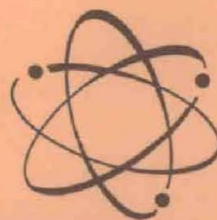




ARMY RESEARCH AND DEVELOPMENT



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Review Group Advocates Effective Utilization of Advanced Study Program

Federal scientific fellowship programs are reviewed in a recent U.S. Army Research Office report by a group organized in September 1963 to study them for the purpose of evaluating means for improvement of opportunities for Army R&D civilian personnel consistent with advanced training requirements.

Findings of the report suggest that commanders and scientific directors of laboratories should devote greater effort to stimulate implementation of existing programs, and that this need is greater than the need for additional study fellowship opportunities.

While authority exists for temporary exchange of professional personnel among laboratories and commands, little evidence was found by the group of utilization of this opportunity.

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Smithsonian Gets Two Army Communications Satellites

Leadership of the U.S. Army in developing space communications equipment, as represented by the pioneer *Score* and *Courier* satellites, is recognized in an exhibit turned over July 7 to the Smithsonian Institution's new Museum of History and Technology.

Located in the Hall of Electricity

Army Working Group Pushing EDIS Project

Formulated in 10 months of intensive planning and organizational effort, the U.S. Army Engineering Data and Information System (EDIS) moved into a series of important implementing actions in July.

Twenty-six representatives of the U.S. Army Materiel Command convened July 27 at AMC Headquarters in Washington, D.C., for a general briefing on plans and progress.

Col. Clement Takes Key Post With Army Research Office

Organizational realignments July 1 and reassignments of personnel during the month affected U.S. Army Research Office (USARO) key staff members and changed functions.

Col Wallace L. Clement, enrolled in the Army R&D Specialist Program since 1957, succeeded Col Charles B. Hazeltine, Jr., as Assistant Director of Army Research. Col Clement came for 15 months as commander of the 14th Armored Cavalry in Fulda, Germany, and Col Hazeltine reported

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The 34-member U.S. Army EDIS Working Group met July 28 for the opening of a 2-day session at the U.S. Army Research Office, Arlington, Va. Purpose: To consolidate the various tasks into a definitive plan of action recognizing the interdependency of all tasks and subtasks.

EDIS is a major part of the Army Scientific and Technical Information Program, comparable in magnitude of envisioned operations to the Army Chemical Information Data System (CIDS) and calling for the widest possible cooperation of industries engaged in national defense activities.

Comprehensive handling of all data and information produced by and essential to research, development, testing and evaluation engineering activities is the goal of the EDIS Project.

Like the CIDS Project, now gaining momentum in actions to prove out the concept of the system and its application to requirements for a national network to collect, store and disseminate chemical information,

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EXAMINING COURIER exhibit with Assistant Secretary of the Army for R&D Willis M. Hawkins (third from left), who presented two pioneer communications satellites to the Smithsonian Institution on behalf of the Army, are (left to right) James C. Bradley, assistant secretary of the Smithsonian; Maj Gen David P. Gibbs, Army Chief of Communications-Electronics; and Frank Taylor, director, Museum of History and Technology, Smithsonian Institution.

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Purpose: To improve informal communication among all segments of the Army scientific community and other Government R&D agencies; to further understanding of Army R&D progress, problem areas and program planning; to stimulate more closely integrated and coordinated effort among the widely dispersed and diffused Army R&D activities; to maintain a closer link from top management through all levels to scientists, engineers and technicians at the bench level; to express views of leaders, as pertinent to their responsibilities, and to keep personnel informed on matters germane to their welfare and pride of service.

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To Improve Your Communications . . . Stop . . . Speak . . . & Listen

By L. J. Andolsek, Commissioner
U. S. Civil Service Commission

Inadequacies in communication at all levels of Government in serving the best interests of management and of employee-employer relations are discussed by Civil Service Commissioner Ludwig J. Andolsek in a featured article in the July-September issue of the Civil Service Journal.

Congressman John A. Blatnick brought Mr. Andolsek to Washington to serve as his administrative aide for some 16 years before he assumed his present duties. During those years Commissioner Andolsek gained a reputation as an able administrator whose approach to a difficult problem invariably is an application of the old geometric theorem—"A straight line is the shortest path between two points." He observes, thinks, talks, straight to the point. His article evidences those characteristics, as shown by these excerpts.



L. J. Andolsek

Communication failure sometimes seems a commonplace in the Federal Service—a costly commonplace we cannot afford! Too frequently we fail to communicate effectively with our internal publics, with organizations representing our employees, and with important external publics. Clogging of communications channels is costing us heavily in terms of efficiency and economy in Government operations. . . .

I have seen situations where personnel workers still do not clearly understand that their job is *solely* to help top management acquire, develop, and retain the best possible human resources to achieve *management's* mission. Somehow they haven't got the word that the personnel function should be mission-oriented and mission-supporting—not operated in a vacuum for its own sake.

I have talked to employees who were only vaguely aware of the Federal merit promotion program, now in its sixth year. They didn't know, for example, how a vacancy in their office, shop, or laboratory would be filled under the promotion system.

A recent Commission study of the program showed that while a majority of employees contacted during Commission inspections had some knowledge of the promotion plan which applies to positions to which they might aspire, a significant number did not. As a result of our findings, we have begun a vigorous action program to see that agencies gain broad management-employee understanding and support of the program.

I have talked to many hard-working employees who—2½ years after Executive Order 10988—still don't understand the new ground rules about employee-management cooperation. But, to be fair, I have also seen situations where management also seemed not to have gotten the word—to be cool toward employee organizations even in the face of a strongly worded headquarters policy statement to the contrary. . . .

I remember the case of a Government research scientist who resigned because he did not wish to assume any administrative duties—he had been given the understanding that he could not advance higher on the salary ladder if his assignment called only for research work. . . .

Failures to communicate with the public at large are legion. For example, there is the outmoded "army of clerks" image the public continues to hold in an era when the Civil Service has become a corps of skilled specialists making their mark in areas ranging from astronomy to zoology. The public's lack of knowledge of this new Civil Service and its persistence in holding to damaging stereotypes hinder quality recruitment and add to its cost. . . .

In setting out a short summary of why effective communication with employees must be a primary concern of everyone in the management line, I will put it in the simplest terms of *what's in it for you*.

Everything you seek to accomplish as a manager depends on people. Internal communications should be calculated to cement a bond of confidence and understanding between management and employees so that the organization's full potential and total effort are directed at getting the job done.

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Army Working Group Pushing EDIS Project

(Continued from page 1)

EDIS is planned as a broad-scale, long-range program.

In fact, the immensity of the task of establishing the operational mechanisms of EDIS for fully effective service is recognized as a project that will necessarily be extended over a period of at least three years. Plans call for establishment of a prove-out pilot system in 18 months.

One of the EDIS major preliminary implementing actions will be an industrial seminar in Washington early in October. The scope of this all-day session will be similar to that of the CIDS industrial seminar last Sept. 17 for 275 leaders of the chemical and pharmaceutical industries.

Scheduled for publication by mid-August is an EDIS Concept and Action Plan report that will outline in detail the objectives, proposed methodology, recognized major problem areas, responsibilities of producers and users of engineering information and data, and projected system network design.

The report will be distributed throughout the U.S. Army Materiel Command, Corps of Engineers, elements of the Office of The Surgeon General, Combat Developments Command, Office of the Chief of Research and Development, U.S. Continental Army Command, and the Strategic Communications Command.

Behind the EDIS Concept and Action Plan, as set forth for implementation by a June 29, 1964, letter published by The Adjutant General, are many long and hotly debated sessions of the Working Group.

Martin H. Weik, Jr., chief of the Systems Branch, U.S. Army Research Office, is the EDIS project manager and Stanley Goldberg, staff automation engineer at the Army's Edgewood (Md.) Arsenal, is chairman of the Army Advisory Group.

Composed of 24 Army Materiel Command representatives selected from all major AMC commands, and two each from the Corps of Engineers, Office of the Surgeon General, U.S. Continental Army Command, Combat Developments Command, Office of the Chief of Research and Development, and the U.S. Army Security Agency, the Working Group has been engaged in four major task assignments.

Task I, detailed in The TAG Letter, is assigned to the Engineer Research and Development Laboratories, Fort Belvoir, Va., and is chaired by Ralph E. Armbruster. The task is to deter-

mine the types and volume of data to be used, identification of originating sources, and investigation of the nature and extent of existing data handling systems.

Task II is assigned to Redstone (Ala.) Arsenal under the leadership of Claud E. Martin, and is titled: Develop Programing and Procedures. Involved are actions to develop formats and procedures for the acquisition, storage, retrieval and dissemination of engineering data and information; the definition of interfaces with other information systems; and the specification of interface requirements.

Other requirements of this task include evaluation of existing control lists for engineering language; development of a control list of terminology for the EDIS, making maximum use of available thesauri; and development of necessary and applicable standards appropriate to engineering data and information handling.

Task III is assigned to the U.S. Army Munitions Command's Edgewood (Md.) Arsenal, with Stanley Goldberg as chairman. Required actions include the development of the concept for the total engineering data and information system, and the design of a pilot system based on the findings of Tasks I and II.

Task IV is assigned to the Army Management Engineering Training Agency at Rock Island (Ill.) Arsenal and will be contingent on the first three tasks. Richard H. Miller, acting chairman, will be concerned with development of plans, programs and material to inform potential users of the capability of EDIS to assure knowledge of and optimum utilization of the EDIS; and the development and holding of seminars, symposia and classes on the EDIS.

Overall management responsibility for the EDIS is assigned to the director of Army Technical Information. In coordinating the program with all of the major Army commands and agencies concerned, he will be aided by an Advisory Group composed of a principal and an alternate member (technical background required) appointed by each major and subordinate command (or designated independent agency or laboratory).

The EDIS project will consider utilization of all systems to handle engineering data and information now active in the Army as, for example, the EDS-009 that is operational at Redstone Arsenal. The ultimate objective to be achieved, in cooperation with other Federal agencies as well as with the academic, industrial and professional communities, is a network that will effectively serve nationwide requirements for the collection, evaluation, storage, retrieval, and dissemination of engineering information.

Implicit in the concept of the EDIS is centrally controlled but decentralized operation. Included in EDIS planning is the recognition that the management and composition of local holdings of engineering data and information vary considerably as developed to meet the peculiar requirements of each activity, and that the various systems must be coordinated for effective integration into the network.

The EDIS, in turn, will be coordinated and integrated with the Department of Defense Engineering Data Retrieval System Plan, as outlined in a planning report published in April.

Briefings on the EDIS Concept and Action Plan are scheduled this month for James W. Roach, Defense Director of Engineering Management, Walter M. Carlson, Defense Director of Technical Information, and Brig Gen Stanwix-Hay, Director of the new Office of Data and Standardization Policy, Department of Defense.



ADDITIONAL FACILITIES for nuclear power training are provided by a \$494,000 building recently completed for the Nuclear Power Field Office, U.S. Army Engineer Reactors Group, Fort Belvoir, Va. Classrooms are provided for the training of Army, Navy and Air Force personnel in the operation and maintenance of nuclear power plants. The building also serves as administrative headquarters for the chief of the Nuclear Power Field Office.

Review Group Advocates Effective Utilization of Study Program

(Continued from page 1)

tunity. The report summary states:

"A great effort in this direction is indicated since it would serve the valuable purpose of building up a cadre of personnel familiar with a broad spectrum of Army R&D problems and capability. It would also serve as a stimulus for greater interdisciplinary efforts. Temporary exchange of personnel among installations at the bench level might be viewed as a type of in-house sabbatical leave.

"The applicability of the sabbatical leave concept to Army needs was considered. It was concluded that, with modification, the concept is not alien to Army needs, and that some current programs share features of the concept. In fact, the Secretary of the Army Fellowship is much like a sabbatical leave."

More effort is required to attract and to enable academic personnel to spend sabbatical leaves at Army research and development organizations, the study group discovered. However, with respect to fellowship support of nonemployees by the Army, policy problems exist which make it inadvisable for the Army to initiate such programs, the report states. It adds:

In scientific areas where grave manpower deficiencies exist, the group decided it would be proper for the Army to use its good offices to induce agencies such as the National Science Foundation and the National Institutes of Health to increase national manpower pools in areas of interest to the Army by their development of resources in universities and special fellowship programs.

Further, the report says it is proper for the Army to point out scientific areas where grave manpower deficiencies exist, and to work toward meeting Army needs by retaining of such employees.

In view of the presumed increase in value of an employee to an organization as he acquires experience and skills, and the fact that he thus becomes more difficult and expensive to replace, the group found a need for more advanced study opportunities than for elementary study. Thus greater support would be given to post-graduate work than to undergraduate work.

The report states that fellowship support for Army employees is consistent with efforts of the Army to increase in-house laboratory capabilities, that programs should be related

to needs in areas of high priority in science, and that effective functioning of organizations should not be hindered by excessive release of personnel to fellowship status.

Employees should regard participation in fellowship programs not as a right but as an opportunity for self-improvement and to enhance their value to their organization, the report points out. While fellowships can be regarded as rewards for loyal and efficient service, it contends that "it is reasonable for recipients of Army fellowships to commit themselves to future employment with the Army for definite periods. . . .

One of the points stressed in the report is that programs providing fellowship-type support to employees may or may not lead to the award of academic degrees. Under the revised concept now in effect, the fact that a degree is awarded is not in itself a bar to participation in the Army fellowship program. This is consistent with tradition and the expanded scope of opportunities afforded by universities and industrial organizations to employees for self-improvement and advancement.

Commanders and laboratory directors are encouraged by the report to make greater use of the Secretary of the Army Research and Study Fellowship Program, which does not restrict the awards to a set number. In

respect to this program, the concept of sabbatical leave should be stressed.

Recommendations include the publication of a single booklet listing Army regulations and programs of fellowship and fellowship-like activities, and the wide distribution of this booklet within the Army R&D community.

Appointed by order of the Director of Army Research, the study group held five general discussion periods at monthly intervals. Members were encouraged to put their thoughts in writing for consideration, along with published material from miscellaneous sources, to stimulate the study of the overall problem between sessions.

The group was chaired by Dr. Carl Lamanna, chief of the Life Sciences Division, U. S. Army Research Office (USARO), and included (alternate listed second in each instance): The Surgeon General, Lt Col D. L. Howie and Lt Col J. L. Sherman; U.S. Army Materiel Command, Dr. Maurice Apstein and Dr. Helmut Sommer; Deputy Chief of Staff for Personnel, S. C. Botts and F. T. Wooten; USARO, Dr. Lynn E. Baker and Dr. Samuel H. King, Human Factors and Operations Research Division; Dr. Fernand de Percin and Dr. Hoyt Lemons, Environmental Sciences Division; Fred Frishman and Dr. Bernard R. Stein, Physical Sciences Division.

Propulsion Lab Lady Chemist Finds Fitting Problem

As one of the few women chemists with the U.S. Army Missile Command at Redstone Arsenal, Ala., Marjorie Cucksee finds that the greatest hazard she faces is attempting to get laboratory clothing in her size.

Working in the Propulsion Laboratory of the Command's Directorate of Research and Development, Mrs. Cucksee had to be provided with safety shoes and laboratory coats.

When the processing clerk received an order for a pair of five and a half safety shoes, he questioned the front office. He was used to ordering man-sized shoes. When her laboratory coats arrived, the sleeves hung to her knees and she couldn't reach the bottom of the pockets.

Mrs. Cucksee has been working in the Propulsion Laboratory for about five months. On her present assignment she works with the polymers that bind solid-missile propellants.

A graduate of the University of Chattanooga, she received her B.S.

degree in chemistry in three years with an A average. She did graduate work at the University of Tennessee.

Mrs. Cucksee has three patent applications pending based on work performed with private industry, before joining the Missile Command.



Marjorie Cucksee

Smithsonian Gets Army Communications Satellites

(Continued from page 1)

Included in the display are six other communications satellites: *Echo*, *Relay* and *Syncom* (National Aeronautics and Space Administration, *Telstar* (American Telephone and Telegraph Corp.), *West Ford* (U.S. Air Force and Lincoln Laboratory), and *Oscar* (Amateur Radio Relay League).

On behalf of the Secretary of the Army, Stephen Ailes, Assistant Secretary of the Army (R&D) Willis M. Hawkins presented the Army exhibit to the Smithsonian as the latest addition to displays depicting all phases of the Nation's history. The Army contributed to this history in space

communications by being the first in the world to bounce radar signals off the moon in January 1945.

Secretary Hawkins and Maj Gen David P. Gibbs, Department of the Army Chief of Communications, joined in telling how pioneering achievements of the Army in developing *Score* and *Courier* first demonstrated the feasibility and practicability of global communications via man-made satellites.

On Dec. 18, 1958 *Score* (Signal Communications via Orbiting Relay Equipment) carried President Eisenhower's "Peace on Earth" Christmas message to the world. Built by the U.S. Army Signal R&D Laboratories

at Fort Monmouth, N.J. (since redesignated the U.S. Army Electronics Laboratories), *Score* was followed by the launching of *Courier* on Oct. 4, 1960.

While *Score*, built with the assistance of Radio Corp. of America, proved that satellites could receive both voice and teletypewriter signals from the ground, and either relay them directly or store them on magnetic tape and carry them to the next station, *Courier* was much more sophisticated.

Constructed by the Philco Corp. under supervision of the Electronics Laboratories, *Courier* could relay directly or store and forward about 360,000 words in a 4-minute pass over a ground station. *Score*, the world's first communications satellite, had a capacity of 2,800 stored words.

Although the Army had worked out early plans for satellite communications in 1955, Secretary Hawkins recounted, the *Score* was produced as a secretive crash project following a telephone call to Brig Gen Earle F. Cook, then CG of the Electronics Laboratories, from the Advanced Research Projects Agency. The question that started work was:

"What could you do for satellite communications equipment if we gave you 40 pounds on the satellite and allowed you 60 days to build it?" (Actually, slippage in the launching vehicle schedule permitted more time, but the work at the Electronics Labs was finished in a timely manner.)

General Gibbs commented on this feat at the July 7 turnover ceremonies by saying: "... This was a team operation and there were teams within teams. The cooperation between the Army and industry, which made these achievements possible, represented teamwork at its best..."

Included among high-ranking dignitaries who attended the presentation ceremonies were Congressmen, several top Army leaders headed by General Frank S. Besson, Jr., CG of the U.S. Army Materiel Command, leaders of RCA, American Telephone and Telegraph Co., Philco Corp., the Communications Satellite Corp., MIT Lincoln Laboratory, the Department of Defense, and key scientists at the Army Electronics Laboratories who were on the *Score* and *Courier* developmental teams.

Frank Taylor, director of the Museum of History and Technology, made the opening and closing remarks and James C. Bradley accepted the exhibit on behalf of the Smithsonian Institution.

McNamara Details Duties of New Assistant

Responsibilities of the newly created position of Assistant Secretary of Defense for Administration, held by Solis Horwitz, were outlined by Secretary of Defense Robert S. McNamara July 15, as detailed in DoD Directive 5110.1 dated July 11.

Mr. Horwitz, who had served as Director of Organization and Management Planning since its creation by Secretary McNamara in February 1961, was nominated as Assistant Secretary of Defense for Administration by President Johnson June 18.

Responsibilities of the Director of Organization Management Planning have been transferred to the new post with additional duties.

One of the new areas is that of Inspection Services, which will provide the capability for making criminal investigations as required within the Office of the Secretary of Defense, the Office of the Joint Chiefs of Staff and other DoD components.

Inspections or studies of the operation or administrative effectiveness of OSD, OJCS, the Unified and Specified Commands, the Defense agencies and other DoD components also are included in Inspection Services.

Mr. Horwitz also will insure that matters presented for Secretary McNamara's signature are consistent with established DoD policy and, where appropriate, consistent with Presidential policy and interdepartmental and inter-agency agreements.

In addition, he will be responsible for consolidated administrative support of the Office of the Secretary of Defense, including mail and records. He will continue as principal adviser to the Secretary of Defense for the National Communications System and Director of the Office of Organization and Management Planning.

Mr. Horwitz was born in Pittsburgh, Pa., on Nov 2, 1910 and received his A.B. and A.M. degrees from the University of Pittsburgh in 1930 and 1932 and his LL.B. from Harvard Law School in 1936. From 1937 to 1942, he was engaged in private law practice in Pittsburgh.

During World War II, he served with the U.S. Army. Following his release from active duty in 1945, he held several Government posts, including: deputy chief counsel of the International Prosecution Section for the trial of major war criminals before the International Tribunal for the Far East, Tokyo; counsel for the Security Resources Board; general counsel of the Reconstruction Finance Corp.; and counsel to the Senate Committee on Government Operations.

From 1954-57 he returned to private law practice in Pittsburgh and Washington, then became counsel to the Senate Democratic Policy Committee. In 1960 he again returned to private practice until his Department of Defense appointment in 1961.



Solis Horwitz

Col Clement Takes Key Post with ARO

(Continued from page 1)

for duty as deputy commander of the Berlin Brigade.

A graduate of the U.S. Military Academy (1940) and the Army War College (1958), Col Clement served in six major campaigns in World War II and the Korean War. Among his decorations are the Distinguished Service Cross, Bronze Star Medal, Military Valor Cross, Legion of Merit and the Army Commendation Medal.

From 1960 to 1963 he was senior standardization representative, U.S. Army Standardization Group-United Kingdom, serving in London, England, following three years as a staff officer and assistant course director at the U.S. Army War College. He was military adviser to the Operations Research Office in Washington, D.C. (1954-57) and staff officer with the Deputy Assistant Chief of Staff, G-3 in 1953 and 1954.

Dr. Richard A. Weiss, Deputy and Scientific Director of USARO from 1958 until he entered the National War College in August 1963, returned to his duties following his recent graduation. Dr. I. R. Hershner, who filled in for Dr. Weiss, returned to his assignment as chief of the Physical Sciences Division. Col Hubert L. Nolan, who was chief during Dr. Hershner's absence, reverted to status as deputy chief.

Lt Col Wendell G. Van Auken was reassigned from the Scientific and Technical Information Division to relieve Lt Col Russell D. McGovern as executive officer for the Director of



Col Wallace L. Clement

Army Research, Brig Gen Walter E. Lotz, Jr. Lt Col Frank L. Taylor, recently reassigned from the Human Factors and Operations Research Division to take over as chief of the Research Programs Office, wears a second hat as assistant executive. He has been enrolled in the AE-R&D Specialist Programs since 1959.

Lt Col Thomas Ostrom reported to the Life Sciences Division from an assignment in Europe and will work in the Medical and Biological Sciences Branch.

Peppino N. Vlannes, who had served as deputy to the director of Army Technical Information for 18 months, became acting director when Col Andrew A. Aines became executive secretary of the Committee on Scientific Information (COSATI), Office, Direc-

tor of Defense Research and Engineering. Paul Olejar moved up as acting deputy chief.

In the Physical Sciences Division, Dr. Bernard R. Stein, author of the first *Army Status Report No. 1 on Fuel Cells* and a member of the Army Research Office staff since 1958, was assigned as acting chief of the Chemistry and Materials Branch.

As a result of organizational changes that became effective July 1, the Advanced Technology Group was abolished. Col Raymond S. Isenson was named chief of a new Research Plans Office that has an Advanced Technology Branch headed by Gregg H. McClurg and a Research Plans Branch under Lt Col G. A. Brumme.

New additions to the Human Factors and Operations Research Division included Lt Col Paul N. Casper, Maj John Johns, Capt Donald R. Campbell and Maj Johnny J. Churchill. Lt Col William W. Nairn III was reassigned to the Plans Division, Office of the Chief of Research and Development.

Following the easing of full-time duty requirements since appointment to The Army Research Council (TARC) in January, Col. Tyron Huber returned to his regular assignment July 21 as chief of the Life Sciences Division. Dr. Carl Lamanna, who had served as chief, reverted to his position as deputy chief. Dr. Leonard S. Wilson, also appointed to TARC, is back in his regular job as chief of the Environmental Sciences Division.

DoD Slates Unclassified Industry Briefings

Objective of a Department of Defense series of unclassified briefings beginning this fall is to provide industry with a thorough understanding of long-range development needs and guidance in planning for and seeking Defense contracts.

Advanced planning briefings are scheduled for New York City, Sept. 17-18; Chicago, Ill., Sept. 29-30; Dallas, Tex., Oct. 13-14 and Los Angeles, Calif. Oct. 28-29. Briefings at eight additional regional locations are planned for the spring of 1965.

Sponsors of the series are the National Security Industrial Association (NSIA), with the Assistant Secretary of Defense (Public Affairs) coordinating DoD participation.

The general procedure will be a DoD keynote speech covering the 5-year force structure and financial programming, including translation to obligations, expenditures and procurement to provide adequate military

power. More detailed information will be given by representatives of the DoD, the Defense Supply Agency, and the Departments of the Army, Navy and Air Force.

Subjects to be covered in the briefings, panel discussions and open forums, include:

Economic impact of DoD long-range planning on Defense industry; intelligence considerations; DoD 5-year force structure and financial program; advanced planning requirements; technological challenge of the next 10 years; planning forecast for common use items; arms control and economic planning; economy in maintaining operational readiness; weapons acquisition and contracting trends; relationship of Defense planning objectives to socio-economic programs; international-military export sales potential; and DoD-industry relationships and the Defense Industry Advisory Council.

R&D Reservist Presented 'Engineer of Year' Award

A Reserve officer with a mobilization designation to the Air Defense Division, Office of the Chief of Research and Development, was named "Engineer of the Year" for 1964 by the Professional Engineers of Oregon at their recent state convention in Eugene, Ore.

Lt Col M. H. Mater, member of the 6161 R&D Unit of Corvallis, Ore., runs a consulting engineering firm specializing in service to the forest products industries in civilian life. Considered a pioneer in sawmill automation, he has spoken throughout the United States, interpreting automation developments in other industries and showing how such concepts can benefit the lumber industry.

In the past 15 years he has written over 80 technical papers on sawmill mechanization and automation.

OCRD Effects Many Personnel Changes

Maj Gen Austin W. Betts became Deputy Chief of Research and Development on July 8, succeeding Maj Gen George W. Power when he took over as CG of the U.S. Army Southern European Task Force, to head a long list of personnel changes within OCRD during the month.

Brig Gen William T. Ryder, Deputy Chief of Research and Development for International Programs, replaced General Power as U.S. member of the Washington Standardization Officers for the Quadripartite mutual weapons development program.

Col Edward Duda relieved Col John A. Graf, assigned to Hq, U.S. Army Mobility Command at Warren, Mich., as deputy director of Plans and Programs, and Col Edward B. Kitchens, Jr., was reassigned from the Plans Division to the Air Mobility Division. Col George H. Russell was assigned to the Plans Division.

Col Robert W. Garrett on July 15 filled the chief of Special Warfare Office position vacated by Col Donald D. Blackburn's reassignment on June 1. Col Francis J. Pallister took over as director of Special Weapons when Col James W. Milner departed on July 13 for an Office of the Secretary of Defense assignment with the U.S. State Department.

Lt Col Patrick G. Wardell succeeded Lt Col Nicholson Parker, chief of the Space Office, upon his conclusion of a 3-year tour of duty in OCRD. Col Robert J. MacDonald became a student at the U.S. Army War College and was succeeded as

chief of the Chemical-Biological Office by Lt Col John W. Ervin; Lt Col Harold C. Kinne, Jr., was designated as deputy chief.

Col Albert F. Rollins concluded a tour of duty July 18 as chief of the Missiles Division and was assigned to the U.S. Army Element, Military Assistance Command, Viet Nam. A successor had not been designated at press time and Lt Col Harold G. DeArment was serving as acting chief.

Col George H. Russell was designated the new chief of the Long-Range Plans Branch, Plans Division and Lt Col Edward J. Bruger was assigned as chief, Programs Branch, Programs and Budget Division.

Lt Col Rex R. Blewett became deputy chief of the International Division, filling a spot vacated by the recent reassignment of Lt Col C. J. Molloy, Jr. Lt Col Blewett returned in 1963 from a 3-year tour in Europe to attend the Army War College. From 1958 to 1960 he was chief of Reserve Affairs when the office was a part of the U.S. Army Research Office Research Support Division.

Col Milford W. Wood began a new assignment on July 13 in the General Operations Division, J-3, Joint Chiefs of Staff and was succeeded as chief of the Air Defense Division by Lt Col Eugene J. Small (acting chief).

Other personnel assignments included: Lt Col Gerald E. Ledford, Policy Division; Lt Col Kenneth G. Groom, Lt Col William C. S. Simpson and Lt Col Thomas E. Fitzpatrick, students, U.S. Army War College, Carlisle Barracks, Pa.; Lt Col William P. DeBrocke, student, National War College, Fort Lesley J. McNair, Washington, D.C.; Maj Leslie H. Gilbert and Capt James S. Bauschpies, Air Mobility Division;

Maj Edwin S. Townsley, Combat

Materiel Division; Lt Col Henry G. Smith, Chemical-Biological Office; Maj Kenneth F. Schenkel, U.S. Army Personnel Research Office; Lt Col Robert F. Shannon and Lt Col Donald N. Sproul, U.S. Army Standardization Group, United Kingdom; Lt Col William W. Nairn, III, and Lt Col William M. Calnan, Plans Division;

Lt Col Jesse A. Fields, Jr., Space Office; Lt Col Chester C. Sargent and Maj Thomas N. Ellis, Combat Materiel Division; Capt David S. Billingsley, Policy Division; Lt Col Edwin A. Rudd and Maj Donald E. Kenney, Anti-Ballistic Missile Office; Lt Col John B. Desmond, Air War College, Maxwell AFB, Ala.; Lt Col Arthur F. Mitchell, U.S. Army Combat Development Experimentation Center, Fort Ord, Calif.; Lt Col James H. Carroll, Jr., U.S. Army Element, Office of the Secretary of Defense (International Affairs).

Corporal Missiles Offered For Public Display Purposes

The U.S. Army Missile Command has Corporal missiles available for donation to other military installations, educational institutions, non-profit museums, municipal corporations, or any recognized veterans' groups for display purposes.

The first combat missile to be deployed with troops, the Corporal is a surface-to-surface type missile with a range of 25 to 75 miles. It is 45½ feet in length and weighs approximately 10,000 pounds.

Transportation charges will have to be borne by the requestor, as Army Regulations require, and missiles will be shipped from the storage point nearest the requestor.

Additional information requests should be addressed to Commanding General, U.S. Army Missile Command, ATTN: AMSMI-SSK, Redstone Arsenal, Ala. 35809.

WSMR Test Simulates Rescue From Apollo Vehicle Flight

White Sands (N. Mex.) Missile Range was the scene of a recent successful test flight of two solid-propellant rocket motors being developed for the planned Apollo spacecraft flights to the moon.

The launch escape and pitch control motors teamed to pull a full-scale boilerplate Apollo spacecraft away from its Little Joe II launch vehicle as the entire assembly was traveling at the speed of sound and four miles in the air. The test simulated mid-air rescue of the spacecraft from a supposedly malfunctioning launch rocket. Parachutes carried the spacecraft to earth.

Technical personnel from NASA's Manned Spacecraft Center, North American Aviation's Space and Information Systems Division, and General Dynamics/Convair conducted the test of the motors built by Lockheed Propulsion Co.

Watertown Arsenal Transferred to AMC Jurisdiction

Transfer of Watertown (Mass.) Arsenal from the U.S. Army Missile Command to the U.S. Army Materiel Command (AMC) became effective July 1. Since Aug. 1, 1962, the Arsenal has been an element of the Missile Command, a major commodity command of AMC.

In April of this year, the Defense Department announced plans to phase out operations at Watertown Arsenal and turn over to the General Services Administration by September 1967 that part of the property not required by the Army Materiel Research Agency (AMRA).

AMRA is an element of AMC and

is a tenant at Watertown Arsenal. It was not included in the phaseout order for the Arsenal itself.

Placing Watertown Arsenal directly under AMC will provide a means of effecting closer coordination and control of personnel and other actions required to balance the workload at Watertown and to provide a proper transition to AMRA during phase-down.

Placement of Watertown Arsenal career Civil Service personnel in other jobs or retraining them to qualify for continued Federal employment, for example, can be more effectively accomplished under direct AMC control, an AMC spokesman explained.

Army Recruiters Rate Well With Industry in Talent Search

Recruiting professional scientific and engineering talent for the U.S. Army is a big business, and like big business it is highly competitive. Army personnel officers definitely feel that there is no room for amateurs in this field.

Each year the Army has to recruit hundreds of engineers and scientists to supplement and replace scarce skills. Much of this recruiting is done on college campuses, and the Army makes an intensive effort to get the best talent available.

The bulk of the Army's need for scientific and engineering talent is based in the U.S. Army Materiel Command and the Corps of Engineers (CE). Contrary to popular belief, the CE employs a considerable number of mechanical and electrical engineers as well as most of the Army's civil engineering workforce.

In evaluating its effectiveness in recruiting, the Army makes comparison with private industry results. Comparisons do not present a complete picture but they do give a statistical base upon which the Army can rate itself.

Considering how many offers are required for one acceptance, for example, the Army rates well. Private industrial concerns average about one acceptance for every seven or eight offers. The Army Materiel Command rate is one for every 4½ offers.

From these figures, it is obvious that extensive recruiting is necessary to fill even one vacancy. During 1962-

63, AMC received about a thousand referrals from scientific and engineering students against a need of 428 at the college level—about 2.3 applications referred against each need. Overall, AMC college referral placements totaled 245 and the average unit cost per placement to the Army was \$772. Private industry reports average placement cost of all engineers and scientists at \$2,500 to \$3,000.

About 49 percent of all college referrals received offers by the AMC during 1962-63. When their 4.5 offers per each recruit actually employed is compared to key industrial competitors, including the aircraft industry and major DoD contractors, which have acceptance ratios as high as 8 and 9 to 1, the Army record appears excellent—at least to recruiters.

Army Mobile Weather Unit Aids Boy Scout Jamboree

Weather warning service for some 50,000 youths camped at Valley Forge, Pa., during the Boy Scout National Jamboree, which ended July 26, was provided by equipment furnished by the U.S. Army.

The National Council of the Boy Scouts of America requested the U.S. Weather Bureau to establish and operate a complete model weather station at the encampment site. The Bureau assigned James C. Fidler, meteorologist in charge of the Central Briefing Office in Washington, D.C., to assume responsibility and invited the U.S. Army to assist him.

The Army has also learned a few things about the work force, especially prospective scientists and engineers. It is not as mobile as many leading newspapers report. Most recruiting is highly effective if conducted for positions which are in the same geographical area as the college the prospective employee attends.

For example, engineers from Maine usually have little interest in working at research activities in New Mexico or Arizona. Consequently, recruiting activities will emphasize opportunities at those installations within 300 miles of the particular college or university.

Army recruiters visit almost every major school in the U.S. and, at present, are able to supply two to three applications for each vacancy. With refinements in recruiting techniques, and with the aid of knowledge gained

The Environmental Sciences Division, U.S. Army Research Office, Arlington, Va., then worked out arrangements with the U.S. Army Electronics Laboratories, Fort Monmouth, N.J., to furnish Weather Radar Set AN/MPS-34, developed by the USAEL Meteorological Division.

The high mobility and reliability of the radar set, which is capable of measuring the range, depth, width, height, relative rainfall (light, medium, heavy) and movement of storm areas to a range of 450 miles, gave the Scouts sufficient advance warning to secure tents and/or evacuate from low areas.

The relatively simple operating requirements of the set permitted Explorer Scouts to be used as operators during normal surveillance periods under the supervision of the USAEL Meteorological Division technicians. Severe rainfall was forecast during the night of July 12 in sufficient time (two hours notice) to permit local Scouts to make suitable preparations.

The AN/MPS-34 is an X-band, 250-kilowatt peak power unit used by USAEL as a research tool to provide weather radar data necessary for the advancement of meteorological instrumentation and other applied research. A tactical sized mobile weather radar is presently under development at the USAEL.

The importance of weather radar for precipitation detection, location and movement has long been recognized by the U.S. Army, not only as a protective device but also as a strategic aid to troop movement.



from past successes and failures, the AMC hopes to expand the ratio of applications for each job opening.

From a salary viewpoint, the Army is generally at a disadvantage in recruiting. Private construction companies can usually offer higher starting salaries. To cope with this, the Army Corps of Engineers emphasizes its well-organized training program for new civilian engineers.

The program has been in effect over 15 years, and the 18-month course gives the new engineer a general picture of Corps of Engineers activities and policies before he begins to specialize.

In addition, the Corps boasts the most comprehensive military and civil works construction program in the engineering field, with a job that can match almost any engineer's desire. The result is notable success in attracting many of the promising young engineers who graduate from

colleges and universities each year.

As its scientific and engineering programs become better known, the Army hopes that it will have more opportunity to choose the most desirable candidates. Most AMC installations, for example, have training programs which range from six months to two years.

Emphasis has been on developing scientific managers over a span of several years. Thus, during a training period, a new engineer receives an opportunity to see the entire operation at an installation before he begins his specialization.

Many installations have programs in which the student is given time off from his work to pursue graduate studies. In others, a portion of the cost of schooling is paid by the Army.

How effective is scientific and engineering recruiting in relation to job success? Army personnel leaders do not know accurately, but are attempt-

ing to find out. The AMC is keeping a grade-point average on every college referral and plans to establish a follow-up system with regard to job performance, including determination of a correlation between grade-point average and job success.

In view of the keen competition from private industry for scientific and engineering talent, Army personnel recruitment leaders believe commendable results are being attained but still are not satisfied. Their motto seems to be, "We can, and will, do better."

DoD Directive Seeks to Cut Weapons Development Costs

Minimizing support costs by increased attention to logistics during the design and production phases of new weapons systems development is the aim of a new Department of Defense directive (4100.35).

The directive establishes as policy the requirement that experienced support personnel will join with development and production people from the beginning of a new development. It is based on pioneering work done in this area by the Navy and the Air Force in the development of Weapon Systems Package Programs.

Excessive support cost of new systems can be prevented, it is believed, provided adequate attention is given support considerations during the design and production phases.

The potential in cost avoidance is great, it was stated, since DoD now has thousands of persons engaged in equipment maintenance at a cost of many millions of dollars a year. An even greater potential lies in the improvements that can be attained in the readiness of equipment.

The directive, which prescribes general, technical and management policies, was initiated by the Director for Logistics, Office of the Joint Chiefs of Staff. Its need is recognized and supported not only by the Joint Chiefs but by the Military Services and Defense industries.

The subject was a major topic of discussion at the DoD maintenance Management Conference held at Williamsburg, Va., in December 1962.

The National Security Industrial Association for the past several years had done considerable work on "early support" concepts and the Military Services have made similar efforts in conjunction with industry.

Redstone Summer Job Benefits NSF-I Winner

High school science achievements that helped put John G. Cleland among honor graduates this June in Decatur, Ala., have led to a summer job at the Army's Redstone (Ala.) Arsenal he terms "right down my alley."

One of the Missile Command's advanced and high priority projects is a pure fluid control system for test missiles, employing principles originally developed at the Harry Diamond Laboratories in Washington, D.C.

As a youth with a clear-sighted talent for exploring new scientific fields—a talent always welcomed at the Missile Command—Cleland is not "lost" among the professionals in the field of fluid dynamics. He built a pure fluid control computer with no moving parts that won honors at the 15th National Science Fair-International this year.

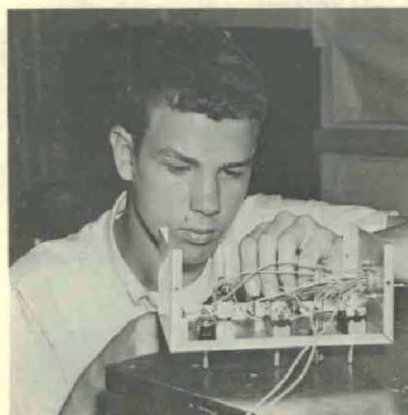
Army judges at the NSF-I looked at the product of Cleland's scientific ingenuity when it was displayed in Baltimore, Md., in May and selected him as one of the 20 NSF-I winners who were given a choice of summer employment or one-week all-expense-paid visits to Army in-house laboratories. He is working in the Inertial Guidance and Control Laboratory.

Pursuing his interests under the guidance of some of the Army's leading professionals in the field of fluid dynamics was to Cleland's liking. "Pure fluid flow controls is a relatively new field," he commented. "A lot of work is yet to be done. And here I'm getting paid for it." That,

he said, is almost like eating the frosting off the cake.

When the test missile with fluid controls is fired later this summer at a Redstone Arsenal test range, the youth who was president of the graduating class at Decatur this year and co-captain of the football team expects to be among those who will see the test.

A relative newcomer to Alabama (he moved to Decatur three years ago with his parents after growing up in Knoxville, Tenn.), Cleland is the first NSF-I winner from the Redstone area to find summer employment at the Arsenal, although the Missile Command is providing employment for 125 students in the physical sciences this summer. He plans to enroll this fall at the University of Chicago to study mathematics and physics.



John G. Cleland

Top Representatives Tour Arctic R&D Facilities

Army R&D activities in Greenland and Alaska were observed during an aerial orientation tour, July 13-19, by top-ranking Army leaders, representatives of the Army Scientific Advisory Panel, and officials of other agencies.

The purpose of the trip was to familiarize members of the Army Scientific Advisory Panel (ASAP) and of the Committee on Polar Research (CPR) and other tour personnel with the Army's northern R&D activities as a preliminary to the conduct of a possible study project of the Army Cold Regions Research and Development Program. The study would be made by ASAP and the CPR representatives.

The 22-man group included Congressman Graham B. Purcell of Texas, Assistant Secretary of the Army Willis M. Hawkins, Chief of Research and Development Lt Gen William W. Dick, Jr., Lt Gen Dwight E. Beach, CG of the Combat Developments Command, Director of Army

Research Brig Gen W. E. Lotz, Jr., and Brig Gen W. G. Merriam of the U.S. Army Materiel Command.

Among other dignitaries who made the flight are Dr. A. F. Crary of the National Science Foundation Office of Antarctic Programs; Commander (Rear Adm) James P. Reedy and Cmdr L. G. Timberlake, Naval Support Force in Antarctica; Dr. D. K. Bailey, Dr. W. O. Field and H. W. Wells, National Academy of Sciences Committee on Polar Research;

R. C. Faylor, Arctic Institute of North America; Dr. H. S. Belding and Dr. Terris Moore, Army Scientific Advisory Panel; Dr. L. O. Quam, Office of Naval Research; and Dr. J. E. Mooney, deputy U.S. Antarctic Project Officer. Donald C. Hilton of the U.S. Army Research Office was the project officer for the tour. Col W. G. Sullivan, chief, USARO Human Factors and Operations Research Division, assisted by Maj C. A. Borcheller of the ASAP, was the trip officer.

Army Participating in Alaskan Science Conference

The Alaskan Science Conference at the University of Alaska, Fairbanks, Sept. 1-4, included a symposium on Arctic military problems sponsored by the U.S. Army Arctic Test Center.

About 14 papers were presented on such problems as construction, terrain analysis, sanitation, water supply, mobility, communications, materials engineering effects of wind-chill and Arctic isolation on human performance, and the life sciences approach to improving military effectiveness in the Arctic.

U. of Arizona Thanks 'Angels' For \$38,796 Contract Grant

"Angels" are responsible for a \$38,796 contract award to the University of Arizona, according to Arthur V. Carlson, Meteorological Department head at the U.S. Army Electronic Proving Ground.

The contract calls for the conduct of a field operation, reduction and processing of data needed to determine the correlation between "angels" and fluctuation of tracking devices.

"Angels" is the term given to unexplained signals on radar screens thought to be caused by atmospheric conditions which cause false images and the phenomena will be studied as a worldwide occurrence.

The Fort Huachuca Procurement Office said the contract brings the total of recent awards to the University to more than \$150,000.

Robert Philippe, chief of the Environmental Sciences Branch, U.S. Army Materiel Command R&D Directorate, will open the symposium with an outline of the philosophy for Arctic military R&D.

Authors of papers included representatives from the Cold Regions

Army R&D Specialist Achieves Rank of General

Bright young officers with an eye to the future and the hope of some day being generals have a new example of the potential payoff of the Army Atomic Energy and Research & Development Specialist Programs.

The latest enrollee in the R&D Program to win his star is Brig Gen Roger M. Lilly, whose promotion was effective July 1. His new assignment is Artillery Command, I Corps (Group), Eighth U.S. Army, Korea.



Brig Gen Roger M. Lilly

In a pre-flight briefing, Robert Philippe, chief of the Environmental Sciences Branch, Research Division, advised participants on the Army Materiel Command's role in the cold regions research program. Lt Col William H. Hall, CO, U.S. Army Research Institute of Environmental Medicine at Natick, Mass., presented The Surgeon General's program.

The group toured the Camp Tuto complex which serves as the main base of the Greenland operations and as the staging area for icecap activity, as well as a center for research in the coastal and marginal areas.

Inclement weather prevented a visit to Camp Century, the Army's "city under the snow" on the Greenland icecap. Visits in Alaska included Point Barrow and Fairbanks.

Briefings included the current Army polar R&D program, U.S. Army Research Support Group activities, and the University of Alaska activities. A demonstration of mobility problems in muskeg areas was given for the participants while in the Fairbanks area.

Research and Engineering Laboratory, Waterways Experiment Station, University of Alaska, U.S. Army Alaska Combat Developments Office, U.S. Geological Survey, Air Force Arctic Aeromedical Laboratory, U.S. Army Materials Research Agency, U.S. Army Natick Laboratories and the U.S. Army Research Institute of Environmental Medicine.

Since February 1964 he had served as deputy CG of I Corps.

Graduated from the United States Military Academy in 1939, General Lilly served during World War II with the 2nd, 4th and 8th Armored Divisions. From November 1942 until War's end he was commander of the 399th Armored Field Artillery Battalion, 8th Armored Division.

In 1947 he was assigned to the Research and Development Group of the Department of the Army General Staff for three years. Graduated from the University of Michigan in 1952 with an M.S. degree in mechanical engineering, he then served three years with the Artillery Board at Fort Bragg, N.C., and Fort Sill, Okla.

After attending the Armed Forces Staff College in 1955, he commanded the Army Task Group (JTG 7.2) of Joint Task Force SEVEN at Eniwetok Atoll during atomic tests and then served 3 years with the Artillery and Missile School at Fort Sill.

Dr. Cheatham to Direct DDRE Tactical Warfare

Tactical warfare programs administration in the Department of Defense, on the staff of Defense Director of Research and Engineering Dr. Harold Brown, is now assigned to Dr. Thomas P. Cheatham, Jr.

Appointment of the successor to Dr. John L. McLucas as Deputy Director of Defense R&E (Tactical Warfare Programs) was announced July 10. Dr. Cheatham was vice president of Litton Industries, Inc., when he accepted his new responsibilities.

Backed by M.S. and Ph.D. degrees from Massachusetts Institute of Technology, following graduation from the U.S. Coast Guard Academy, Dr. Cheatham served as a research associate at MIT, an instructor at Boston University, consultant to the Norwegian Government, and as a consultant to industrial and Government organizations in several fields.

Before joining Litton Industries, Inc., in May 1960, where he was director of advanced systems engineering until promoted to vice president in 1963, he was director of research

and general manager of the Applied Science Division of Melpar, Inc.

Professional experience of Dr. Cheatham encompasses administrative engineering and research, data-processing and data-reduction techniques, digital computer guidance and control systems, advanced communication techniques and applied physics, countermeasure techniques, space sci-



Dr. T. P. Cheatham, Jr.

U.S. Army Ordnance Center Reassigns 12 Personnel

The U.S. Army Ordnance Center and School announced July 8 personnel changes involving 12 officers and a number of top staff positions.

Reassignment of Col Eugene F. Boesch, assistant commandant, triggered job changes for Col Ross R. Condit, Col Leland S. Devore, Jr., and Lt Col Robert F. Blume.

Departure of Lt Col Merle J. Smith, director of doctrine, brought in Col Edward E. Beda from Paris, France NATO agency liaison. Capt Phillip M. Rosenberg became the Ordnance Center and School's new assistant secretary.

Capt Frederick S. Wright, III, a July Ordnance Officer Career Course graduate, stepped into command of the Ordnance Center and School Headquarters and Headquarters Co.

Capt D. L. Lane the new chief of the Office of Academic Operations Division, succeeded Maj Thomas G. Fulton.

Col Condit, former director of instruction, moved into Col Boesch's position as the Ordnance Center and School assistant commandant. Col Devore became the new director of instruction after serving as director of the Command and Staff Training Department.

Lt Col Blume, an Infantry officer, moved up a notch to the post of director of the Command and Staff Train-

ing Department. He previously served as the department's assistant director.

Col Beda, the new director of doctrine, filled the position vacated by Lt Col Smith, who has an assignment as Professor of Military Science and Training at Morgan State College in Baltimore.

Nike Consultant to Help Direct Purdue Jet Propulsion Center

Dr. Bruce A. Reese, consultant to the Nike-X Project Office at Redstone Arsenal, Ala., has been named associate director of Purdue University's Jet Propulsion Center.

Former technical director of the antimissile missile project, he was at Redstone for nearly three years during development of the Army's Nike Zeus ICBM defense missile system and its successor, the Nike X.

Recognized as an authority on jet propulsion, he returned to Purdue last fall as a professor in mechanical engineering. He had held that position at the Indiana school before going to Redstone and has served as a consultant to the Department of Defense Advanced Research Projects Agency, the Air Force and many defense and industrial contractors.

Dr. Reese is a member of the American Institute of Aeronautics and Astronautics and the American Society of Mechanical Engineers.

ences and bionics, and applications of teaching machines.

Among his professional affiliations are membership in Sigma Xi, the Institute of Electrical and Electronic Engineers, American Rocket Society, Society for Industrial and Applied Mathematics, International Scientific Radio Union, Society of Naval Architects and Marine Engineers, and the American Institute of Aeronautics and Astronautics.

Dr. McLucas Leaves ODDRE For Top NATO Science Job

Assistant Secretary General for Scientific Affairs, North Atlantic Treaty Organization, is the new title of Dr. John L. McLucas, who assumed his duties recently after serving since May 1962 as deputy director, Defense Research and Engineering (Tactical Warfare Programs).

Dr. Dirk U. Stikker, NATO Secretary General, announced appointment of Dr. McLucas and said he will chair both the NATO Science Committee and the newly created Defense Research Directors Committee. This is the senior scientific position in NATO and Dr. McLucas will be adviser on military and civil scientific and technical matters.

In the Department of Defense, he has been responsible for supervision of the research, development, test and evaluation programs and projects relating to tactical warfare.

A native of North Carolina, he was president of HRB-Singer, Inc., State College, Pa., prior to his service in the Department of Defense. He received a B.S. degree from Davidson College in North Carolina, a master's degree from Tulane University and a Ph. D. in physics from Pennsylvania State University.

During World War II Dr. McLucas served as a radar and operations officer in the U.S. Navy.



Dr. John L. McLucas

Document Collections Merged at Redstone

Two major collections of scientific and technical reports located in the same building and providing similar services were merged July 1 at Redstone Arsenal, Huntsville, Ala.

After reviewing the document service at Redstone, the Defense Documentation Center (DDC) and the U.S. Army Research Office agreed to merge the facilities, involving more than 600,000 documents.

Organizations concerned are the Redstone Scientific Information Center (RSIC), an activity of the Army Missile Command, and the Huntsville Field Office of the DDC. DDC documents cover all subject areas which involve the DoD; RSIC holdings are not limited to DoD but emphasize subject areas of the missile and aerospace related sciences and technology.

Scientists and engineers of the

Huntsville area who are working on defense programs will be more effectively and economically served from the single technical report collection, officials stated.

Organizational affinity is indicated by the fact that the majority of the DDC work force either was or had been on assignment from RSIC prior to the merger.

The Huntsville DDC office was terminated as a separate unit July 1. The RSIC incorporation of the DDC report collection, supplemented by the DDC extension service, provides access to the complete collection of documents for all DDC users (Government agencies as well as present and potential contractors) in the Huntsville

area and the southeastern states as required.

This agreement for extending service from RSIC represents acknowledgement of the principle of inter-agency cooperation in scientific information as expressed through the creation, development and joint funding of RSIC.

The DDC Headquarters in Washington, D.C., will furnish microfilm copies of technical reports, FOIRs (Field of Interest Registers), announcement bulletins, bibliographies, indexes and other reference tools as needed, and will transfer Redstone DDC equipment to RSIC.

Policy and technical guidance to RSIC will be provided by the DDC through the Director of Army Technical Information in the U.S. Army Research Office at Arlington, Va.

CRDL Meet on CIDS Draws High Level DoD Officials

High-level representatives of the Department of Defense and military services met at U.S. Army Edgewood (Md.) Arsenal Chemical R&D Laboratories July 1 to discuss the Chemical Information and Data System.

The group was headed by Dr. Nicholas N. T. Samaras, assistant director (Chemical Technology), Office of Deputy Director of Defense Research and Engineering; Walter M. Carlson, Defense Director of Technical Information; and Frederick M. Varney, Office of Assistant Director of Engineering Management.

The visitors were welcomed by Brig Gen Fred J. Delmore, commanding general of Edgewood Arsenal; Dr. William H. Summerson, chief scientist; Col William G. Willmann, Laboratories commander; and Dr. S. D. Silver, technical director of the Laboratories. Program chairman was J. P. Mitchell, the Laboratories' director of technical services.

CIDS is being designed as a universal method of storing, retrieving, and exchanging technical information and data by employing modern machine techniques. Phase II of the program involves the development and implementation of an action plan, and the establishment and maintenance of a centralized Army facility for chemical information and data services.

Participants in the discussion at the Laboratories heard reports on status of various aspects of Phase II.

Contractor Designs Precision Sight for Shillelagh

Pin-point accuracy in firing the Army's frontline battlefield Shillelagh missile from aircraft and helicopters is the claim made for a small stabilized sight developed by the prime contractor for the Shillelagh system.

As announced by the contractor in mid-July, the sight "refuses to budge even when vibrated, jiggled, jostled or bounced aboard aircraft and helicopters." Using the device, a gunner aboard an aircraft can establish a stable line of sight on either a stationary or moving target.

Prototype models of the sight are reported to have passed preliminary tests. For civilian use, a camera might be mounted with the sighting optics to produce aerial pictures of clarity comparable to those taken from stationary platforms.

Inventors of the stabilized sight are engineers Jack L. Johnson and Einar Lundquist, of the Philco Corp.

Aeronutronic Division. Robert B. Katkov heads the Shillelagh development program.

Aeronutronic recently signed a million dollar contract with the Research and Development Directorate, U.S. Army Missile Command, Redstone Arsenal, Ala., to demonstrate the stabilized sight for use aboard a Bell UH-1B helicopter.

The Shillelagh missile is planned as the main armament of the Sheridan armored reconnaissance vehicle, forming the Sheridan/Shillelagh weapon system. In final development, the project is managed by Col Wayne G. Higgins at the U.S. Army Weapons Command, Rock Island Arsenal, Ill.

Development of the missile and its associated guidance equipment is being managed by the Shillelagh Missile Engineering Division of the Project Manager's Office, U.S. Army Missile Command.

Veteran APRO Officer Begins USAREUR Assignment

After a 5-year assignment with the U.S. Army Personnel Research Office, Maj John E. Ranes departed late in July to serve with the Intelligence Division, Headquarters U.S. Army Europe, Heidelberg, Germany.

Because of his scarce qualifications as an intelligence systems research analyst, specializing in aerial surveillance requirements, his normal tour of duty was extended twice. His work involved liaison with other Army, Navy and Air Force agencies engaged in aerial surveillance research. His research was recognized when he presented a technical paper at a conference of the American Society of Photogrammetry.

Capt Edwin Santos will succeed Maj Ranes at USAPRO. A graduate of City College of New York, Capt Santos served formerly as an instructor at the U.S. Army Intelligence School, Fort Holabird, Md., and recently ended a 3-year tour at the U.S. Army School of the Americas, Fort Gulick, Canal Zone.



Maj John E. Ranes

White Sands Missile Range Marks Growth on 19th Anniversary

White Sands (N. Mex.) Missile Range celebrated its 19th anniversary July 9, marking growth of the Nation's first missile testing site from a handful of soldiers in pup tents to a 4,000 square-mile concentration of some of the most accurate data gathering instruments in the world, with more than 15,000 employees.

One week after the range was organized, a new era in science, history and world politics was ushered in. A blinding flash and a rising erie mushroom-shaped cloud proved to scientists at the range that they had unleashed the greatest power known to mankind, by detonating the first atomic bomb.

On Sept. 25, 1945, WSMR fired its first missile, a test launch of a modified Tiny Tim adapted to simulate the larger, more powerful WAC Corporal. A few months later, efforts started in earnest to develop America's arsenal of missiles with a static test of the captured German V-2, followed a month later by a flight test. From then until 1951 the United States flew 67 missions with modified V-2s, all but two at White Sands.

The laboratories and launch complexes developed for the V-2, the Navy Viking and Aerobee, the Air

Force Mace and the Army Corporal and Nike Ajax formed the nucleus of today's vast military and scientific missile programs.

Today the magnitude and scope of programs at White Sands are far beyond those imagined when the range was established. Nineteen years ago missilery had scarcely gotten off the ground and a trip to the moon was still fantasy.

Only 32 firings were chalked up in the first full year of operation, compared to the current average of more than 2,000 each year. Three times as many tests are conducted in the non-firing category, including missile tracking balloon and parachute tests.

Funds to support the extensive operations at the range have increased \$62 million over the FY 1963 to a planned estimate of \$196 million in 1965.

White Sands' booming business enhances the economy and prestige of nearby communities, such as El Paso, Tex., Las Cruces and Alamogordo, N. Mex. These three cities are receiving much of a \$100 million annual payroll, in addition to the White Sands dollar going into their areas for procurement of range instrumentation, operating supplies and materials and construction contracts.

White Sands contracts to New Mexico State University and Texas Western College total over \$5 million annually, covering data acquisition, processing and analysis, collection of meteorological data and study of shock and sound waves.

The range has had a vast impact on the area in other ways. Marked changes have been made in teaching philosophies and disciplines to meet the technical requests of Government contracts with the universities.

Carrying the major workload at the range are the Army Missile Test and Evaluation Directorate (AMTED), the Electronics Research and Development Activity (ERDA), and Plans and Operations.

As the consolidation of the Plans and Projects Office and the Range Operations Directorate, combined under a recent reorganization, Plans and Operations handles technical planning and mission activities and plans that support test programs to include logistics.

Data-gathering facilities at WSMR, acknowledged to be the best in the Free World, are connected to the impact areas by 1,100 miles of roads, 80,000 miles of wire and cable and 240 microwave and radio channels.

AMTED supports contractors developing Army missile projects and conducts independent tests to evaluate the missile as to whether it meets military requirements and is suitable for use by troops in the field.

Through AMTED have come such weapons as the Nike Ajax, the Nation's first antiaircraft missile, the Hawk, Hercules, the mobile Sergeant, and the developmental Nike Zeus-Nike X antimissile missile system.

ERDA, whose primary mission is to investigate and perfect the wide field of electronic equipment to be used by the modern Army, came to the range in '46 as 10 men and two radar vans. Now it is an organization of more than 2,000 military and civilian technicians operating a \$100 million communications—electronic plant.

ERDA also engages in worldwide meteorology studies, using small inexpensive sounding rockets to probe secrets of the upper atmosphere.

While missile testing remains WSMR's primary function, its support of technical developments by other agencies such as the Atomic Energy Commission, the Department of Defense (Advanced Research Projects Agency, ARPA), and NASA indicate the continuing importance of the range in the future.

Army Officers Participate In Naval Reserve R&D Meet

Twenty-four U.S. Army officers from 16 Reserve Research and Development Units throughout the United States, attended the recent Sixteenth Naval Reserve Research Seminar in Washington, D.C.

Naval Reserve Company 5-8 was host to the annual seminar, conducted under the auspices and with the cooperation of the Office of Naval Research, and attended by 80 Naval and 5 Air Force Reservists.

Rear Adm L. D. Coates, USN, Chief of Naval Research stated that \$142,800,000 was available in the current year for nonweapon R&D in the Navy. Other speakers described major fields of Navy research, including oceanography, meteorology, astronomy, submarine detection and deep diving by humans.

Other sessions were devoted to Research in Information Systems; Research in Environmental Sciences; Impact of Basic and Applied Psychological Research on Naval Systems; and Air Programs. All-day visits were made to the Goddard Space Flight Center and to the Naval Research Laboratory.



Sfc John R. Dodd, USA Engineer Reactor Group, Fort Belvoir, Va., assists with checkout of the most powerful Fast Burst Atomic Reactor in the Free World, which will be housed in the Nuclear Effects Laboratory being completed at White Sands (N. Mex.) Missile Range. Capable of an output of 100 billion watts of power in a fraction of a second, the reactor will emit the neutron and gamma radiation present during an atomic explosion, without the heat or blast, which will enable scientists to test the operation of missile components under simulated atomic blast environments.

Former Edgewood Arsenal CG Receives Second Star

Maj Gen Lloyd E. Fellenz, director of Chemical-Biological and Nuclear Operations in the Office of the Assistant Chief of Staff for Force Development, was recently promoted to that rank.

The 52-year-old, Kansas-born general graduated from the United States Military Academy with a B.S.

Canadian Universities to Host 4 Chemical Institute Symposia

Universities in three eastern Canada cities will host four symposia sponsored by the Chemical Institute of Canada during August, September and October.

The symposia will feature prominent scientists from Government, industry and universities throughout the United States and Canada as speakers.

A Symposium on Reactive Intermediates in Organic Chemistry will be held Aug. 27-28 at Laval University, Quebec City, Que. Topics will include free radicals, carbonium ions, carbenes imidogens, carbonions and organometallics. Inquiries should be directed to Prof. Ch. R. Engel, Department of Chemistry, Laval University, Quebec 10, Que.

The 11th Ottawa Symposium on Applied Spectroscopy and Analytical Chemistry will be held in Ottawa Sept. 9-11 at Carleton University. It is expected to attract about 200 delegates and speakers from the U.S., Canada and England. Separate sessions are being planned on gas chromatography and instrumental methods in quality control.

Kinetics of Pyrolytic Reactions will be the subject of a symposium scheduled at the University of Ottawa, Ontario, Sept. 9-11. It will be concerned with the kinetics and mechanisms of thermal decompositions and isomerizations. Included will be reactions in the gas phase, in the liquid phase and in the solid-state, but no surface-catalyzed reactions.

Further information may be secured from Prof. K. J. Laidler, department of chemistry, University of Ottawa, Ottawa 2, Ontario.

Three half-day sessions have been arranged for the Symposium on Bioenergetics that is slated at the University of Western Ontario, London, Ont., Oct. 15-16. Sessions will include bioenergetics in plants, microorganisms and animals. Information may be obtained from Dr. K. P. Strickland, Department of Biochemistry, Faculty of Medicine, University of Western Ontario, London, Ont.

degree in 1934. His most recent assignment, prior to being called to Washington for the fourth time in his career, was as commander of Deseret Test Center, Fort Douglas, Utah. He was promoted to brigadier general in 1961 while commanding the Army Chemical Center, now Edgewood Arsenal, Md.

General Fellenz has been a Chemical Corps officer since 1940 when he became a member of the War Plans Division. He participated in the Sicilian Campaign in the Mediterranean Theater of Operations during 1943 and 1944.

Upon returning to the States, he was assigned to the War Department General Staff and served with the Policy Branch and later as Chief of the Program Branch until February 1946. In August of 1946 he entered the National War College and following graduation was assigned to the Joint Strategic Plans Group in the Office of the Joint Chiefs of Staff in Washington, D.C.

General Fellenz was assigned to Fort Bragg, N.C., in 1952 and served as commander of the 81st Chemical Group before being assigned to Fort Monroe Va., in 1953 as Chemical Officer, Continental Army Command.

ICAF Grad Returns to Army Medical R&D Command

Col Colin F. Vorder Bruegge has returned to the U.S. Army Medical R&D Command as special assistant to the commanding general, following his recent graduation from the Industrial College of the Armed Forces.

Before he left the Command last August, he was awarded the First Oak Leaf Cluster to the Legion of Merit for exceptional performance of services from July 1959 to July 1963, first as chief of the Research Division and later as deputy commander. From



Col C. F. Vorder Bruegge



Maj Gen Lloyd E. Fellenz

In May 1956, he was assigned to the Army Chemical Center as deputy commander and later as commander of the Chemical Warfare Laboratories until January 1959. His next assignment was in the Office of the Chief Chemical Officer (OCCmIO) as the assistant chief for Planning and Doctrine in Washington and in August 1960 he became director for Military Operations, OCmIO.

Among the decorations which General Fellenz has received are the Legion of Merit, Army Commendation Ribbon with Metal Pendant and two Oak Leaf Clusters and the Europe-Africa-Middle East Campaign Medal.

1956 to 1959, he had served as deputy commander of the U.S. Army Medical Unit, Fort Detrick, Md.

From 1948 to 1950, he was assistant director of the Armed Forces Institute of Pathology, and from 1950 to 1955 he was special assistant to the director for organization and planning, and technical adviser and Institute representative for the planning group for the new Armed Forces Institute of Pathology building.

During World War II, he served in England and France. In 1946, he was commanding officer, Seventh Medical Laboratory, Germany and later chief, Preventive Medicine Division, Surgeon's Office, Headquarters in Berlin.

He is a Diplomate of the American Board of Pathology; member of the University of Tennessee Chapter of the Alpha Omega Alpha Honor Medical Society; member of the American Association for the Advancement of Science; Fellow, American Society of Clinical Pathologists; and Fellow, College of American Pathologists.

The colonel received premedical training at Memphis State University and his M.D. degree for the College of Medicine, University of Tennessee.

GIMRADA Employees Win Fellowships for Research, Study to Improve Skills

Two civilian employees of the U.S. Army Engineer Geodesy, Intelligence and Mapping Research and Development Agency (GIMRADA), Fort Belvoir, Va., are recipients of special study fellowships won through national competition.

B. J. Bodnar, assistant chief of the Research and Analysis Division, has been awarded a Secretary of the Army Research and Study fellowship that will enable him to make a study of the state-of-the-art in physical geodesy.

Studies at the Royal Institute of Technology, Stockholm, Sweden, will be under Professor Bjerhammer, who is generally recognized as one of the foremost Western authorities on contemporary physical geodesy. Bodnar will leave for Stockholm this fall.

Randall D. Esten, a supervisory research engineer and chief of the Photogrammetry Division of GIMRADA, is one of 10 Federal employees selected by Princeton University for its "Princeton Fellows in Public Affairs" program.

Beginning in September, he will study at Princeton's Woodrow Wilson School of Public and International Affairs during the academic year. The fellowship program is designed to improve the professional competence of Government employees and to further their careers in public service.

Esten has been employed at Fort Belvoir since 1948, has authored a number of papers dealing with photogrammetry, and is active in the affairs of the American Society of Photogrammetry. Since 1947, he has received three Outstanding ratings and two Sustained Superior Performance awards for his work.

A native of Nashua, N.H., he was graduated from the Massachusetts Institute of Technology in 1945 and earned his master's degree from Syracuse University in 1948.

BODNAR is the first employee of GIMRADA to receive a Secretary of the Army Research and Study Fellowship. The program was instituted in 1956 to enable career employees . . . chosen from the Department of the Army in open competition . . . to spend up to a year away from their normal duties while making a study in a particular field of vital concern to the Army and national defense.

Prior to the establishment of GIMRADA in 1960 as a separate Corps of Engineers' agency, however, Charles R. Manor, of the Topograph-



B. J. Bodnar



Randall D. Esten

ic Department of the U.S. Army Engineer Research and Development Laboratories, was recipient of a Fellowship.

Bodnar's field of study, physical geodesy, is concerned basically with the study of the gravity field of the earth, its interpretation, and its applications. For many years, an area of interest only to European theorists, physical geodesy has gained considerable military importance.

Bodnar's area of concern is the underlying long-range basic research aspects in purely theoretical areas, which can supply the Army with needed information to meet future requirements. The main theoretical in-

terest is the determination of the figure of the earth by gravimetric methods and the proper interpretation of anomalies of the earth's gravity field.

Bodnar, 48, is a native of New York City. He received his B.S. degree in civil engineering from New York University in 1938, studied photogrammetric optics at the University of Tennessee, and pursued advanced graduate interests in optics and design at Catholic University. He entered the Civil Service in 1938 and was employed by the U.S. Geological Survey until 1952, when he transferred to the Fort Belvoir Labs.



TEN SECRETARIES AND STENOGRAPHERS from the Natick (Mass.) Laboratories were selected to attend courses at Massachusetts schools under a \$5,000 scholarship fund established by Dr. Edward F. Degering, head of the Radiation Chemistry Branch at Natick. Establishment of the fund was reported in the April 1963 issue of the *Newsmagazine*, p. 19. Chosen for the courses, ranging from writing to seminars for secretaries in psychology, business administration, human relations, personality, English, effective speaking, and business law, are (left to right) Jean Henderson, Dale Carnegie Institute; Diane Hill, Clark University; Winifred Coleman, Northeastern University; Edna Albert, Adult Education Institute of New England; Marcia Manguso, Framington State College; (Dr. Degering); Carol Ramer, Burdett College; Judith Smith and Rita Manion, Boston University; Dorothy Leavill and Sheila Pharnes (latter not shown), Northwestern University.

Fiscal Year Closing Rush Swells Contracts to \$467 Million

Actions to obligate funds in the closing days of FY 64, ending June 30, produced a total of \$467,783,000 as the value of contracts issued in recent weeks by the U.S. Army for research, development and production.

Kaiser Jeep Corp., Toledo, Ohio, received three contracts totaling \$77,746,969 for production of various types of cargo and utility trucks. Sec-

Soldier Scientist Simplifies Study of Propellant Particles

An enlisted chemist in the Propulsion Laboratory of the Army Missile Command, Redstone Arsenal, Ala., has reduced to its simplest form a tedious, continuing study of the size and shape of certain particles used in solid propellants powering today's sleek weapons.

While a staggering amount of equipment could be assembled to do the job, Sp/4 Don R. York concluded that a simple vacuum system would produce the required results. Equipment he uses is purchased from standard commercial firms.

The size and shape of the particles, by eliminating voids, have a significant effect on how well the propellant burns. Increasing the density of the propellant delivers more punch.

Particles which come under York's scrutiny flow suspended in a liquid solution beneath a microscope. He actually measures not the particles themselves but the resistance they cause passing through an opening.

York described the visual effect as similar to "watching underwater movies."

He came to the Army R&D lab after receiving a B.S. degree in chemistry from Loyola University.



Sp/4 Don R. York

ond high was Sylvania Electric Products Co., Needham Heights, Mass., with two contracts for classified electronics equipment totaling \$37,500,000, which included a \$15,000,000 second-year buy.

Continental Motors Corp., Muskegon, Mich., was awarded two contracts totaling \$24,565,663, with one as the first increment of a 3-year purchase of multifuel engines plus spare parts and special tools.

Bowen-McLaughlin York, Inc., York, Pa., won three contracts totaling \$21,867,267 for 175 mm. guns and vehicles, 8-inch howitzers, ½-ton truck bodies, recovery vehicles and spare parts and for overhaul of 313 M48A1 tanks.

Hughes Aircraft Co., Fullerton, Calif., was granted six contracts with total value of \$19,774,468 for AADS-70 Army Air Defense Systems further development, design and fabrication of a systems improvement modification kit for the AN/FSQ-18, -28 and -38 air defense systems, other air defense equipment and classified electronics equipment.

General Motors Corp., Detroit, Mich., received five contracts amounting to \$18,696,915 for metal parts for the 105 mm. projectile, various transmissions, diesel engines for the M113A1 personnel carriers, continued revision of pilot vehicles, and production drawings for the General Sheridan XM551 Tank.

Western Electric Co., New York City, was awarded three contracts totaling \$16,171,295 for Nike Hercules improved modification kits and related items.

International Telephone and Telegraph Corp., ITT Federal Laboratory Division, Nutley, N.J., was the recipient of two contracts totaling \$14,105,489 for U.S. Army communications equipment and installation.

International Harvester Co., Washington, D.C., was issued four contracts totaling \$13,512,265 for production of maintenance, tractor and cargo trucks.

Page Aircraft Maintenance Inc., Lawton, Okla., received a \$11,787,976 contract modification for organizational and field maintenance of rotary and fixed-wing aircraft assigned to Fort Rucker, Ala.

Day and Zimmerman, Inc., Philadelphia, Pa., was issued a \$9,571,286 contract modification for loading, assembling and packing of various boosters, primers and detonators. Chrysler Corp., Detroit, Mich., gained three contracts totaling \$9,121,304 for

trucks and engines for personnel carriers.

Anthony Co., Streator, Ill., will produce 433 rough terrain fork lift trucks for \$8,885,091. International Fermont Division of the Dynamics Corp. of America, Suffern, N.Y., will produce gasoline engine driven generator sets over a 3-year period for \$8,688,885.

The Hupp Corp., Hercules Engine Division, Canton, Ohio, was awarded multi-buy contracts totaling \$6,229,163 for gasoline engines. General Dynamics Corp. Rochester, N.Y. and Pomona, Calif., under four separate contracts totaling \$5,971,146, will produce repair parts for 500 radio sets, design models of countermeasure set AN/TLQ, and continue research and development on the Mauler weapon system, including continuation of quality control effort.

Collins Radio Corp., Dallas, Tex., for \$5,878,775, will produce AN/TRC-90 transportable tactical radio communications sets and will design, manufacture and install a closed loop radio frequency carrier intercom system for the Operations and Checkout Building at Merritt Island, Fla.

Bell Helicopter Co., Fort Worth, Tex., was issued contracts extending over two years amounting to \$5,762,850 for 103 basic instrument trainers for engines installed in helicopters.

North American Aviation Co., Inc., Columbus, Ohio, was awarded a \$5,666,450 contract for limited production of Type IV Roadrunner Target Missile System.

Universal Match Corp., Unidynamics Division, St. Louis, Mo., received two contracts for \$5,532,980 for the manufacture of Pershing transportable guided missile erector launchers and for production of major spare parts for Pershing launchers.

Bendix Corp., Radio Division, Baltimore, Md., received a \$5,500,000 contract for classified electronics equipment. Hercules Powder Co., Wilmington, Del., will load, assemble and pack Honest John weapons, Little Johns, Nike boosters and miscellaneous propellants and explosives for \$5,013,745.

Ford Motor Co., Highland Park, Mich., will produce 1,870 ¼-ton trucks for \$4,978,454. Kentron Hawaii, Ltd., Honolulu, received a \$4,748,845 contract for operation and maintenance of Technical Range Facilities and Instrumentation at Kwajalein Atoll in the Marshall Islands. Pettibone Mulliken Corp., Washington, D.C., was awarded a \$4,737,056

contract for 169 rough-terrain forklift trucks, 75 with crane attachments.

Radio Corp. of America, Camden, N.J., was issued a \$4,621,972 pair of contracts for technical and engineering services on development and test of orbital and suborbital missiles and rockets at White Sands Missile Range, N. Mex., and for research and development to implement the system components verification for the AADS-70 system.

Kleinschmidt Division of SCM Corp., Deerfield, Ill., received three contracts totaling \$4,168,659 for teletypewriter and teletype sets (tape relay and switching systems) and page-printing teletype sets.

Raytheon Co., Lexington, Mass., was given three contracts totaling \$4,241,739 for technical services and materials for the field installation of modification kits to support the Hawk missile system, further design and development on Hawk, Channel Pulse Modulation Multi-Plexers, engineering development models and accessory items.

Melpar West Virginia Corp., Falls Church, Va., was awarded a \$4,050,336 contract for 1,235 infrared search light sets. International Business Machines Corp., Washington, D.C., received two contracts totaling \$3,834,100, one for configurations of various types of automatic data processing equipment and the other for classified electronics equipment.

Peterson Buildings, Inc., Sturgeon Bay, Wis., will produce self-propelled amphibious 60-ton lighters for \$3,770,220. Jeta, Inc., Yonkers, N.Y., will manufacture nonwinterized and winterized 60-cycle generator sets for \$3,592,920. Airesearch Manufacturing Co., Los Angeles, Calif., will conduct research and feasibility studies in air filtration techniques under a \$3,525,000 contract.

Lesser contracts were: Honeywell, Inc., Hopkins, Minn., \$3,421,262, fuze projectiles and fuzes for classified ammunition; Control Data Corp., Rockville, Md., \$2,939,250, various types of automatic data processing equipment; Weatherhead Co., Cleveland, Ohio, \$2,793,000, producing 114,000 high explosive antitank projectiles;

Sperry Rand Corp., Univac Division, St. Paul, Minn., \$2,750,072, classified electronics equipment; Northrop Corp., Needham Heights, Mass., \$2,692,849, helicopter armament subsystems; Bell Helicopter Co., Fort Worth, Tex., \$2,534,500, change involving a door hinge rotor in a previously issued contract; FMC Inc., San Jose, Calif., \$2,471,093, 214,117 track shoes, T-130 for personnel carriers;

Martin Marietta Corp., Orlando, Fla., \$2,465,776, industrial engineering services for the Pershing weapon system; Aerojet-General Corp., Downey, Calif., \$2,451,513, research and development on projectiles and plant services; Cubic Corp., San Diego, Calif., \$2,396,815, a long-range survey system; General Electric Co., Burlington, Vt., \$2,319,559, product improvement, design and development of the 20 mm. vulcan gun pod, M61A1 with accessories and tooling;

Stanford Research Institute, Menlo Park, Calif., \$2,209,808, scientific and engineering services to include field experiments in military operations and collection and reduction of scientific data for the U.S. Army Combat Developments Command Experimental Center.

Others were: Philco Corp., \$1,192,580, Pershing research study; Space General Corp., \$1,605,000, design, fabrication and test of prototype biological detection device; Sperry Phoenix, Sperry Rand, \$1,144,500, amplifiers and compass indicators for UH-1 helicopter;

Stewart and Stevens Services, Inc., \$1,727,871, 297 diesel engine generator sets; Harvey Aluminum Sales, Inc., \$1,502,012, classified ammunition; King-Hunter, Inc., \$1,193,468, airlift site preparation;

Bulova Watch Co., \$1,600,000, mortar ammunition head assemblies; Technical Services, Inc., \$1,732,384, develop Army supply catalogs; Cessna Aircraft Co., \$1,902,268, dispensers, Capitol Radio Engineering Institute, \$1,500,000, classified services; Massachusetts Institute of Technology, \$1,275,000, research on electronic and molecular physics and communication sciences; Lear-Siegler, Inc., \$1,183,-

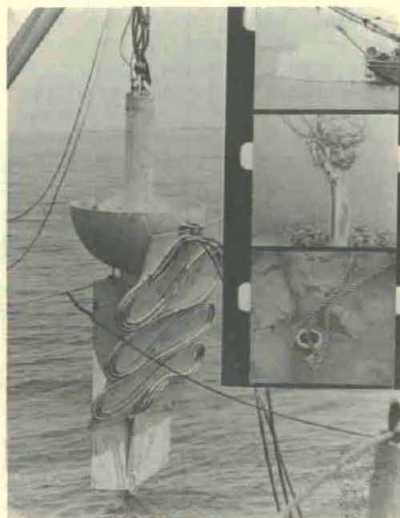
312, helicopter amplified assemblies and attitudes indicators;

University of California, \$1,575,000, research in radiation physics and aerodynamics for ARPA; Bendix Eclipse, \$1,272,567, Pershing ground support equipment; Aerojet General, \$1,249,760, classified ammunition; Grumman Aircraft Engineering Corp., \$1,992,927, modification of eight Mohawk aircraft;

FMC Corp., \$1,877,001, Pershing guided missile carriers; Sperry Gyroscope Co., \$1,784,850, classified research on Project Defender; Jata, Inc., \$1,477,731, generator sets; Hesse Eastern, Inc., \$1,758,971, 66 mm. rocket launchers; White Motor Co., \$1,258,052, body truck vans; Research Triangle Institute, \$1,180,700 for research studies;

Page Communications Engineering, \$1,916,449, improvement of Philippine-Taiwan communications system; R.E.D.M. Corp., \$1,417,500, head assemblies, mortar ammunition fuzing systems; Lansdowne Steel and Iron Co., \$1,536,682, 8-inch projectiles; Albion Malleable Co., \$1,731,240, metal projectile parts; Communications Systems Corp., \$1,591,044, radio receivers, mobile tactical sets; Remington Arms Co., \$1,717,543, small arms ammunition; Melpar, Inc., \$1,300,000, classified electronics equipment;

Pacific Car and Foundry Co., \$1,296,477, infantry fighting vehicles (models); Emtex Division, Missiles Systems Corp., \$1,280,895, demolition kits; Hayes International, \$1,506,928, Pershing missile trainers; Caterpillar Tractor Co., \$1,385,640, tractors; Ingraham Co., \$1,666,188, boosters; Raytheon, \$1,220,639, continuation of ARPAT Project for ARPA.



EXPLOSIVE ANCHOR, shown at left, is being tested by the U.S. Army on the Potomac River about 10 miles south of the Nation's capital. Designed by the Engineer Research and Development Laboratories, Fort Belvoir, Va., to moor tankers in the open sea, the 3,300-pound device can do the job of a conventional anchor weighing 55,000 pounds. When lowered into the water, an impact-type fuze sets off an explosion that drives the anchor into the subsurface to anchor loads up to 300,000 pounds. Using a 7-foot barrel and 14 pounds of propellant, the Army has driven the anchor 35 feet into sandy clay and 20 feet into hard coral, leaving only the cartridge and cable visible to underwater divers. The anchor is expendable, or may be retrieved, depending on the time element for hoisting the anchor and type of subsurface into which embedded.

Hovering, STOL Aircraft Play Strong Role in U. S. Army Mobility

By Richard L. Ballard

Aerospace Research Engineer,
U.S. Army Research Office

The first aircraft provided the Army by the Wright Brothers had flight characteristics very similar to the needs of the Army today: low and slow.

Since the Wright Brothers, major achievements have been made in aircraft performance with emphasis on high speed and flights at several times the speed of sound have been achieved. However, the Army continues to maintain its interest in speeds less than the speed of sound, in subsonic flight.

What does the Army mean by low-speed aircraft aerodynamics? It means covering the full spectrum of subsonic flight; it means the aerodynamics of vertical takeoff-and-landing (VTOL) and short-takeoff-and-landing (STOL) aircraft; it means the aerodynamics of rotary-wing aircraft, such as helicopters; and it means the aerodynamics of aircraft flight at speeds from zero to 40-50 knots, including hovering. (Hovering flight has sometimes been defined as the pilot who likes to fly, but does not have anywhere to go. This is *not* the Army's definition!)

Why is low-speed aircraft aerodynamics important to the Army? The Army is looking for better performing aircraft, as are the Air Force and the Navy. Improved low-speed characteristics for operating in and out of unprepared areas or limited-access areas, low drag for cruising economy, control at low speed or during hovering flight are performance characteristics important to the Army. Ultimately the improvements in these performance characteristics gives the Army improved mobility.

With mobility being one of the three basic needs of the modern Army (communications and firepower being the other two), any technology that improves mobility is important. The objective of the Army low-speed aerodynamics research program is to make available advanced aerodynamics technology leading to continued improvement in operational capability of the type of aircraft required in the field environment.

Why is the Army supporting low-speed aircraft aerodynamic research? Not only is the Army's program oriented to continued improvement of mobility effectiveness, as mentioned, but the advancement of low-speed

Richard L. Ballard joined the staff of the U.S. Army Research Office in the Physical Sciences Division in January 1960. Assigned to the Physical and Engineering Branch as an aeronautical research engineer, he has responsibility for the Army Aeronautical Research Program and the Ballistics and Mechanics Research Program.

In 1950, he earned a B.S. degree from Virginia Polytechnic Institute (VPI) and in 1954 received an M.S. degree from New York University. At VPI, he was a member of Gamma Alpha Rho honorary aeronautical engineering society, and a student member of the Institute of Aeronautical Sciences.

From 1950 to 1954, he was employed by Grumman Aircraft Engineering Corp. as an applied loads engineer on the aircraft projects XF10F-1, F9F-6, S2-F, TF-1 and F11F-1. Following two years in the U.S. Army, where he served as a mechanical engineer assistant at the Ballistics Research Laboratories, he was employed from 1956 to 1960 at the Martin Co. in Baltimore as a staff specialist for applied loads and design criteria in the Structures Department. There he was associated with the Vanguard, Matador, P6M, and Dynasoar Programs and advanced projects.



R. L. Ballard

flight technology on a national scale has other significance. Supersonic or space flight appears to have priority with other agencies. Still, the allegedly less glamorous area of low-speed flight has reflected benefits to equivalent civil requirements or general aviation as a whole, as well as being essential to the Army.

Examples would be large-city shuttles, where accessibility to large landing areas is a problem; the need for a high-performing, short-haul, inter-city aircraft; the need for improved agricultural aircraft; and even to the performance of large and high-speed aircraft during landing or takeoff.

The Army's approach to supporting low-speed aerodynamic research is the continued matching of requirements with the state-of-the-art. The six categories of Army aircraft planned for the Army inventory—light observation aircraft, surveillance, advance aerial fire support system, utility/tactical transport, light tactical transport, and heavy lift—are continually reviewed. Advances in technology may allow higher performance and therefore a revision of requirement; alternately, the state of requirements will lead to increased research or change in emphasis in current programs.

The Army field agencies responsible for this are the Army Research Office-Durham at Durham, N.C., and the Army Transportation Research Command at Fort Eustis, Va. The Army Research Office-Durham has

responsibility for the more fundamental aspects of the program, and the Transportation Research Command contracts for the exploratory portions of the research program.

Relationships with other agencies and the need for reliance upon their resources have resulted in mutual benefits, when common interest prevailed. Various cooperative programs have existed and continue with the Office of Naval Research, Navy Bureau of Weapons, Air Force Systems Command, and the National Aeronautics and Space Administration Research Centers at Langley Field, Va., and Ames at Moffett Field, Calif. Cooperative efforts with these agencies have been indispensable to the Army program in low-speed aerodynamic research.

Involved in the Army aerodynamic research program are numerous contracts with various industry and university contractors. Common to all of these contractors, each regarded by the Army in the best-qualified category, is a mutual objective with the Army in advancing technology in low-speed aerodynamics; also, to assure continued interest in low-speed flight research at all scientific levels, including the undergraduate and graduate student at the university level.

Contractors include such educational institutions as Princeton University, Mississippi State University, Clemson College, Pennsylvania State University, Virginia Polytechnic Institute, University of Washington,

Massachusetts Institute of Technology, Brooklyn Polytechnic Institute, Ohio State University and University of Toronto. Industry contractors include Dynasciences Corp., General Electric Corp., Sikorsky Aircraft Division of United Aircraft Corp., Bell Helicopter Co., Lockheed Aircraft and Cornell Aeronautical Laboratories.

Investigations of contractors probe subjects such as viscous flow, diffusers, curved mixing flows, full-scale vortices systems, aerodynamics of wind tunnel wall corrections for high-lift models, wing-fan interference, aerodynamic blade loading, tandem cascades, fan noise, propeller slipstream effect, turning jet sheet, airfoils in nonuniform flow, VTOL propellers at low-advance ratios and the flow characteristics in a nonuniform impinging jet. Inclusion of the details on each of these investigations is not feasible here; however, descriptions of several of these studies that typify the program follow.

An investigation of nonuniform sheared flows has demonstrated that under certain conditions there is a marked variation in the maximum lift attainable. This variation is dependent

upon the position of the airfoil in the nonuniform sheared flow and appears to be a function of the velocity shear and velocity shear gradient.

Figure 1 is illustrative of some of the 2-dimensional lift data obtained. The lift coefficient is based on an average velocity for the flow; and the data provide a direct comparison of the lift at various positions in the flow. It should be noted that, because of limitation of the model suspension in use at the time these data were obtained, angles of attack higher than approximately 18 degrees were unattainable.

However, during current 3-dimensional flow experiments (under certain conditions) with a modified suspension system, angles of attack as high as 30 degrees have been obtained without a clear break in the lift versus angle of attack data. As indicated by the figure, it is possible to locate a wing in the slipstream, such that the maximum possible lift is obtained from slipstream effect.

To exploit the advantage of better understanding of viscous properties of fluid flows, a research program is continuing to examine the fundamental

nature of high-lift and low-drag boundary layer. One aspect is an analysis to predict the nature and effect of the turbulent boundary layer in an arbitrary pressure gradient with transpiration. The existing methods of turbulent boundary layer control are considered as well as the effect of transpiration through angled slots on the layer.

Part of this study is the theoretical and experimental research into the development of a low-shear turbulent boundary layer control system. Research has continued on laminar stabilization by sustained distributed perforations and porous materials. This research has been supplemented by flight research concerning laminar bubbles and leading edge separations not only in steady flow but also in unsteady flow.

Recent experiments as an adjunct to this research have shown that an extension of the 2-dimensional boundary layer theory adequately describes the flow of axisymmetrical free jets. This closely relates the fundamental properties of turbulent boundary layers and axial jet flows. Current research on turbulent entrainment is directed toward thrust augmentation by using ejectors on free jets.

Significant research has been performed on viscous vortices and the results will be used in the damping of unsteady flow. As a part of this program, an aerodynamic research aircraft (Fig. 2, p. 35) was specifically designed to explore full-scale problem areas, including high-lift, low-drag, high-thrust, and the compatibility of these areas with fixed-wing operations.

The aircraft used in these studies has a boundary layer control system utilizing a camber-changing wing. The distributed suction is applied through thousands of small holes in the upper wing. The variable camber wing is incorporated instead of flaps to minimize negative pressure peaks at high-lift conditions. Maximum attention has been given to fillets and fuselage intersection design to reduce interference effects.

These innovations are required to be compatible with a low-drag configuration and, if necessary, for laminar boundary layer control. This complete program is oriented to increase the usefulness of STOL vehicles and to obtain technological advances that can be applied to all subsonic regions of fluid mechanics where bodies are affected by the viscous properties of fluid flows.

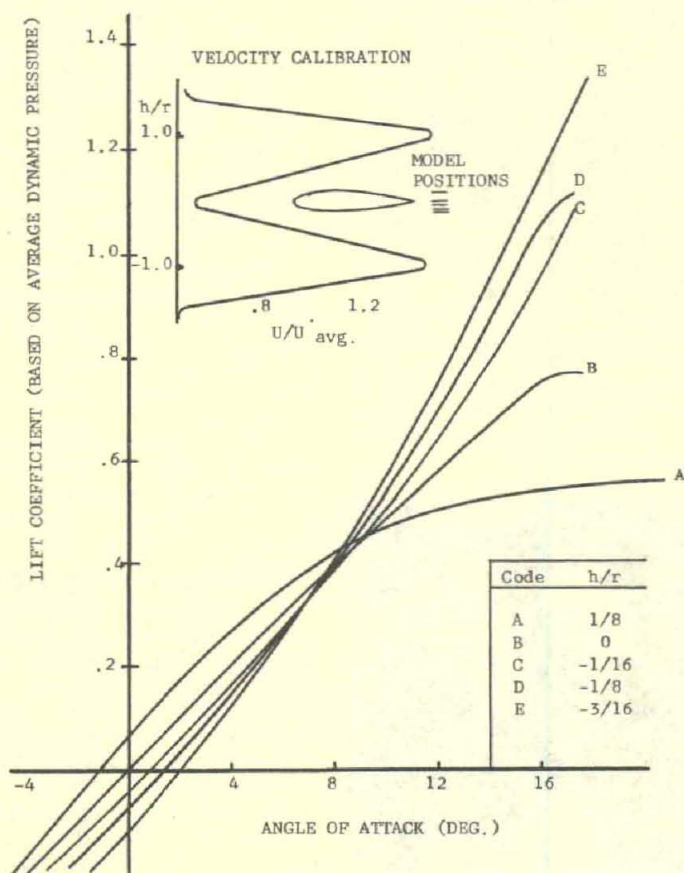


FIGURE 1

WING SECTION LIFT IN A TWO - DIMENSIONAL PROPELLER SLIPSTREAM

(Continued on page 35)

CSC Slates Career Development Seminars

The U.S. Civil Service Commission Office of Career Development is sponsoring seminars and courses beginning in September to improve development of managerial and first-line supervisory employees.

A Workshop on Negotiating and Implementing Agreements, relating to employer-management cooperation, will be held Sept. 9-11.

Participation is open to about 30 individuals assigned management re-

sponsibility for negotiating agreements or training and giving advice to others on negotiating agreements.

An Executive Seminar in Operations Research will be conducted Sept. 10-11. It will provide an introduction to operations research, what it is, and how it has been and can be used in the conduct of governmental activities. Career executives with broad administrative responsibilities, GS-15 or equivalent and

above, are eligible for nomination.

An Institute for Executives in Scientific Programs will be held Sept. 21-25. Eligibility is limited to grades GS 15-18. The Institute is designed to give scientists an opportunity to explore important concepts and current issues in the organization and administration of scientific and related activities of the Federal Government; also, to provide an insight into critical issues facing Federal officials in the determination and implementation of research, development, testing and evaluation policies.

A Management-Employee Group Relations Seminar, developed with the cooperation of the CSC's Bureau of Programs and Standards and the Interagency Advisory Group Committee on Employee-Management Cooperation, will be conducted Oct. 5-7.

Participation will be open to about 35 Federal managers and their staff assistants who need to gain knowledge about management-employee group relations. The objective is to strengthen managerial skills in this area.

All of the courses will be held in the CSC Building, 1900 E Street, N.W., Washington, D.C.

In addition, the CSC will cooperate with the American Political Science Association in offering an Internship in Congressional Operations between Nov. 9, 1964 and Aug. 13, 1965. It is designed to provide an opportunity for career administrators at middle grade levels (GS 11-14) to acquire a thorough understanding of Congressional operations.

Activities in the training program include full-time work assignments in the offices of Congressmen and Senators and participation in weekly seminar meetings with leading Congressional, governmental and academic figures.

Further information about these programs may be obtained through the Office of Career Development, U.S. Civil Service Commission, Washington, D.C. 20415.

USAEPG Lets \$105,795 Contract

The U.S. Army Electronic Proving Ground Procurement Office at Fort Huachuca, Ariz., recently awarded a fixed-price contract for \$105,795 for work on electronic reconnaissance and surveillance, deceptive counter-measures, solid-state devices and microwave telemetry.

The contract with Applied Technology, Inc., Palo Alto, Calif., is to run for 13 months and calls for the delivery of a feasibility test model of a dual frequency electromagnetic counter-measures system.

Textile Technologist Wins Natick Director's Award

A method for determining the right type of fabric used in the construction of radome shelters, causing the least interference with the operation of radar equipment recently gained the 1963 Research Directors' Award.

Constantin J. Monego, a textile technologist at the U.S. Army Natick (Mass.) Laboratories, became a second-time winner of the award. In 1955 he shared the same honor with two others.

The award, top distinction at the Natick Laboratories, was based also on his appointment as the judge for the 1963 Intersectional Technical Paper Competition Committee of the American Association of Textile Chemists and Colorists.

Monego serves at Natick as staff adviser and expert on heat and mass transfer through textile materials. This task includes techniques for investigating convective mechanisms and analysis of convective and radiative systems of heat transfer in fuel utilization studies in tentage. He is directly involved in the development of air-supported shelters.

An existing procedure, which established minimum required electrical characteristics, was costly and required sensitive electronic equipment.

Monego began by trying to find out if a correlation existed between the electrical and physical properties of coated and uncoated fabrics. If this occurred, it would facilitate the development of fabrics with the desired electrical properties.

Seventeen different fabrics, both coated and uncoated, were prepared and tested for electrical characteristics. Tests for physical properties were also conducted. The results were highly satisfactory. Monego found the looked-for connection between the bulk density of a fabric and its measured dielectrical constant.

He also discovered that the dissipative loss could be maintained by proper selection of fibers and coat-

ings, and that the boresight error (the angle of shift of the radar beam when passing through the material) is influenced by gradual variations in the thickness of the fabric.

These findings resulted in a method for selecting the best fabric to be used in the construction of radome shelters. The new system is fast, inexpensive, and stands out as a significant contribution in the field of military communications.

Monego received a B.S. in textile engineering at the Philadelphia Textile Institute (now the Philadelphia College of Textiles and Sciences) and attended Temple University, taking graduate courses in physics. Currently, he is enrolled at the Massachusetts Institute of Technology, specializing in textile engineering analysis and instrumentation.

From 1946 until he entered Government service in 1951, he was assistant professor of dyeing, printing and finishing at the Philadelphia Textile Institute.

Monego has published eight papers on various topics on color measurement, light and heat transfer, and has coauthored or contributed to 12 additional papers on related subjects. He has written several technical reports in the textile field.



Constantin J. Monego

Chemical Notations Systems Survey Reported

Findings of an intensive survey on chemical notation systems conducted during the past year by the National Academy of Sciences-National Research Council (NAS-NRC) are reported in a newly published document.

Survey of Chemical Notation Systems was published by the NAS-NRC Committee on Modern Methods of Handling Chemical Information. Financed by a \$56,000 National Science Foundation grant, the survey was directed by Dr. I. Moyer Hunsberger, dean of the College of Arts and Sciences, University of Massachusetts.

Dr. Robert C. Elderfield, former chairman of the Division of Chemistry and Chemical Technology of NAS-NRC, said objectives of the survey included "a thorough analysis of the characteristics of the various chemical codes, chemical notations and other nonconventional methods of handling information derived from chemical structures."

Discussed in the report are similarities and differences between various methods, the criteria which lead to their adoption or development, and the problems encountered in their use. Considered also are potentialities of

each system for more widespread use, needs not met by existing systems, and purposes that might be served by agreement among chemists on the use of one or more standardized systems.

Chemists first became interested in the use of notation systems for structures of chemical compounds as possible substitutes for names, many of which did not identify compounds uniquely and unambiguously. It was believed that a notation could be made to do so more easily than a system of nomenclature.

During the past decade interest in the possibility of using machines to handle scientific information has been growing rapidly. Chemists have devised a number of coding systems for representing chemical structures in mechanized information systems. Most prominent among these are the Dyson and Wiswesser systems.

The notation system devised by G. Malcolm Dyson of England formed the basis of the international standard as adopted in 1959 and then revised by a commission of the International Union of Pure and Applied Chemistry (IUPAC).

Among important findings in the NAS-NRC report is that the Wiswesser notation holds clear advantages over IUPAC, including considerations that it can be handled by standard punched card machines and that it is more easily read and alphabetized.

Conclusions also indicated that the most effective role of computers in chemical structure retrieval has not yet been ascertained and that more experimental evidence is needed to show the best uses of the various types of search systems now functioning and under development.

Copies of the *Survey of Chemical Notation Systems* are available for \$7 apiece at the Printing and Publishing Office, National Academy of Sciences, 2101 Constitution Avenue, Washington, D.C. 20418.

WRAIR, AFIP Men Win AMA Convention Awards

Awards were presented at the American Medical Association's recent annual convention to scientists from the Armed Forces Institute of Pathology (AFIP) and the Walter Reed Army Institute of Research (WRAIR).

An exhibit designed and constructed at the AFIP received one of the top prizes in its field. Dr. William C. Manion, chief of AFIP's Cardiovascular Branch, and Dr. Giorgio Baroldi were awarded the Hektoen Silver Medal for their exhibit titled, "The Circulation in Normal and Pathological Hearts." Dr. Manion recently completed fellowship training under Dr. Baroldi at the University of Milan in Italy.

Hektoen Medals are presented for exhibits which display original investigation and are judged on the basis of originality and excellence of presentation. AFIP's exhibit was constructed by the Institute's Scientific Illustration Division.

Col Robert M. Hardaway, Jr., director, Division of Clinical Surgery, WRAIR, Capt Martin L. Dalton and Capt Maurice J. Elovitz presented two research exhibits which earned AMA awards.

An exhibit titled "Convalescent Serum in the Treatment of Severe Experimental Burns," won the Certificate of Merit (1st prize) in the Military Medicine Section. The exhibit was prepared by Ole J. Malm and Capt George J. M. Slawikowski.

"Syndromes of Disseminated Intravascular Coagulation," designed by Col Hardaway, was awarded honorable mention (second prize) in the Military Medicine Section.

APRO Chief Scientist Appointed Purdue Professor

A 21-year career with the U.S. Army Personnel Research Office (USAPRO) will end for Dr. Hubert E. Brogden, chief scientist, when he reports for the fall term at Purdue University as a professor of psychology.

Dr. Brogden, who will specialize in quantitative methodology in his new duties, has gained broad recognition for his work in development of psychometric theory and its applications to the solution of human factors problems in the selection of Army personnel for jobs suited to aptitudes.

USAPRO has only recently developed a computerized solution to the problem of classifying military personnel for military occupation specialties based on aptitudes and attitudes manifested in psychometric measures.

Graduated from the University of Illinois with a Ph. D. degree in 1939, Dr. Brogden joined the USAPRO staff in World War II when the organization was engaged in a crash program to develop selection and classification instruments for transferring civilian skills to military requirements.

Scientific development of self-descriptive measures now used exten-



Dr. Hubert E. Brogden

sively as leadership prediction instruments for selection of candidates to officer training schools and to the U.S. Military Academy is attributed in substantial measure to his efforts.

Dr. Brogden is the author of more than 100 professional journal publications and research reports. He served as president of the Psychometric Society in 1956-57, is a Fellow of the American Psychological Association, and a member of the Psychonomic Society, Eastern Psychological Association, and Midwestern Psychological Association.

Research Analysis Corp. Adds 4 to Professional Staff

Dr. Gilbert B. Rozran, Daniel E. Cowgill, Judith A. Bancroft and Jane-Ring Fritz Crane are among recent additions to the technical staff of the Research Analysis Corp., a nonprofit Army contract agency.

DR. ROZRAN was supervisor of human factors research and a systems engineer at the Burroughs Corp. Research Center, Paoli, Pa., where he worked on digital computer-based command and control systems such as Norad 425L.

Author of 12 publications in scientific journals, Dr. Rozran received

his B.A. and M.S. degrees in industrial psychology from Miami University and a Ph. D. in psychology and general engineering from Purdue University.

Before joining RAC, Mr. COWGILL was supervisor of the Systems Evaluation Group of the Polaris Analysis Department at Vitro Laboratory, Silver Spring, Md. His major activities included evaluation of proposed changes to certain areas of the Polaris weapon control system and development of new concepts for automatic weapon control systems.

Previously he was a development engineer at IBM Federal Systems Division, in charge of developing and administering operation tests of the Project Mercury Launch System equipment at Cape Canaveral (now Cape Kennedy), Bermuda and Goddard Space Flight Center. From 1956-59 he developed simulations on IBM 704 of the Atlas inertial guidance computer for American Bosch Arma Corp.

His education includes Harvard University, Oberlin College (B.A. in mathematics), Boston University (M.A. in mathematics), Columbia University and George Washington University.

MISS BANCROFT worked until recently with the Technical Research Advisory Group at the U.S. Continental Army Command. Previously she was a member of the Advanced Technology staff of the Martin-Marietta Corp. and a systems engineer and group leader at Eastman Kodak Co. She holds a B.S. degree in mathematics from McGill University and has done graduate work in applied statistics at the University of Rochester.

MRS. CRANE was a management specialist for Chrysler Corp., advising management on model building, the use of computers and operations research. From 1955-59 she worked in statistical analysis, technical assistance in statistics to developing countries, and computer programming with the Bureau of the Census. Her education includes an A.B. degree in international relations from Brown University and graduate work at the University of Maryland and George Washington University.

HumRRO Study Aimed at Better Armored Platoons

Improving the ability of an armored combat platoon to perform its critical reconnaissance and security-type missions is the goal of a HumRRO project now underway at the Armor Human Research Unit, Fort Knox, Ky.

Composed of a mixture of four dissimilar elements—tanks, infantry, mortar and scouts—this specialized unit of 38 to 40 men, the smallest combined-arms team in the U.S. Army, must accomplish a single platoon mission, dependent upon each squad or section performing its own particular mission.

Exercising command and control over such diverse elements is a major problem encountered in the training of platoon and section leaders. Experience has proved that too few hours of instructions have, in the past, been devoted to the basic missions of such outfits.

Another problem involves movement of track and wheel vehicles in field exercises requiring more terrain than is readily available. To remedy this situation, in the HumRRO training study at Fort Knox, a miniature armored cavalry platoon battlefield has been constructed. The device consists of a large viewing screen which projects platoon and enemy units in mock combat situations.

Task RECON, though only partially complete, has produced good results. The Reconnaissance Trainer, a tactical war-gaming device developed by Armor HRU, is now being used by the U.S. Army Training Center, Armor, to train scouts.

Portions of field-training exercises prepared for use with this device have been recommended by the Armor School for inclusion in the Army field manual on divisional armor and air cavalry units.

The RECON team is preparing a number of other training materials, among them an armored cavalry platoon workbook to be used by inexperienced platoon leaders as a self-teaching device. The workbook contains 15 field-training exercises covering all relevant types of combat missions.

HumRRO researchers are preparing complete lists of job descriptions, along with how-to-do-it guides, to enable platoon members to learn their jobs more thoroughly.

Armor HRU also plans to photograph a series of how-to-do-it training films on tactical employment of the intact platoon in its accomplishment of combat missions, and another film on aspects of platoon actions that are difficult to learn.



Armor personnel participate in Human Resources Research Office experimental exercise at Fort Knox, Ky. Each of nine booths of the Reconnaissance Unit Trainer represents a vehicle in Armored Cavalry Platoon.

FRG Troops Fire Pershing 300 Miles to WSMR Target

Federal Republic of Germany troops have successfully fired a Pershing missile from Black Mesa, near Blanding, Utah, into a predetermined impact area within White Sands (N. Mex.) Missile Range.

The more than 300-mile overland flight of the missile recently was monitored by instrumentation and tracking equipment manned by White Sands personnel to gather performance data and as a safety measure.

The firing represented "graduation" tests of training which the Germans have received at Fort Sill, Okla., and Redstone Arsenal, Ala. Elements of the U.S. First Field Artillery Brigade from Fort Sill, Okla., provided administrative and logistic support.

WSMR Tests Multi-Function Array Radar

The Multi-function Array Radar (MAR), combining functions of three radars into one concrete and steel package at White Sands (N. Mex.) Missile Range, is expected to provide Nike X with a more effective defense against long-range ballistic missiles.

Development of MAR is being managed by the Nike X project office of the U.S. Army Missile Command at Redstone Arsenal, Ala. Ultimate performance of Nike-X against ICBM's and submarine-launched missiles conceivably may depend on the tests conducted with MAR at White Sands.

Three concrete and steel domes covering an acre and a half house the MAR system. Projections called radiating elements beam high-powered electrical energy into space. When energy is pumped from two or more

of the radiating elements simultaneously, the beam flickers from side to side at nearly the speed of light and can be halted to focus on a tiny point in space.

The test version of MAR at White Sands, which has been operating since July 1, has only one receiving eye and one transmitting eye. Later versions, including one scheduled for Kwajalein Island in the Pacific—major test site for Nike X development—may appear different but should employ the same principle.

MAR works on the theory that radar beams can be bent electrically by playing one beam against the other—a delicacy in timing which requires computerized operation.

Another impressive capability of MAR is that only the operator's chair will have to be oiled. Nothing else moves. Because MAR has no moving antenna, there is no friction to overcome or inertia to keep it from changing direction and speed instantly. In fact, MAR will be capable of operating so quickly that it will appear to look in every direction at once.

Management Authority Gains Rank of Colonel, Ph.D Degree

Management is his business and he is widely recognized as one of the Army authorities in his field. Col Charles F. Austin achieved his finest "management" performance, however, when he recently was promoted to his present rank soon after obtaining a Ph.D. degree from Harvard University.

Currently on the faculty of the Industrial College of the Armed Forces, Col Austin is credited with an important role in helping to "build" the United States Army Management School at Fort Belvoir, Va.

The Ph.D. degree climaxed nine years of off-duty courses, indicative of the persistent effort for excellence that carried him from private to colonel. From 1951 to 1958 he capitalized on the Army's off-duty study program conducted through the University of Maryland to earn his B.S. degree in military science.

During his 22-year Army career he has been a guest lecturer or instructor on leadership and management subjects at many military schools and civilian educational institutions. Among these are the Harvard Graduate School of Business Administration, the U.S. Army War College, the U.S. State Department Foreign Service Institute, and the American Management Association.

"Management's Self-Inflicted Wounds (A Formula for Executive Self-Analysis)," his best-known lecture, will be the title of a book scheduled for early publication. He has authored numerous articles in professional publications on leadership and management.

Army Awards Contract for Inflatable Antenna

A contract to fabricate and test a 10-foot-diameter model of an inflatable antenna that could be used by highly mobile ground forces has been awarded by the U.S. Army Electronics Laboratories, Fort Monmouth, N.J.

Included in the contract is a fabrics and material study to determine the most suitable method of producing the new type of packageable microwave antenna.

The antenna will be a sophisticated model of one of two structures fabricated by the Goodyear Aerospace Corp. during a recent study of advanced antenna design techniques, also sponsored by the Army Electronics Command. The study covered 22 types of transportable antennas.

One of the 5-foot-diameter structures is an open dish paraboloid; the other, which also utilizes a paraboloid reflecting surface, has a convex lens configuration.

A preliminary analysis of the configurations indicated an attainable ratio of 10 to 1 between the operating diameter and the packaged diameter, and a weight ratio of one pound per square foot of reflective surface.

In order to provide an accurate reflective surface that can be packaged and expanded repeatedly, the company developed a method of forming a contoured flexible foam surface on

MAR is being designed to replace radars used in the Nike Zeus antimissile missile system, predecessor to the Nike X system. They are: acquisition radar for detecting missile warheads at long ranges; target tracking radar for pinpointing location of warheads; and discriminating radar which sorts live warheads from decoys.

MAR stops just short of performing maintenance on itself but does spell out trouble spots. Flashing lights point out the ailing part to the repairman and the system also diagnoses its troubles and prints out the remedy on an electric typewriter.

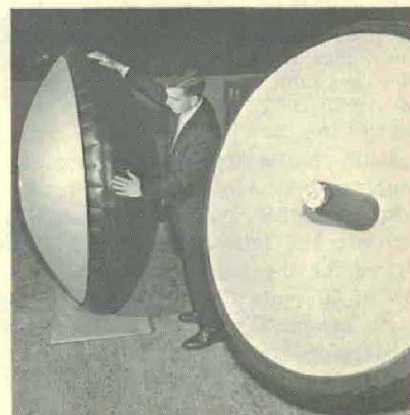
MAR has been hailed as a great step forward in the art of electronic ranging and tracking of flying targets. It is the latest of the Army's air-defense radar developments begun only a few years ago with the Nike Ajax system of defense against manned aircraft.

Western Electric Co. is prime contractor for the Nike X System and Bell Telephone Laboratories has responsibility for the system's design and development. Sylvania Electric Products, Inc. is subcontractor to Bell for the White Sands MAR.

the ribbed rubber shell of the antenna.

Optical measurements indicated an RMS deviation of plus or minus .013 of an inch, engineers said. A promising means for improving spaceborne antennas also was described by the company after a study of 12 concepts. The suggested system involves a metallic structure with curved ribs that swirl out from the hub to create a parabolic reflector shape.

Rigid panels or mesh would be folded together during the first stages of flight, and would unfurl as the vehicle reached outer space.



INFLATABLE ANTENNAS built for Army by Goodyear Aerospace Corp.

MRC Offers Various Math Study Plans

The Mathematics Research Center, (MRC) U.S. Army, at Madison, Wis., offers several orientation lecture series, advanced seminars, symposia and extended residencies.

The orientation series at the center normally extends over the mornings and afternoons of two or three consecutive days. Objectives are to present or emphasize facts and viewpoints which should be more widely known or understood.

The lectures may be presented on request at Army installations other than the MRC, which is located on the campus of the University of Wisconsin, if an adequate number of personnel are interested and can be relieved from their duties to permit full and undisturbed attendance.

Presently available are four series—The Statistical Design of Experiments, The Numerical Solution of Partial Differential Equations, Eigenvalue Problems and Their Applications, and Matrix Calculations and Applications. A fifth series, The Numerical Solution of Ordinary Differential Equations, is being considered.

Each advanced seminar is devoted to a segment of mathematical or statistical theory, generally one in which there have been important modern developments relevant to Army interests. The purpose is to present a survey of the state of a field, extending up to the frontier of current research. Mainly expository, the lectures are given by recognized authorities. Periods for discussion, both prearranged and spontaneous, are included. Attendance at a seminar is

by invitation and groups are small.

A symposium on a topic of current interest and importance is held annually each spring and speakers are leaders in the field from the U.S. and abroad. In June 1963, the MRC conducted a symposium on Stochastic Models in Medicine and Biology and in May 1964 a special symposium on Asymptotic Solutions of Differential Equations and Their Applications.

Persons interested in enrolling should make sure that their names are on the MRC mailing list for notices of the annual symposia.

An important in-service educational opportunity for extending competency

in an applied mathematical field is offered by a residency at the MRC. Available to Civil Service employees as well as military service personnel of the Army, a residency is flexible but should ordinarily be three months or longer.

The MRC staff includes specialists in many mathematical fields and opportunity is provided for unrestricted discussions of problems and difficulties. Colloquia on various topics usually are in progress. The University of Wisconsin Computing Center (CDC 3600 and 1604) and the assistance of a programming staff are available.

Correspondence with MRC should be addressed to: Director, Mathematics Research Center, U.S. Army, University of Wisconsin, Madison, Wis. 53706.

CRREL Briefs Air Force Officers on Arctic

Twenty U.S. Air Force officers left for assignments in the Far North recently after an intensive briefing at the U.S. Army Cold Regions Research and Engineering Laboratory (USA CRREL), Hanover, N.H.

The men, from a score of Air Force installations throughout North America, spent a week in day-long classroom sessions at CRREL, presented by 28 staff scientists and engineers. CRREL, an installation of the U.S. Army Materiel Command, has as its mission research and investigations in snow, ice and frozen ground.

Most of the Air Force men at the school were assigned to civil engineering duties at arctic and subarctic locations. The lectures were designed to guide them in coping with and utilizing properly, the natural mate-

rials, and to acquaint them with the expected or perhaps the unexpected in cold regions environments.

Discussions covered such subjects as the fundamentals of freezing and thawing, frost action in soils, the CRREL-developed techniques of snow and ice removal and established criteria on the bearing capacity of ice and snow.

Other classroom lectures concerned foundations, structures and building material in cold environments, and water supply and sewage disposal. The students also were introduced to such CRREL research areas as air-photo interpretation and sub-surface exploration.

Sponsor of the course was the Air Force Institute of Technology, Wright-Patterson AFB, Ohio. Capt Robert Anderson of the Institute, who served as Air Force coordinator, noted that this marked the first time a course had been given outside the Institute.

Attending the school, in addition to the Air Force officers were representatives of the U.S. Army Corps of Engineers and the Army Materiel Command in Washington.

Each man took with him on "graduation" a stout textbook made up of the individual presentations, and two voluminous folders containing additional reference material.

Col W. L. Nungesser, CRREL's commanding officer, said it is not expected that all of the material presented in so short a time can be completely assimilated by each man, but that "because of the course, each will be better equipped to handle cold regions problems and emergencies, and to perform better his day-to-day responsibilities."

FAA Releases Revised List Of R&D Technical Reports

The Federal Aviation Agency has released a revised list of 112 research and development technical reports now available to the public. Current to April 1964, the list updates one issued in June 1963.

R&D results are reported in areas concerning air traffic, navigation, airports, weather, collision avoidance, aircraft and miscellaneous activities. Prices for the reports range from a low of 50 cents for "Flight Progress Strip Loader, Type II," to a high of \$23.50 for "Severe Storm Detection and Circumnavigation."

Copies of the list may be obtained from the Office of Technical Services, U.S. Department of Commerce, Washington, D.C. 20230.



U.S. AIR FORCE Capt Robert Anderson, one of 20 who completed an intensive briefing at U.S. Army CRREL prior to arctic assignment, is so loaded with reference materials that he finds a parting handshake with Kenneth A. Linell, CRREL course coordinator, a little difficult.

To Improve Communications... Stop, Speak, Listen

(Continued from page 2)

Giving their full cooperation is voluntary, so the degree of efficiency an organization attains depends in part on how willingly workers contribute their capabilities.

Therefore, you need to give employees a clear understanding of the what and why of organizational goals, how they relate to the worker, what the stakes for the work force are, and how employee performance and progress are measuring up to requirements. Communication is the vital factor in achieving high employee morale and motivation, lower absenteeism and turnover, and greater productivity.

Effective communication can spell the difference between a tight ship and one drifting aimlessly on a sea of uncertainty. It can be the make-or-break factor in meeting the President's expectations of improved management and greater efficiency and economy in Federal operations.

Now I know that every manager recognizes the importance of and has

set up systems for employment-management communication, but I wonder if enough attention has been given to *what is understood*. This is what really counts.

Top management has to set the tone and assure the means for facilitating a constant flow of information vertically and horizontally—top to bottom, bottom to top, and across organizational lines. It must impress upon subordinate management levels that the free flow of information—keeping channels of communication open—is an essential, everyday part of the management process. And it should insist that these principles are practiced. . . .

The proper tone is established through proper attitudes that must be evident at all times. The first attitude is that of *oneness*—an attitude that the organization is not solely or even primarily centered around the higher echelons, that it is every single person on the rolls, and that everyone is important to teamwork and mission achievement.

The second is an attitude of *caring*—honestly caring about employees' problems, growth and development, achievement, recognition, and work satisfactions. The third is an attitude of *sharing*. Management tends to keep too much information from employees, both intentionally and unintentionally.

Unwillingness to share is best characterized by the tight-lipped defensive attitude of "who has a *right* to know?" I suppose that, in any given situation, very few people would have the right to know. On the other hand, perhaps everyone *should* know. When we are not sure, we should communicate to the largest number. . . .

While the problem of communication with internal publics often is a case of "everybody talking, nobody listening," the principal problem in communicating with external publics more often is caused by failure to speak. Federal managers certainly are far more public relations conscious than was the case a few years ago, but many of us still have a way to travel toward fulfilling our responsibility for stewardship reporting to our stockholders—the American people.

We need to give more than lip service to the truth that an informed citizenry is the strength of representative government, and to assure that our subordinates are ever mindful that effective operation of our

program depends on public understanding and support.

Since the great majority of Federal business is done in hundreds of localities throughout the country, where our installations may be mainstays of the local economy, we need to accept the fact that Government establishments—like their industrial cousins—have certain responsibilities of "corporate citizenship" in their communities. . . .

By and large, I believe that Federal managers are sensitive to the importance of effective communications with their internal and external publics. For the most part the systems they have established for good communication seems to be working well.

If my emphasis on examples of communication collapse seems contradictory, it is because I believe that anything short of perfection in this vital area merits management attention. I am convinced that every manhour we devote to assuring effective communications with employees, employee groups, and our external publics will pay for itself many times over in increased efficiency, economy, productivity and public cooperation.

Management Seminar Slated On R&D Creativity Problems

Required background reading for a 5-day Career Development Seminar for U.S. Army scientists and engineers in GS-12 grade and above included an article which appeared on page two of the August 1963 issue of this publication and the book which the article reviewed.

The book, *Managing Creative Scientists and Engineers*, which has been borrowed as the title and subject of the seminar, was written by Eugene Raudsepp, an industrial psychologist with a private consulting firm. The article, "Creativity Conflict: Management versus Scientists," was authored by Dr. T. W. Adams, of the Research Plans Branch, U.S. Army Research Office.

The seminar at the U.S. Army Engineer Research and Development Laboratories, Fort Belvoir, Va., Aug. 31 to Sept. 4, was attended by about 50 engineers, scientists, administrators, attorneys, and accountants.

Through exchange of opinion, participants probed for better ways to manage, utilize and motivate U.S. Army creative in-house personnel.

The sessions will explore the concepts of the individual, his creative environment, including influential forces, and approaches of more effective management of creative abilities.

AMC Preparing Directive On Contract Data Control

In response to a request from the U.S. Army Materiel Command, more than 30 people, representing most major AMC elements, are preparing a directive to help establish more order in contractor data management.

John Englert of the Missile Command's Management Science Office is chairman of the group. He stated that "there has been a lack of standardization in the management of data and reports. . . . In some instances contractors have had difficulty in knowing what they have committed themselves for in the maze of paper work.

"The end result of this directive," Englert said, "will be a list of minimum data requirements which will promote standardization, eliminate duplication, identify problem areas and even determine costs of data."

The authorized data list will represent requirements of the AMC as to what is needed from contractors, including everything but hardware. It will cover such things as drawings, specifications and reports.

As a basis for writing a directive to meet the needs of all, every command has submitted their minimum requirements to the Missile Command, over 800 in all. Englert hopes to come up with about 300 items.

FEA Tests Unitized Mixed Load Methods

Simulated methods of testing unitized modular container loads to withstand stress of overseas shipment procedures are being conducted by the Quartermaster Research and Engineering Field Evaluation Agency (FEA) at Fort Lee and at Fort Eustis, Va.

A previous engineering test on effectiveness of various types of unitized, mixed container loads to withstand the hazards of storage, shipping and handling was conducted by the FEA in 1960 when six types of 20 loads each (120 in all) were evaluated.

Upon completion of those tests, the loads were returned to the Agency at Fort Lee. Sixty of the loads were assembled and repackaged, then consigned to Fort Eustis, where the handling and shipping test phases of the present study are being conducted.

Three different types of containers—fabricated of V2S with sleeve, V3C with liner fiberboard material, and style 4 (nailed wood boxes filled with supporting and nonsupporting items) were used to assemble and unitize the experimental test loads.

The experimental containers are positioned on standard wood-base pallets, according to a predesigned stacking pattern. One group of 10 loads is made up of all supporting items and is used for test control purposes. Five containers have a combination of supporting and nonsupporting loads identical to those used in the aforementioned engineering test.

The shipping and handling test phases of the FEA study are timed to coincide with the training schedules of the Transportation School at Fort Eustis. Operations consist of a series of cycles of transporting the unitized test loads to and from temporary warehouse storage, then loading and unloading the test items by means of conventional and rough terrain forklift trucks on and off Army stake and platform vehicles.

Other handling procedures involve moving the test loads to shipping piers, where Transportation School student trainees load and off-load the experimental shipments from dockside to cargo holds of a freighter.

When test shipments are off-loaded from the ship, they are transferred to

rail freight handling facilities and double-stacked in the interior of freight cars. The cars are set in motion and humped at varying speeds of from 3 to 10 miles per hour, allowing the test loads to be exposed to simulated railroad shipping conditions.

After completing each test cycle at Fort Eustis, the loads are given a complete inspection by FEA test personnel. When shipping test loads have received approximately the same amount of handling as those in the engineering tests, a complete inspection of the entire shipment and a partial examination of individual test containers and contents will be accomplished.

Further test cycles then will be conducted by the FEA in an attempt to ascertain whether the various types of experimental unitized container loads differ significantly in durability.

ARPA Plans to Construct Big Seismic Array Station

A large seismic array station at a site not yet selected in the north central United States is planned by the Defense Department's Advanced Research Projects Agency (ARPA) as part of its Nuclear Test Detection program (Project VELA).

ARPA has constructed five smaller seismic array research stations now in operation in Oregon, Utah, Tennessee, Arizona and Oklahoma. The largest of these, in Arizona's Tonto Forest, includes an interlinked complex of 51 seismometers and is approximately 6 miles in diameter.

Data from ARPA's seismological research observatories and from linear arrays established by the United Kingdom's Atomic Energy Authority indicate that a major improvement in detection and identification of underground nuclear explosions and earthquakes at distances of several thousand miles may possibly be found by use of clusters of seismometers with capabilities spaced over several wave lengths of seismic energy.

Since such wave lengths are of the order of 5 to 15 miles, the experimental array as now conceived by ARPA scientists would utilize approximately a score of these instrument clusters spotted over an area about 100 miles across.

Each cluster, containing several instruments buried in the ground will be spaced over an area of one square mile and will be connected to other clusters by buried cable and/or conventional telephone line.

AMC Commander Cites Project Management Assistant

General Frank S. Besson, Jr., commanding general, U.S. Army Materiel Command, recently presented the Legion of Merit to Col John M. Christensen, Jr., who until his recent retirement served as his special assistant for Project Management.

The Legion of Merit is presented only to key individuals for meritorious service in performing extremely difficult duties in an unprecedented and clearly exceptional manner.

As adviser on all matters pertaining to Project Management, Col Christensen was responsible for the overall management of 35 of the Army's most important missile, electronic, vehicular, aircraft and weapon systems. This program entailed an expenditure of \$2.3 billion annually and the direction of more than 20,000 employees.

In presenting this award, General Besson said: "Through Col Christensen's decisive leadership, administrative excellence, and professional competence, project management was established within the Command on a scale never before realized in the Department of the Army. . . ."

Col Christensen was graduated from the U.S. Military Academy in 1941; he obtained an M.B.A. degree from Harvard Business School in 1950. His military education includes

the Army Quartermaster School, Command and General Staff College, Fort Leavenworth, Kans., and the Industrial College of the Armed Forces, Washington, D.C.

In September he will begin a new career as a member of the faculty at the American University's School of Business Administration, Washington, D.C., teaching in the field of management, Government-business relations and transportation.



Col John M. Christensen receives Legion of Merit from General Frank S. Besson, Jr., CG, Army Materiel Command. Mrs. Christensen looks on.

Scientists Discuss Future Application of Lasers

The biological effects and future medical applications of Laser light beams were carefully examined recently by some 300 military and civilian scientists at the First Conference on the Biologic Effects of Laser Radiation.

Held at the Armed Forces Institute of Pathology in Washington, D.C., the conference was sponsored jointly by AFIP and the U.S. Army Medical Research and Development Command.

Among the key speakers were Dr. Edmund Klein and Dr. Sam Fine of Roswell Park Memorial Institute of Buffalo, N.Y. and Northeastern University, Boston, Mass., who discussed the "Effects of Laser Radiation on Biologic Systems."

It was generally agreed at the session that Laser beams have more than a burning or searing effect on cancerous tissues, and that particular attention should be paid to the power these intense rays produce.

A panel discussion was held on the future biological uses and clinical applications of the Laser.

Members of the panel were Dr. Stanhope Bayne-Jones, dean emeritus, Yale University Medical School and consultant in research and development to The Surgeon General, U.S. Army; Dr. Robert Stowell, scientific director, Armed Forces Institute of Pathology, Washington, D.C.; Dr. Alfred Ketchum, chief of surgery, National Cancer Institute, Bethesda, Md.; Dr. Charles M. Pomerat, director of cell biology, Pasadena Foundation for Medical Research, Pasadena, Calif.; and Dr. Ronald Scott, dean, College of Engineering, Northeastern University, Boston, Mass.

Possible future clinical uses of the Laser discussed during the conference were:

- Irradiation treatment of certain tumors or skin diseases, bloodless removal of organs, surgical incision, or cauterization of bleeding organs or blood vessels.

- Destruction of deep-seated pathological tissue or selected areas of normal tissue as in the treatment of Parkinson's Disease (paralysis agitans) by using a high-energy Laser beam focused down a fiber optic pipe.

- Use in the performance of microsurgery or the destruction of subcellular particles.

- Potential laboratory uses as high-powered light sources.

- Production of mutations of microscopic organisms by specific wavelengths, allowing genetic changes to be studied in a more precise fashion.

The effects of Laser radiation were also reported by other investigators, including Army, who verified the reaction of certain body cells to specific light wavelengths, particularly those in the violet and ultraviolet spectrum. These are the light rays that produce sunburn.

Abnormalities of irradiated tissue culture cells noted included the production of malformed cells, delayed cell division, and in some cases cell death.

The U.S. Army Medical Research and Development Command early in 1963 initiated the U.S. Army program of research on the biological effects of Laser radiation.

One of its activities has been to observe Laser irradiation of animal tissue, where definite alterations are observed, according to Capt Martin

WRAIR Employing 25 Students in Research Tasks

Twenty-five talented high school students are spending the summer working with the research staff at the Walter Reed Army Institute of Research in Washington, D.C.

Drawn from the junior and senior classes of their schools, the young people are planning careers in various scientific fields. All were chosen for the Summer Science Training Program after applying to the National Science Foundation and American University.

The program is a project of the Joint Board of Science Education, which is guided in the Washington area by Dr. Leo Schubert, chairman of American University's chemistry department. Selection for participation in the training course is based on scholastic ability, science motivation and the completion of specific high school courses in science and mathematics.

Funds for the program are derived

Armory Aids Local Economy

Springfield Armory, always one of the largest employers in Springfield, Mass., contributed significantly to the well-being of the region during the past 12 months.

Col William J. Durrenberger, commanding officer of the U.S. Army Weapons Command installation, said the total dollar impact was in excess of \$21,000,000—\$19,245,071 in salaries to civilian employees, \$2,400,000 in direct "over-the-counter" purchases and contracts awards under bidding procedures, and more than \$100,000 for military personnel salaries.

S. Litwin, MC, assistant chief of the Surgical Research Branch of the Command and monitor of the conference.

Service installations which the Command monitors in this aspect of research include the Armed Forces Institute of Pathology, the U.S. Army Medical Research Laboratory, Fort Knox, Ky., and the Army Chemical Research and Development Laboratories, Edgewood Arsenal, Md.

In addition, there are Medical R&D contracts with Northeastern University, Boston, Mass., Roswell Park Memorial Institute of Buffalo, N.Y., the Medical College of Virginia, the Pasadena Foundation for Medical Research, the Martin Co., Orlando, Fla., and the Honeywell Co., Minneapolis, Minn.

Many other service organizations and civilian industries are working on other aspects of Laser research as well, Capt Litwin said.

from grants of the National Science Foundation, the American Cancer Association and the Washington Heart Association.

In addition to the high school students, a group of teachers is also spending the summer at WRAIR under grants from the National Science Foundation in conjunction with American University. Successful completion of the 6-week seminar will earn the teachers six hours of college credit.

Each week they spend two full days in the lecture room at American University and hear a lecture each of the other three mornings, followed by work at the Institute until 4:30 p.m.



Jonathan S. Miller (seated), senior at Lawrenceville (N.J.) School, and Joel R. Weinstein, a junior at Woodrow Wilson H.S., Washington, D.C., two of 25 students participating in the Summer Science Training Program at WRAIR, study slides during experiment in the Histology Laboratory.

Rall Succeeds Van Atta as GIMRADA Director

Col Lloyd L. Rall, formerly deputy director of Photography, Office, Chief of Engineers, assumed July 1 the duties of director of the U.S. Army Engineer Geodesy, Intelligence and Mapping Research and Development Agency (GIMRADA), Fort Belvoir, Va. He succeeds Col W. H. Van Atta, who will command the U.S. Army Map Service.

GIMRADA is the principal field agency of the U.S. Army Corps of Engineers for the research and development of new materiel, methods and techniques in the fields of mapping, surveying, geodesy and Engineer intelligence.

A native of Galesville, Wis., Col Rall, 47, was commissioned in the Corps of Engineers, U.S. Army Reserve, following his graduation in 1940 from the University of Wisconsin.

He served the entire period of World War II in the Asiatic-Pacific

theater during which he was Deputy Engineer, Forward Area, U.S. Army Strategic Air Force, for two years.

Following the war, he served two years in Tokyo, Japan. After being commissioned in the Regular Army in 1947, he subsequently served in the Office of the Joint Chiefs of Staff; Chief of Engineers representative on the Army Equipment Policy Panel; Executive Officer, Research and Development Division, Office of the Chief of Engineers; Assistant District Engineer, Seattle, Wash.; Deputy Engineer, Communications Zone, France; Commander, 540th Engineer Combat Group, Germany, and Professor of Military Science and Tactics, Missouri School of Mines and Metallurgy.

Col Rall has been succeeded as Deputy Director of Topography by Col John W. Chesley, Jr., formerly assigned to the U.S. Army, Pacific.

Army Sends Microwave Surveying System to Troops

Engineer troops in the field soon will be able to conduct ground surveys faster and more accurately as a result of new surveying equipment being introduced into the supply system.

Delivery is starting on 400 units of a military version of the microwave surveying system being procured under a \$1,150,000 contract with Fairchild Camera and Instrument Co.

Although measurement of distances by microwaves, or electromagnetic radiation is not a new technique, the military version represents the latest advancements in the technology of electronics. A savings to the Army of 30 percent less than the cost of sim-

ilar commercial instruments is seen.

The U.S. Army Engineer Geodesy, Intelligence and Mapping Research and Development Agency (GIMRADA), Fort Belvoir, Va., tested and evaluated similar type commercial equipment to establish the Qualitative Materiel Requirements (QMR).

The Engineering Department of the U.S. Army Mobility Command Engineer Research and Development Laboratories, also at Belvoir, engineered the procurement specification to encourage multiple bidding on a completely militarized instrument.

The military microwave surveying instrument is rugged, portable, readily adaptable to present methods of surveying, relatively impervious to environmental surroundings and simple to operate.

The complete system consists of two or more interchangeable low-powered microwave units operated in conjunction with each other comparing the phase of the signal generated in each unit with the phase of the signal transmitted from the other.

The phase shift of the signal is proportional to the distance traveled, when corrected for the ambient velocity of radio waves, and becomes the actual distance. This distance is accurate to ± 1.5 mc. ± 4 parts per million in the range of 200 meters to 50,000 meters.

Tripod mounted, each unit is a portable package weighing approximately 35 pounds and is capable of operation as a measurer or responder, by proper operation of the controls.



CWO James H. Darnden, Department of Topography, U.S. Army Engineer School, is shown using new military microwave distance measuring instrument at Fort Belvoir, Va.

NSF-I Winner Views Natick Labs Research

Linda Phyllis Wills, 17-year-old Auburn, Ind., high school graduate, recently completed her expense-paid visit to the Army Institute of Environmental Medicine, U.S. Army Natick (Mass.) Laboratories.

The tour was her prize for being judged one of the top 20 science students selected by a panel of Army judges from hundreds throughout the country at the recent 15th National Science Fair-International (NSF-I).

Miss Wills, winner of a Department of the Army Certificate of Outstanding Achievement, viewed Army research activities at Natick designed to determine how environmental factors affect the behavior of the combat soldier, his supplies and equipment.

Her hosts during the tour of the facilities were Lt Col Jack L. Flora, executive officer, and Dr. David E. Bass, scientific director. She resided with the J. Fred Oesterling family in nearby Framingham, Mass. Dr. Oesterling is deputy scientific director for research at the Natick Laboratories and was chairman of the 12-man panel of Army judges at the 1964 NSF-I event.

In developing her project for the NSF-I, Miss Wills designed apparatus which demonstrated that the electrical resistance in tissue is lower in certain malignancies. Her entry also gained her an award in zoology and medicine and a citation from the American Cancer Society.



WINNER OF TRIP TO ARIEM, Army Natick Laboratories, for her project in 15th NSF-I, Linda Phyllis Wills is welcomed by executive officer Lt Col Jack L. Flora, and Dr. David E. Bass, scientific director.

NO TIME. It may be well for the busy executives to recall, every now and then, the common adage: If you haven't time to do it right, when will you have time to do it over?

Milking Snakes Is Risky Business . . . Fort Knox Lab Technician Does It for Research

If you were suddenly confronted by an eastern diamondback rattlesnake or an Indian cobra, chances are you would seek safety by running away—fast!

Researcher Capt Herschel H. Flowers, however, is a veterinarian from the U.S. Army Medical Research Laboratory at Fort Knox, Ky., who is as much at home with reptiles as an infantryman is with his rifle.

Among Capt Flowers' duties is to care for some 100 snakes, all poisonous, which he conscientiously feeds, and "milks" each week for venom.

Milking is a ticklish process in which the snake is induced to strike (bite) a nylon diaphragm attached to a sterile glass flask. The venom is used for complicated biochemical and physiological testing purposes. It also goes into the making of a vaccine against snake bites.

Capt Flowers, in his research, sometimes becomes an involuntary subject for testing the effectiveness of the antivenom vaccines under development at the Fort Knox Medical Laboratory. More often, however, he volunteers for the experiments.

"In the past several years we have developed a vaccine that will produce an effective immunity against cobra bites," the Captain said. "I have taken 30 injections of the cobra vaccine without any ill effects. It certainly paid off because I have been bitten twice, once in the arm and once on the finger, and recovered after only minor medical treatment.

"One of the real hazards of our job is that of being bitten without any protection, but as time goes by we expect these hazards to be substantially minimized through the use of an effective vaccine."

The purpose of the venom research is to improve and broaden the coverage of antivenoms—to develop vaccines that will immunize Special Forces and other troops from the poison produced by several different types of snakes.

He hopes "that an effective vaccine will be perfected within two years to protect against all snakebites of the family elapidae, which includes the cobras, kraits, mombas and the coral snakes of the New World, and the majority of Australian snakes as the death adder, black snake and tiger snake."

A native of Orlando, Fla., the captain entered the Army in January



Capt Herschel H. Flowers, veterinarian from the U.S. Army Medical Research Laboratory at Ft. Knox, Ky., demonstrates fang structure of 6-foot Eastern Diamondback rattler.

1961 and began venom work at the laboratory the following July.

"At the present time, we are evaluating ethylene-diaminetetraacetic acid (EDTA) as an agent in minimizing local destruction of tissue from bites of the pit viper family, which includes the rattlesnake, copperhead, water moccasin, and the fer-de-lance. Also, the toxoiding of venom to prepare more effective antiserums is being currently investigated.

"We have also produced the only antiserum against North American coral snake venom. It will be compared with South American coral snake antiserum to determine if the latter is effective in treating bites by the North American coral snake."

Schaeppi Named Acting Head Of P&P at Redstone Arsenal

Paul K. Schaeppi, a 13-year veteran at Redstone Arsenal, Ala., has been named acting director of the Procurement and Production Directorate, Army Missile Command, a post formerly held by Col E. V. Lau.

At Redstone, he has served successively as procurement officer and chief of the Technical Staff, Industrial Operations, Army Rocket and Guided Missile Agency; assistant director of Support Operations; and deputy director of P&P.

In 1960, he was awarded ARGMA's Senior Executive Award in recognition of his work in improving procurement operations and implementing programs resulting in considerable governmental savings.



THE WINDOW-WASHER'S VIEWPOINT. A few of our research executives are showing symptoms of brooding perplexity, bordering on pessimistic doubt as to their ability to impress the viewpoint of the scientist in the laboratory upon the thinking of "those people" in Washington and vice-versa.

What seems essential for a strong national posture to one group sometimes appears irrelevant to the other. What seem gross violations of intellectual virtues to one group sometimes appear commonplace naturalness to the other.

This contrast of viewpoints reminds me of the haute-society damsel taking a shower on the seventeenth floor of the swanky Hotel Pierre. It was a beautiful summer day, so she opened the bathroom window to let in the exhilarating air. She burst into full song, closed her eyes, soaped herself thoroughly, and rinsed herself clean. And just as she opened her eyes, she saw a window washer hanging outside looking in. The lady was so startled that she froze in position and stared transfixed at the window washer. Whereupon the man wrinkled his brow and said, "What the heck are you staring at, lady? Haven't you ever seen a window washer before?"

PERSPICACITY OF THE SHEIK. One of the most impressive things about the top-notch executive is his ability to see through the competitive "upmanship" going on around him.

He has the perspicacity of the powerful Arabian Sheik who lost one of his horses during a long desert journey. So he ordered the requisition of a horse from the next town on the way. Two horses were brought to him for decision. Since the owners did not want to part with their horses, they both cried bitterly about the age and weakness of the animals and how they would never meet the Sheik's standards.

"Very well," said the Sheik, "let's have a race. I'll take the winner."

"But your Highness," whispered his aide, "this will not decide the issue. The owners will not push the beasts to their very best."

"Ah, but they will," said the Sheik. "Order each man to ride the other's horse."

Contract Awarded to Foster Graduate Technical Study

Introduction of a new curriculum in public administration and expansion of the industrial engineering curriculum will result from the \$462,438 contract awarded in mid-July to the University of Alabama.

The U.S. Army Missile Support Command announced that the contract is in support of the Graduate Study Program conducted by the University at Huntsville, Ala., under joint sponsorship of the Army Missile Command and the Marshall Space Flight Center.

The program will continue in such fields as physics, mathematics, engineering mechanics, electrical engineering and mechanical engineering.

Under impetus of providing for the advanced educational needs of the missile and space programs at Redstone Arsenal, the graduate program in Huntsville has grown larger than the same program on the University's main campus in Tuscaloosa.

This year, for the first time, graduate degrees are being awarded in some technical areas for work taken under the Graduate Study Program. The University's graduate program in Huntsville, initiated to keep personnel up-to-date with advances in the technical fields, has created one of the largest graduate schools in the Southeast. The University provides courses based on the requirements of the Missile Command and MSFC.

Enrollment in the University's Graduate Study Program is not re-

stricted to students sponsored by the Army or MSFC. Total enrollment during FY 1964 was 1,686 and only 791 were Federal sponsored. The 895 other students came from the ranks of engineers in private industry in the Huntsville area.

Medical R&D Command Gets First Judge Advocate General

The first Judge Advocate General ever assigned to the U.S. Army Medical Research and Development Command, as announced July 14, is Maj Julian B. Carrick, Jr., a former representative to the Maryland House of Delegates.

Assigned previously to the Joint U.S. Military Mission to Turkey as Assistant Judge Advocate, he will advise the commanding general and his staff at the Medical R&D Command on all legal matters pertaining to operation of the Command and its 14 subordinate units. The Command is involved in some 500 contracts and grants.

Graduated from the University of Baltimore in 1942 with a LL. B. degree, Maj Carrick entered the Army soon after as an enlisted man and later became a psychiatric social worker at the Engineer Replacement Training Center, Fort Lewis, Wash. He received an M.S. degree in psychiatric social work from Simmons College, Boston, in 1961. He is a member of the American Bar Association.

Scientific Calendar

Quantum Electrodynamics of High Intensity Photon Beams, sponsored by ARO-D and Duke University, Durham, N.C., Sept. 1-2.

Annual Convention of Standards Engineering Society, N.Y.C., Sept. 1-3.

3rd Biennial Aerospace Power Systems Conference, sponsored by AIAA, Philadelphia, Pa., Sept. 1-4.

8th International Conference on Coordination Chemistry, sponsored by the International Union of Pure and Applied Chemistry with partial support by the U.S. Army, Vienna, Austria, Sept. 7-11.

International Conference on Microwaves Circuit Theory and Information Theory, sponsored by IEEE and IECE, Tokyo, Japan, Sept. 7-11.

Conference on Fundamental Research in Plain Concrete and Structural Division Conference, sponsored by the American Society of Civil Engineers, Urbana, Ill., Sept. 8-11.

7th National Convention on Military Electronics, sponsored by IEEE, Washington, D.C., Sept. 9-11.

American Institute of Chemical Engineers Meeting, Las Vegas, Nev., Sept. 13-16.

Metallurgical and Petroleum Engineers, Mining Convention, sponsored by the Society of Mining Engineers of American Institute of Mining Engineers, Portland, Ore., Sept. 13-16.

Univac Users Association Meeting, N.Y.C., Sept. 14-16.

Oxidation of Metals and Alloys, sponsored by Ohio State University, Columbus, Ohio, Sept. 14-18.

World Conference on Radio Meteorology, sponsored by the American Meteorological Society, Boulder, Colo., Sept. 14-18.

Annual Meeting of Western Section of Operation Research Society of America, Honolulu, Hawaii, Sept. 14-18.

Non Destructive Testing, sponsored by Ohio State University, Columbus, Ohio, Sept. 14-25.

Symposium on Ceramic-to-Metal Seal Technology, sponsored by the American Ceramic Society, Philadelphia, Pa., Sept. 17.

7th Annual Conference of the Northwest Computing Association, Seattle, Wash., Sept. 17-18.

Annual Engineering Management Conference, sponsored by IEEE, Cleveland, Ohio, Sept. 17-18.

National Meeting of the American Institute of Chemical Engineers, Las Vegas, Nev., Sept. 20-23.

Fall Meeting of the Ceramic-Metal Systems Division, sponsored by the American Ceramic Society, French Lick, Ind., Sept. 20-23.

International Mineral Processing Congress, sponsored by Society of Mining Engineers of American Institute of Mining, Metallurgical and Petroleum Engineers and Columbia University, N.C., Sept. 20-22.

4th Annual National Conference on Environmental Effects on Aircraft and Propulsion Systems, Trenton, N.J., Sept. 21-23.

Military Aircraft Systems and Technology Meeting, sponsored by AIAA, Washington, D.C., Sept. 21-23.

PTG on Antennas and Propagation Symposium, sponsored by IEEE, Idlewild, L.I., N.Y., Sept. 22-24.

1st National Conference on Automotive Electrical and Electronic Engineers, sponsored by IEEE, Detroit, Mich., Sept. 22-23.

National Annual Convention and Exposition of the Association of Iron and Steel Engineers, Cleveland, Ohio, Sept. 22-25.

American Ordnance Association Division Meeting, sponsored by the American Ordnance Association and AFSC, Wright-Patterson AFB, Ohio, Sept. 23-24.

Plastics Film, Sheet and Coated Fabrics Conference, N.Y.C., Sept. 25.

3rd Canadian Symposium on Communications, sponsored by IEEE/Montreal and Region 7, Montreal, Quebec, Canada, Sept. 25-26.

National Power Conference, sponsored by American Society of Mechanical Engineers and IEEE, Tulsa, Okla., Sept. 27-Oct. 1.

1st International Conference on Instrumentation in Aerospace Simulation Facilities, sponsored by IEEE, Paris, France, Sept. 28-29.

3rd National Meeting of the Society for Applied Spectroscopy, Cleveland, Ohio, Sept. 28-Oct. 2.

5th Annual ADP Technical Symposium, sponsored by the Association for Computing Machinery, Washington, D.C., Sept. 29.

5th Symposium on Physics and Nondestructive Testing, sponsored by American Ordnance Association and AFSC, Wright-Patterson AFB, Ohio, Sept. 29-Oct. 1.



TWO BRIDGES master-minded by Howard H. Mullins of the U.S. Army Engineer Research and Development Laboratories, Fort Belvoir, Va., came together recently. Here a unit of the Army's new Mobile Floating Assault Bridge Ferry (MFAB-F), designed and developed by Mullins, crosses the U.S. Route 60 highway bridge at Ansted, W. Va., on which Mullins was resident engineer when it was built in 1925. The crossing occurred as the MFAB-F returned from tests at Fort Knox, Ky. Mullins traveled to Ansted to ride in the bridge-ferry cab.

SATCOM Official Receives Sloan Ph.D. Fellowship

Assistant technical director James McNaul of the U.S. Army Satellite Communications (SATCOM) Agency, Fort Monmouth, N.J., has been awarded a Sloan Ph. D. Fellowship at Stanford University.

The Fellowship is for an intensive 9-month program of study in which major emphasis is given to the acquisition of new knowledge in business and to the development of the essential skills and managerial techniques required of top-level business executives. It is renewable for a second year to complete the requirements for a doctor of philosophy degree.

The participating group consists of a limited number of highly qualified Sloan Business Executive Fellows representing different industries, geographical areas, and functional fields, plus six Sloan Ph. D. Fellows.

Since he joined the SATCOM

Agency, in 1961, McNaul has been closely associated with the evolution and development of a concept for small, highly transportable satellite communications terminals such as the Agency's newest station, the Mark IV(X), which with its crew of four can be loaded on one aircraft, and can go into satellite communications within three hours after landing.

McNaul has been at Fort Monmouth since 1956, when he was assigned as a Signal Corps officer to what was then called the Signal Engineering Laboratories. He participated in Project MONMOUTH, a communication system and frequency compatibility study and was primarily involved in the application of components to electronic systems.

He received his B.S. degree in electrical engineering from the University of Wisconsin in 1956 and recently



SLOAN PH. D. FELLOWSHIP selectee James P. McNaul points out details of study program to Brig Gen J. Wilson Johnston, CG, U.S. Army Satellite Communications Agency.

Cancer Institute Cites Missile Command Assistance

U.S. Army Missile Command support of a successful cancer research project has been recognized by a letter of appreciation from the Director of the National Cancer Institute (NCI).

Kenneth M. Endicott, Director of the Institute, in a letter to Maj Gen John G. Zierdt, commanding general of the Missile Command, expressed his thanks for support given his organization by the Applied Physics Branch of the Command's Electromagnetic Laboratory.

Missile Command engineers engaged in Laser research that assisted Cancer Institute surgical investigators in successfully killing malignant tumors (cancer) in mice during experiments conducted with Army Lasers, as reported in this publication (May 1964).

The letter said that as a result of Army support, his NCI investigators, Dr. John P. Minton and Dr. Alfred Ketcham, have been able to obtain valuable information concerning the effect of neodymium Laser radiation on malignant and normal tissues in experimental studies with living animals.

Missile Command engineers who assisted NCI investigators are William B. McKnight, chief of the Applied Physics Branch, William Davis, Jr., chief of Special Programs, and James R. Dearman, Laser project engineer.

Endicott said research results indicate "the potential biological information to be obtained from experiments

with Laser radiation appear to be even greater than anticipated. . . .

"I wish to thank you for your continued interest in this project and for your generous offer to assist us further in our program of Laser radiation investigation."

At the time of the original test announcement General Zierdt said:

"The Army spends its research and development money to improve its ability to fight. All of us earnestly hope, however, that some discoveries this money underwrites will produce benefits in other forms for the taxpayers who pick up the bills. This type of research is one that all of us in the Missile Command are proud to assist in any way we can."

AFIP Schedules Graduate Course In Forensic Dentistry, Oct. 26-30

The Armed Forces Institute of Pathology has announced plans for the annual AFIP postgraduate course in Forensic Dentistry Oct. 26-30.

The course is designed to acquaint dentists with situations in which they may be of assistance to legal authorities in identification and detection procedures and also to familiarize them with current aspects of professional liability. A wide survey of the Forensic dentistry field is planned.

Further information and application forms may be obtained by writing the Director, Armed Forces Institute of Pathology, Washington, D.C. 20305.

completed requirements for an M.S. degree in industrial management at Stevens Institute of Technology.

He is a member of the Armed Forces Communications and Electronics Association, Institute of Electrical and Electronic Engineers, and Kappa Eta Kappa. He was formerly National chairman of the IEEE Professional Group on Radio Frequency Interference.

Redstone Arsenal Sets Up Air Defense Systems Unit

The Air Defense Fire Coordinating/Distribution Systems Office, directed by Brig Gen H. P. Persons, Jr., deputy CG for Air Defense Systems, began operation July 1 at Redstone Arsenal, Ala.

The Army Missile Command office is responsible for developing equipment which surveys the air space and assigns air defense missile units to areas of responsibility as well as control of firepower for the units.

The organization formerly was the U.S. Army Air Defense Engineering Agency at Fort Meade, Md. Heading the new element at the Missile Command on a temporary basis is Col R. M. Colquitt, Nike Hercules project manager. Directing the working affairs of the office is deputy chief James W. Gould.

Their highly specialized work involves detailed development and procurement knowledge in the fire coordination and distribution field. Spokesmen at the Army Materiel Command, of which the Missile Command is a major element, said that the transfer was made to bring greater efficiency and economy of operation as well substantial savings in overhead and administrative work.



Woodson Ely, acting chief of the Nuclear Research and Engineering Branch, Procurement and Production Directorate, Picatinny Arsenal, N.J., recently received the Army's Meritorious Civilian Service Award.

Maj Gen F. A. Hansen, CG of the Munitions Command, presented the award to Ely for his work as contracting officer with the U.S. Army Ordnance Industrial Center, Germany, from 1948 to 1963.

While serving in Europe, Ely won three coveted awards in conjunction with his hobby of auto racing. In 1962 he received the Golden Sport Award, which has been presented to only two Americans in the history of the Automobile Club of Germany.

The Army Commendation Medal was awarded recently to Col Philip G. Krueger for "Exceptionally meritorious service" as deputy commander of the Army Engineer Research and Development Laboratories, Fort Belvoir, Va.

Col J. H. Kerkering, ERDL CO, made the presentation to Col Krueger prior to the latter's departure for Hanover, N.H., where he will command the Army Cold Regions Research Engineering Laboratories.

Col Henry A. Goodall, deputy director of the U.S. Army Institute of Dental Research, Walter Reed Army Medical Center, received an Army Commendation Medal for outstanding service at the Center since June 1959.

A veteran of 23 years of service in Army dentistry, he was cited for



FOURTEEN STARS were added to the sleeves of seven U.S. Army Missile Command men at Redstone (Ala.) Arsenal recently when they attained the top of the noncommissioned officers rank of sergeant major. From the center (clockwise) are James A. Robinson, William F. Neal, Brenden Galvin, Roland J. Martin, Paul E. Hoverson, James H. Atherton, Russel T. Voisine.

making outstanding contributions to the postgraduate and professional educational and research program, "now recognized as one of the most outstanding in military and civilian institutions."

Soon after the presentation, Col Goodall went to West Germany to take up new duties as Command Dental Surgeon of the Heidelberg Command, and as CO, 89th Medical Detachment dental activities.

Army Sp/5 Richard I. Darling received an additional award for a recent suggestion which has an estimated first-year savings of \$87,800. Initially he was named Fort Huachuca, Ariz., Suggestor of the Month for March and was awarded the Army Commendation Medal. In July he was presented with a marble desk pen set and a \$100 check.

Darling's suggestion for a computer cable configuration change was recently named best of the third quarter, FY 64, in the Incentive Awards

Program of the Test and Evaluation Command.

A Department of the Army Certificate of Achievement and a plaque bearing ERDL's Belvoir insignia were awarded to Sgt Maj Kenneth Spaulding prior to his departure for a new assignment in Germany.

Spaulding was cited for "exceptional performance" of his duties as acting chief, Military Planning and Control Branch (1961-63) and as sergeant major (1963-64).

Kenneth L. Tapley, an administrative officer in ERDL's Electrical Department, was presented with a Certificate of Achievement.

A suggestion that makes it easier to join sections of tarpaulins or to secure flaps over operational access openings has earned an initial award of \$100 for Edwin F. Bohlayer at ERDL. He will be eligible for an additional monetary award if the suggestion is adopted Army-wide. Col Kerkering, who presented the award to Bohlayer, also presented awards to four other employees of the Laboratories:

Irwin J. Schumacher received a certificate marking his promotion to a higher grade as a mechanical engineer in the Engine Branch. Arthur C. Dauray, employed in the Warfare Vision Branch, received an initial award of \$50 for disclosure of an invention for a "gaseous discharge device" for which a patent is filed.

Brian S. Miller and Eugene Rodrick received Special Act or Service Awards—Miller for authoring an article entitled "Formation and Bleaching of Color Centers in Sodium Azide," published in the *Journal of Chemical Physics*, and Rodrick for an article, "Copter-Transportable Equipment," published in *Automotive Industries*.

Dr. Clyde S. Barnhardt, Sr., entomologist for the Army Limited War Laboratory at Aberdeen Proving Ground, Md., received a patent certificate for a mosquito light trap. The trap is designed for flashlight battery operation and is to aid entomologists in determining the species and relative numbers of mosquitoes in an area.

An instrument to correct distortions in aerial photographs, invented by Eugene P. Griffin and James W. Halbrook of the Army Engineer Geodesy, Intelligence and Mapping Research and Development Agency (GIMRADA), Fort Belvoir, Va., earned them a patent plus cash awards of \$50 each.

Dr. Seymour D. Silver, technical director of the Edgewood (Md.) Arsenal Chemical R&D Laboratories,

Detrick Medical Unit Officer Receives AVMA Award

Lt Col Earl W. Grogan, U.S. Army Medical Unit, Fort Detrick, Md., was the recent recipient of the American Veterinary Medical Association Scholastic Certificate.

The award cited him as the outstanding Veterinary Corps officer student in his class at the Medical Field Service School, Brooke Army Medical Center, Fort Sam Houston, Tex. He scored a grade average of 98.2.

A native of Deport, Tex., he earned a doctor of veterinary medicine degree at Texas A&M College in 1941. In 1951 he was awarded a master's degree in Public Health at Johns Hopkins University in Baltimore, Md.

Col Grogan, who is assistant to the commanding officer of the Walter Reed Army Medical Unit at Fort Detrick, has served since 1962.



Lt Col E. W. Grogan



TOP HONORS among 18 Dental Corps students who recently completed a graduate course in Advanced Theory and Science of Dental Practice at Georgetown University School of Medicine and Dentistry, under a contract signed by the Army in 1963, were won by Maj Reno A. Ahlvin, Jr., and Capt Richard J. McConnell. Maj Gen Joseph L. Bernier, chief, Army Dental Corps, presented the award. Another 44-week course for 18 students will begin in September at the Institute of Dental Research, Walter Reed Army Medical Center.

recently received an Outstanding Performance award for his coordination and direction of the Laboratories' in-house and contractual efforts.

The citation commended his "technical competence, administrative ability, leadership and capability for translating organization, planning and resources into major immediate and long-range accomplishments...."

James H. Horton, chief of ERDL Engine Branch at Fort Belvoir, has been appointed to two positions by the Society of Automotive Engineers: member of the Governing Board of the Powerplant Activity Committee and chairman of the Gas Turbine Engine Subcommittee of the Powerplant Activity.

Dr. Martin S. Peterson, technical forecaster for the Plans Office at Natick (Mass.) Laboratories, received an Outstanding Performance rating. He is responsible for planning, implementing and guiding programs designed to cover present as well as future military needs.

Other awards were presented to the following Natick employees: Outstanding Performance ratings to mechanical engineers Stanley Fram and Wilmer F. Held, textile expert Conway W. Weikert and mathematician Ronald Geromini;

Honorary citations plus salary increases were presented to electrical engineer John Arbarchuk, Gerald Newcomb of the Army Research In-

stitute of Environmental Medicine located at Natick, Mass., Robert R. Potter of the comptroller's office, mechanical engineers Charles S. Reasby, Richard Y. Keilly, George E. Smith and Philip Streechon and microbiologist Morris R. Rogers.

Charles F. Cashell and Nicholas P. Oglesby received Outstanding ratings and Quality Salary Increases in recent ERDL ceremonies at Fort Belvoir. Cashell was cited for his work as assistant chief of the Electrical Department and Oglesby for his work as chief of the Combat Equipment Section, Mechanical Equipment Branch.

Department of the Army certificates and cash awards were presented to ERDL's Frank V. Dungan, Edwin J. Dodd and Joseph F. Mancuso for useful suggestions. Other awards presented were Quality Salary Increases to Mrs. Annie S. Levay, clerk-typist and George A. Gariepy, a mechanical engineer in the Petroleum Equipment Branch. Robert M. McKechnie and George F. Sams, both employed in the Electrical Power Branch, received certificates marking promotion to higher grades.

Col Raymond J. Karpen, commander, Medical Equipment R&D Laboratory at Fort Totten, N.Y., was presented with the First Oak Leaf Cluster to the Legion of Merit prior to his retirement from the Army.

Army Natick Lab CG Honored at Retirement Parade

Brig Gen Merrill L. Tribe, commanding general, U.S. Army Natick (Mass.) Laboratories, has retired after 26 years of active Army service.

At the retirement parade, Brig Gen W. G. Merriam, director, U.S. Army Materiel Command Research and Development Directorate, decorated General Tribe with the Legion of Merit, Second Oak Leaf Cluster, "for demonstrated outstanding effectiveness as a commander, planner and coordinator" during his 4-year assignment as commander of the Natick Laboratories.

A group of high ranking military and civilians, headed by Maj Gen Robert C. Kyser, deputy commanding general, Army Supply and Maintenance Command, attended the ceremony honoring General Tribe.

Before his Natick assignment in 1960, General Tribe served as commander of the U.S. Army's Quartermaster Supply Center, Giessen, Germany. A native of Ogden, Utah, he graduated from the University of Utah in June 1933 with B.A. degree, and from National University with LL.B. degree in 1937. He has been

New CSC Bulletin Describes Federal Training Programs

Federal employees interested in training opportunities that may lead to more responsible jobs, promotions and better pay can find a wide variety of course offerings in a newly published bulletin, *Interagency Training Programs, 1964-1965*.

Prepared by the Civil Service Commission's Office of Career Development, the bulletin is "intended to facilitate promotion and coordination of interagency training in accordance with provisions of the Government Employees Training Act."

Listed in 19 general areas are courses ranging from foreign policy seminars to elevator maintenance, and from automatic data processing equipment to rodent control. Some of the major areas are executive management, supervision, communications, legislative operations, procurement contracting and policy, and the United States and world affairs.

Courses listed in the bulletin may not be available to all who are interested. Some may be attended only by GS-15s and above. Others require Top Secret or NATO clearance. Restrictions are designed to prohibit registration by employees lacking in basic training or other qualification requirements to profit by the training.



Brig Gen Merrill L. Tribe receives Legion of Merit Second Oak Leaf Cluster upon retirement as CG, U.S. Army Natick (Mass.) Labs. Making the presentation is Brig Gen W. G. Merriam, director, Army Materiel Command, R&D Directorate.

New Computer Advances CCIS-70 Concept

The concept of using computer techniques to solve battlefield problems was advanced with recent delivery of the Random Access Computer (RAC) to the U.S. Army Electronic Proving Ground, Fort Huachuca, Ariz.

Col Gerald P. Lerner, who one day earlier became the new project manager of the Command Control Information System-1970 (CCIS-70), accepted the computer from Stanley W. Cochran, vice president and division general manager of the Radio Corp. of America (RCA), developer of the RAC.

The computer will be used at Fort Huachuca to help accomplish the U.S. Army Materiel Command's CCIS-70 project objectives. This portion of the project is concerned with using computer techniques to provide the field commander with the intelligence he needs to make tactical decisions. Volumes of information about all aspects of prospective and friendly forces form the basis for the information provided to the commander.

Col Anderson Q. Smith, former CCIS-70 project manager, had said

during the final stages of RAC development, "Addition of RAC to the project's test bed of equipment is a significant step in automating those procedures that will allow the tactical commander to make effective, timely decisions. RAC will serve to expand the project's ability to field a tactical automated system in the 1970 era."

The computer center accepts information from various sources, including intelligence reports sources and from forward observers, and automatically assembles, sorts, evaluates and stores it for use as needed.

A constantly updated map display is provided automatically to give the field commander a view of the entire operation. Map information includes such items as symbols representing the size, type and location of all forces, both friendly and enemy, as well as terrain features, supply dumps and all the hundreds and even thousands of facts necessary for the effective evaluation and direction of an operation. The computer performs an average of 100,000 instructions per second and provides an instruction

Col Lerner Assumes CCIS-70 Project Management

Army research and development activities on the Command Control Information System (CCIS-70) project are now under the management of Col Gerald P. Lerner, who recently relieved Col Anderson Q. Smith.

Reassigned from the U.S. Army Electronics Command at Fort Monmouth, N.J., where he had served since 1963, Col Lerner has long been associated with Army computer programs and was project officer for the Mobile Digital Computer (MOBIDIC 7A) now serving the U.S. Seventh Army in Europe.

While assigned to the staff of the Chief Signal Officer, Col Lerner as-

sisted in initiating the Signal Corps Automatic Data Processing Systems (ADPS) Program, the UNICOM/STARCOM, and the Satellite Communications Project.

In 1940 he entered military service as assistant professor of military science and tactics at Texas A&M University. He has a degree in electrical engineering from the University of Illinois and a master's degree in business administration from Harvard University.

Col Smith's new assignment is chief, Command and Control Branch, J-3, U.S. European Command, Paris, France.

repertoire of 55 automatically decoded and executed orders.

The RAC and its auxiliary equipment will be housed in three Army vans, one for the computer and its auxiliary equipment, the second for equipment and screens for printing out or displaying the information, and the third for input-output equipment.

The RAC was built for the CCIS-70 project by RCA under the technical direction of the project's systems design and engineering division at Fort Huachuca, Headquarters of the project is at Fort Belvoir, Va.

USAEL Plastics Expert Retires

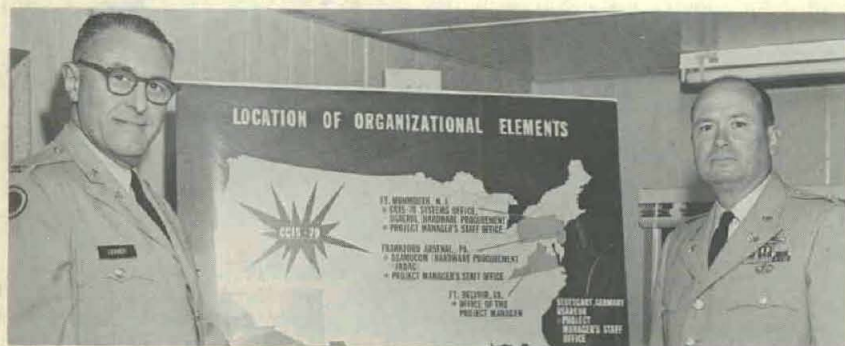
Adolph Rusch, Jr., top expert in the design and use of plastics at the Electronic Components Department, U.S. Army Electronics Laboratories, Fort Monmouth, N.J., retired recently after more than 18 years of Government service.

Rusch was honored at a luncheon given by his associates and Col James M. Kimbrough, Jr., director of the Laboratories, presented him with a letter of commendation.

Known for 3 patents, 5 patent disclosures and 17 technical reports, Rusch had obtained an Outstanding Performance Rating and a Sustained Superior Performance Award for his achievements in the design and fabrication of plastic lenses urgently needed in combat for reading of aerial maps and for use in mine detection and tank equipment; application of the relatively new field of reinforced plastics to radar antenna masts, insulators, high-impact battery cases, the nose cone for the Nike Cajun rocket, and lightweight generator cases; encapsulation of parts pioneered in the Vanguard II and SCORE satellites; and development of improved reinforced magnetic tape for high-speed processing equipment.

Federal Teamwork Pays Off

Governmental Agency Teamwork of the Army, Navy and NASA paid off recently for Lt Cmdr Joseph F. Debold when he was presented with the DoD Joint Service Commendation Medal. He was cited aboard the *USNS Kingsport* off the coast of Hawaii by Brig Gen J. Wilson Johnston, CG of the U.S. Army Satellite Communications Agency, for "exceptional achievement and meritorious performance of duty as CO of the U.S. Naval Research and Development Satellite Communications Group aboard the *Kingsport*." Project SYNCOM is funded by NASA and administered through SATCOM Agency.



Col Gerald P. Lerner (left) discusses location of organizational elements of the U.S. Army Materiel Command CCIS-70 Project, as he takes over management of the Project from Col Anderson Q. Smith, who has been reassigned.

Research In Review...

(Continued from page 18)

To develop methods for predicting the aerodynamics loads of the blades of a helicopter rotor in steady-state and transient flight, several analytical programs are currently being performed. The initial effort of these studies was to formulate the aerodynamic representation of the rotor system, and it resulted in a method to predict the periodic lift distribution on the blades when the blade motions were specified.

This approach utilized a lifting line representation of the blades and satisfied the boundary conditions only at the $\frac{1}{2}$ chord. Investigation is continuing and attention is being given to satisfying the boundary condition over the entire chord for each blade section. Determining the blade aerodynamic pitching moments will permit improved prediction of the lift. It is planned to incorporate the blade equation of motion to enable the blade response to be predicted simultaneously with the aerodynamic loads. Subsequent investigation will include transient and maneuver conditions.

Supporting this analytical aerodynamic blade loads program are several experimental programs involving model testing of the rigid-rotor concept and of a matched blade stiffness model; a full-scale wind tunnel test of a rotor blade system at NASA Ames Research Center; and an investigation to determine the harmonic blade loading distribution on rigid and flexible rotor blades.

A parametric study of a helicopter rotor system is considering the aerodynamic loading and structural response, to predict rotor blade vibratory bending moments and shears. By being able to predict accurately the aerodynamic blade loads during steady-state and transient flight, including maneuvering, designers may improve blades for better rotary-wing aircraft.

In exploring the handling qualities of basic VTOL Aircraft in hovering and at low speeds, numerous difficulties are encountered in experimentation by flight or wind-tunnel tests. Measurements of aerodynamic parameters in flight tests at low-speeds present a major instrumentation problem. Wind tunnel wall corrections become increasingly important when VTOL aircraft model slipstream

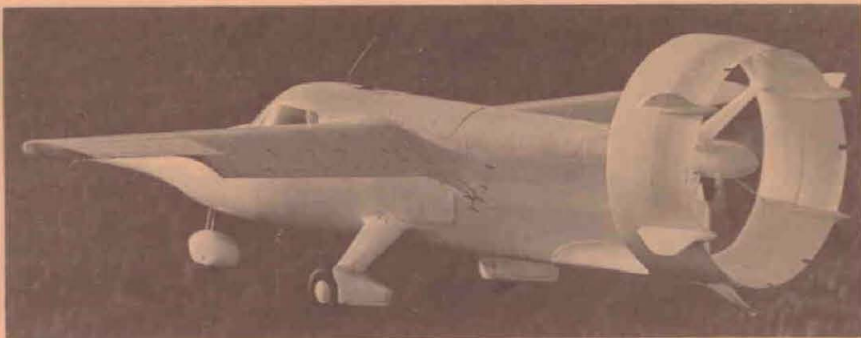


Figure 2

velocities are at least of the order of the forward speed or greater.

As a part of the Army low-speed program a 750-foot forward flight track facility has been developed. Figure 3 shows a model mounted on the track carriage. The most important feature of the facility is that it is possible to measure directly the dynamic response of a VTOL model dynamically similar to the full-scale aircraft at any time during the transition from hovering to forward flight.

Various aerodynamic research experiments have been performed with this facility on helicopter rotor systems and VTOL models. The experiments demonstrated accurate simulation of the dynamic characteristics of full-scale counterparts, and proved the experimental facility is useful for testing VTOL models.

These studies as well as others not described are directed at improving basic fixed-wing aircraft and rotary-wing aircraft aerodynamic characteristics—high lift at low power requirement, high thrust from the power available and low drag for maximum cruising economy with the power available. Important also is the increase of the basic knowledge of handling quality characteristics of VTOL aircraft, including rotary-wing, at hovering and low-speed flight.



Figure 3

The Army's low-speed aircraft aerodynamic research is continuing with the objective of advancing flight technology, toward the goal of achieving new and improved aircraft designs that will be ready to meet advanced mobility requirements critical to the Army's modernization aims for any type of combat requirement.

Hawk Project Manager Named Dean at All-Service School

Assignment of an Army dean at the newly organized Defense Weapons Systems Management Center, Wright-Patterson Air Force Base, Ohio, has deprived the Army Missile Command of its Hawk and NATO Hawk air defense missile system project manager for the past year.

Col Charles R. Graham, a veteran of 23 years of military service, will serve on a faculty composed of representatives from all Military Services. His successor at the Missile Command is Lonnie Hightower who has served as deputy manager for the Hawk project.

Formerly an instructor in engineering at the United States Military Academy, West Point, N.Y., Col Graham later served in the Office of the Army Chief of Ordnance Research and Development Agency. He has B.S. and M.S. degrees in mechanical engineering from Columbia University.

Hightower is a veteran of 10 years in missile work at Redstone (Ala.) Arsenal and has headed up the Lacrosse and Dart missile systems in a way that won him the Missile Command's Junior Executive Award.

BIG WIND. Some executives remind us of what Disraeli (1804-1881) said of Gladstone, "a sophisticated rhetorician inebriated by the exuberance of his own verbosity." As my Master says, "big wind, long talk, no rain." (Dr. R. G. H. Siu, T-THOUGHTS)



PRESIDENT JOHNSON congratulates 6 Army employees among 19 honored for contributing most toward the Administration's cost reduction program. From top right (counterclockwise) with the President are Defense Secretary Robert McNamara, Kathryn Reubart and Kenneth Russel; Joseph Jenus, Jr.; Col Frank Havel; Merl Meek; and Richard Kettering.

AMC Personnel Cited for Cost Reduction

Six U.S. Army Materiel Command (AMC) personnel were among the 19 Department of Defense employees presented Certificates of Merit by President Johnson July 21 for significantly contributing to the DoD Cost Reduction program.

The AMC was the only Army agency whose personnel were selected for citation during the Pentagon ceremony, which focused attention on Cost Reduction Week and the DoD goal of saving \$4.6 billion annually by FY 1968 and in each succeeding year.

Secretary of Defense Robert S. McNamara credited thousands of civilian and military personnel in the Defense establishment throughout the world with contributing to the \$2.5 billion in savings achieved during Fiscal Year 1964. He laid down three rules for helping to reduce costs and meet the 1968 goal: "Buy only what is needed. Buy at the lowest sound price. Reduce maintenance costs."

AMC personnel who received certificates from the President are Col Frank L. Havel, project manager, General Purpose Vehicles, AMC, Warren, Mich.; Kenneth H. Russell, supervisory chemical engineer and Joseph Jenus, chemical engineer, Picatinny Arsenal, Dover, N.J.;

Mrs. Kathryn Reubart, supervisory production controller, Ammunition Procurement and Supply Agency, Joliet, Ill.; Richard C. Kettering, electrical equipment installer-repairer, and Merl D. Meek, electrical equipment installer, Pueblo (Colo.) Army Depot.

Col Havel's "outstanding leadership" as general purpose vehicles project manager resulted in tangible

savings to the Government of \$21,400,000 through cost design and procurement policies on 2½-ton trucks and multifuel engines; also, by replacing magnesium wheels with steel wheels on ½-ton trucks.

Mr. Russell, Mr. Jenus and Mrs. Reubart worked on reblending excess powder to meet the requirement for the 175 mm. propelling charge, saving \$5,132,340.

Mr. Meek and Mr. Kettering, in repair of the static probes used in the Nike Hercules missile, saved \$630,200.

Participants in the ceremony included the Assistant Secretary of Defense (Installation and Logistics), Secretaries of the Military Departments, members of the Joint Chiefs of Staff, Army Materiel Command officials and other high-ranking civilian and military officials of the Department of Defense.

Charts showing all aspects of the cost-reduction program were exhibited in the Pentagon Concourse throughout the Cost Reduction Week, July 20-26.

The certificate winners attended a series of meetings in Washington with top officials of their parent Department or Agency and the Office of the Secretary of Defense to discuss results of the Cost Reduction Program for FY 1964 and goals for the future.

As honor guests they were entertained at a luncheon at Cameron Station, Alexandria, Va., by the Materiel Secretaries of the Military Departments, Logistics Chiefs and the Director of Defense Supply Agency, followed by a tour of selected Defense activities in the Washington, D.C., greater metropolitan area.