receiving equipment response time should be in the order of a second. In the case of an automatic system that directs jamming transmissions against victim radars on a pulse-by-pulse basis to conserve jammer power, a equipment response time in the order of microseconds is required. This need for fast response time has lead to the development of~~ three distinct types of high intercept-probability receivers: rapid-scan pulse-compression (microscan) receivers, wide-open frequency discriminator type receivers, and contiguous-filter (comb-filter) receivers. Stanford has ~~pursued~~ long-term research programs involving receivers of the first two categories. New techniques were developed and have been demonstrated in experimental receiver models of both types [Refs. 1 through 3].

Microscan receivers have been built for monitoring the HF band and the UHF/SHF bands. The most recently built HF receiver, the SP-~~5~~-A, [Ref. 4] covers the spectrum from 500 kHz to 30 MHz in contiguous 250-kHz

Miscellaneous

DATE: November 6, 1967

To : Prof. Rambo, C. Shoens,
R. Miller, R. Simmons, M. Morrison

FROM : D. C. Bacon

SUBJECT:

I recently talked with Fred Glover regarding procedures we should follow in the case of a future involvement with demonstrations or sit-ins at AEL. If it appears that involvement is imminent, he suggests that the line of communication should be as follows:

Fred Glover
Lyle Nelson or
Donald Carlson

D. C. Bacon

DCB: pw

WESTERN UNION
SENDING BLANK

CALL LETTERS FDL TELEGRAM CHARGE TO Stanford Electronics Labs
November 20, 1967

To: CG USAECOM FT MONMOUTH NJ
AMSEL-PP-CM-32-G10-6203

REFERENCE YOUR TWX RELATIVE TO USE OF AIR FORCE FACILITIES ON PROPOSED CONTRACT DAAB07-68-C-0149 WITH STANFORD UNIVERSITY. AUTHORIZATION GRANTED TO USE FACILITIES AS REQUESTED ON RENT-FREE, NON-INTERFERENCE BASIS.

OFFICE OF NAVAL RESEARCH
RESIDENT REPRESENTATIVE
STANFORD UNIVERSITY

Send the above message, subject to the terms on back hereof, which are hereby agreed to

PLEASE TYPE OR WRITE PLAINLY WITHIN BORDER—DO NOT FOLD
1269—(R 4-55)

STL and the Nation-wide Defense Establishment

STL is in frequent contact with major American military bases, defense-oriented corporations, and universities. In fact, the mailing list for the Systems Techniques Lab reads like a Who's Who of the Military-Industrial-University Complex.

The military addressees include the following:

Air Force Avionic (Aviation Electronics) Laboratory, Wright-Patterson AFB, Ohio
Strategic Air Command, Offutt AFB, Nebraska
US Air Force Security Service, San Antonio, Texas
Air Force Weapons Laboratory, Kirtland AFB, New Mexico
3537th Electronic Warfare Tng Sq., Mather AFB, California
Chief of Naval Operations, Dept. of the Navy, Washington, D.C.
Chief, Bureau of Naval Weapons, Washington, D.C.
Commandant, US Army Air Defense School, Ft. Bliss, Texas
US Naval Avionics Facility, Indianapolis, Indiana
US Naval Missile Center, Point Magu, California
Commanding Officer, US Army Electronics Laboratories, Ft. Monmouth, New Jersey

WESTERN UNION

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November 20, 1967

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Strategic Air Command, Offutt AFB, Nebraska
US Air Force Security Service, San Antonio, Texas
Air Force Weapons Laboratory, Kirtland AFB, New Mexico
3537th Electronic Warfare Tng Sq., Mather AFB, California
Chief of Naval Operations, Dept. of the Navy, Washington, D.C.
Chief, Bureau of Naval Weapons, Washington, D.C.
Commandant, US Army Air Defense School, Ft. Bliss, Texas
US Naval Avionics Facility, Indianapolis, Indiana
US Naval Missile Center, Point Magu, California
Commanding Officer, US Army Electronics Laboratories, Ft. Monmouth, New Jersey

Commanding General, US Army Security Agency, Arlington, Virginia
USA Missile Command, Redstone Arsenal, Alabama
Commanding General, White Sands Missile Range, New Mexico
Weapons Development Dept., Anti-Radiation Guidance Div., China Lake, California
Electronic Warfare Labs, USAECOM, White Sands Missile Range, New Mexico
Director, National Security Agency, Ft. Meade, Maryland/McLean, Virginia
Director, Weapons Systems Evaluation Group, Washington, D.C.
Commanding General, USA Electronic Proving Ground, Ft. Huachuca, Arizona
Office of the Secretary of Defense, Advanced Researched Projects Agency, the Pentagon, Washington, D.C.
Central Intelligence Agency, Office of Scientific Intelligence, Virginia

Among the corporate leaders in electronic warfare receiving copies of STL work are the following:

Martin Marietta Corp., Orlando, Florida
Aerospace Corp., Los Angeles, California
General Electric Co., Utica, New York
HRB Singer, Inc., Science Park, State College, Pennsylvania
Radio Corp. of America, Van Nuys, California
Raytheon Co., Santa Barbara Operation, Goleta, California
Aeronutronic Div., Philco, New Port Beach, California
Cutler-Hammer, Inc., Airborne Instrument Lab, Deer Park, New York
Sylvania Electric Products, Reconnaissance Systems Lab, Mountain View, California
International Business Machine, Oswego, New York
Melpar, Inc., Falls Church, Virginia
General Dynamics, Ft. Worth, Texas
North American Aviation, Los Angeles, California
Lenkurt Electric Co., Inc., San Carlos, California
Boeing Airplane Division, Seattle, Washington

Finally, copies are sent to the variousdefense-university related ''think tanks'' around the country, including the following:

Stanford Research Institute, Menlo Park, California
University of Michigan Institute of Science and Technology, Ann Arbor, Michigan
Cornell Aeronautical Labs, Cornell University, Buffalo, New York
The RAND Corp., Santa Monica, California
Lincoln Labs, Massachusetts Institute of Technology, Lexington, Massachusetts
Electronic Research Labs, Syracuse University Research Center, Syracuse, New York
Cooley Electronics Laboratory, University of Michigan, Ann Arbor, Michigan
Military Physics Division of Defense Research Laboratory, University of Texas, Austin, Texas
Carlyle Barton Laboratory, Johns Hopkins University, Baltimore, Maryland

These contacts enable STL researchers to keep abreast of the latest developments in military electronics.