U. S. AIR FORCE
Office of Scientific Research

The Air Force Office of Scientific Research (AFOSR) oversees the entire Air Force basic research investment portfolio. The Office is responsible for planning, managing, and controlling a high-quality basic research program. Using a carefully balanced research portfolio, AFOSR research managers create new technology and advance current technology, enabling users in the Air Force and U.S. industry to produce world-class, militarily significant and commercially valuable products. In addition, AFOSR manages significant portions of the basic research investment for the Department of Defense, Advanced Research Projects Agency, and Ballistic Missile Defense Organization.

AFOSR has four scientific directorates which manage programs in about 40 research areas. The four scientific directorates are: 1) Aerospace and Materiels Sciences, 2) Physics and Electronics, 3) Chemistry and Life Sciences, and 4) Mathematics and Geosciences. A fifth directorate, Academic and International Affairs promotes initiatives of USAF interest with both educational and international organizations. This directorate supports a variety of science and engineering programs with university faculty members and graduate students and joint initiatives with foreign scientists and institutes.

To further international science and technology connections, AFOSR has two overseas offices: European Office of Aerospace Research and Development (EOARD) in London and Asian Office of Aerospace Research and Development (AOARD) in Tokyo. The primary EOARD and AOARD functions are to identify and understand foreign research and technology programs, to arrange technology interchange between USAF and foreign scientists and engineers, to support the Engineer and Scientist Exchange Program, to support workshops and conferences, and to generate and monitor contracts and grants.

AFOSR reports to Headquarters, Air Force Materiel Command, Director of Science and Technology.

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Air Force General: http://www.hq.af.mil

Air Force Material Command: http://oasum1.wpafb.af.mil:12000

U.S. ARMY
Advisory Group for Aerospace Research and Development (AGARD)

The Advisory Group for Aerospace Research and Development (AGARD) is an Agency of the North Atlantic Military Committee within the North Atlantic Treaty Organization (NATO). The AGARD Headquarters is located in the outskirts of Paris, France.

The mission of AGARD is to bring together the leading personalities of the NATO nations in the fields of science and technology relating to aerospace for the following purposes:

- Recommending effective ways for the member nations to use their research and development (R&D) capabilities for the benefit of the NATO community;
- Providing scientific and technical advice and assistance in the field of aerospace R&D (with particular regard to its military application) to the Military Committee;
- Continuously stimulating advances in the aerospace sciences relevant to strengthening the common defense posture;
- Improving the cooperation among member nations in aerospace R &D;
- Exchanging scientific and technical information;
- Providing assistance to member nations for the purpose of increasing their scientific and technical potential, and
- Rendering scientific and technical assistance to other NATO bodies and to member nations in connection with R&D problems in the aerospace field as requested.

The AGARD is organized around three main elements: the National Delegates Board which is the governing body; the AGARD staff which is the executive body, and the scientific and technical panels, together with the Aerospace Applications Studies Committee (AASC) and the Technical Information Committee (TIC), which constitute the expert bodies of the Agency.

There are seven AGARD Panels composed of about 450 members, who are experts actively engaged in R&D or management in academic institutions, government establishments or industrial enterprises related to the aerospace field.

Each Panel defines a program of meetings, lectures and publications in its own specialty. Panel members are responsible for enlisting the necessary support and participation from their own countries. The detailed areas of interest of each Panel vary fairly rapidly as the field of aerospace science and technology expands and as interactions between specialist areas become more or less relevant. In very general terms, the mission of each Panel is to fulfill the AGARD mission within its own area of scientific and technical interest and competence. The following outlines the current areas of interest of each Panel.

Aerospace Medical Panel is concerned with the effects of aerospace environment factors on pilot performance, including biological, psychological, and medical requirements in space. The Panel has stimulated

research activities in the field of air crew medical standards, human factors related to accident prevention, ergonomics and human engineering in equipment design.

Fluid Dynamics Panel concentrates on theoretical and practical problems in fluid dynamics related to the design and operation of aerospace vehicles. Its work ranges from the study of the fundamental physics of airflow to the development and use of advanced testing facilities and equipment.

Flight Vehicle Integration Panel is concerned with the engineering aspects of air and space vehicle design, integration, testing, operation, and cost. All classes of manned and unmanned aerospace vehicles are addressed, including airplane, rotor craft, missiles, unmanned air vehicles, transatmospheric vehicle, spacecraft and launchers.

Mission System Panel is concerned with the engineering techniques and technologies employed in highly integrated aerospace mission systems. Both air and spaceborne systems (manned and unmanned) are covered.

Propulsion and Energetics Panel is concerned primarily with stimulating research in combustion processes. This includes problems of propulsion systems, energy production and conversion and their application to propulsion systems, and research in the fields of both combustion and the aerodynamics of turbomachines rockets, and ramjets.

Structures and Materials Panel efforts are in the areas of structural heating, structural material developments, and structural loading and response problems. Typical areas of discussion include optimum structural design methodology, materials processing, structural reliability and maintainability.

Sensor and Propagation Panel is concerned with aerospace sensor technology/sensor systems and use of electromagnetic radiation at all frequencies. This comprises the sensor, the target, the external environment and propagation through the atmosphere and space.

The Aerospace Applications Studies Committee is responsible for the organization, management and technical reviews of systems-oriented studies which cross the boundaries of the disciplines of individual AGARD Panels, and often deal with the military applications of emerging technologies.

The Technical Information Committee is concerned with all aspects of scientific and technical information as an integral part of the aerospace and defense R&D process. The Committee has three specific objectives: to assist the aerospace and defense R&D efforts in the NATO nations by promoting effective handling and transfer of scientific and technical information; to improve cooperation among member nations in the management of scientific and technical information and to foster and improve the exchange of such information; and to provide advice and support to AGARD and the NATO Community in the development of information support and services.

The most tangible form of output resulting from AGARD activities is that represented by AGARD publications. About 80 or 90 are issued each year, in categories which constitute a simple and easily recognizable set of aerospace technical literature. The categories are as follows:

> AGARDOGRAPHS constitute the principal formal category of publications for work prepared by or on behalf of AGARD Panels. An AGARDOGRAPH pertains to a single, clearly defined subject, and comprises material generally agreed to be of lasting interest.

REPORTS deal, generally and not at great length, with subjects of more limited scope (such as a specific item of research work), that are expected to be of relatively short-term interest.

ADVISORY REPORTS differ from REPORTS in that they also contain advice and/or recommendations for action, such as the initiation of further research on a particular subject. They are usually addressed primarily to a specific readership.

CONFERENCE PROCEEDINGS are reports of Panels' Technical Meetings, and generally include the full text of the papers that were presented at the Meeting, and an account or summary of the discussions which followed.

LECTURE SERIES publications consist of the full texts of presentations made at Lecture Series. They are normally published in full, and made available to persons attending the lectures and to others concerned.

Documents produced by the AGARD Panels and Committees are available through the NASA Center for Aerospace Information (CASI), 800 Elkridge Landing Road, Linthicum Heights, MD 21090, or from the Defense Technical Information Center (DTIC), Cameron Station, Alexandria, VA 22304.

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U. S. ARMY
Corps of Engineers

International Activities

The following is a list of international scientific and technology exchanges the Corps participates in for the benefit of the domestic civil works program:

The U.S. - Japan Natural Resources Exchange in the areas of seismic engineering for dams and large structures, coastal engineering for storm damage protection, and environmental technology for managing contaminated dredge material.

The Permanent International Association of Navigation Congresses (PIANC) to foster progress on inland and maritime navigation and port development matters. Forty countries are members of PIANC.

The International Commission on Large Dams (ICOLD) to foster planning, design, construction and operation of dam projects. Eighty-three countries are members of ICOLD.

Under the U.S. - Finland Agreement on Science and Technology the Corps is cooperating with the Technical Research Centre of Finland on cold regions pavement design and geotechnics, concrete technology and on the action of ice on structures.

London Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter. The Corps is a member of 62 country member participants.

Contracts with Foreign Countries

Contracts in the fields of environmental quality and civil engineering sciences with academia and researchers from Australia, Denmark, Greece, India, Italy, Ireland, Netherlands, Russia, Sweden, and the United Kingdom.

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ACE HomePage: http://bbsun.usace.army.mil

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U.S. ARMY
Army Research Office - Europe
A Division of the U.S. Army Research, Development and Standardization Group-UK
Army Research Office - Far East

The U.S. Army has a large research and development (R&D) program. Research is conducted not only in the Army research laboratories but also in a number of universities throughout the United States, Europe, the Middle East, and some countries in the Far East.

To manage such large R&D programs, funding agencies must keep abreast of the global developments in their scientific area of interest. In recent years the investment in manpower, research facilities, and project funding has been growing very fast, not only in the Western countries but also in the Eastern countries, particularly the Pacific Asian region.

A profusion of information is published in various forms all over the world. To filter this information to identify real scientific advancements, personal contacts must be established with the research leaders, exchange visits must be made, and conferences and workshops on focused issues must be held. Realizing the importance of this approach, the Army Research Office (ARO) has established two overseas offices. The European Research Office, in London, is a Division of the U.S. Army Research, Development and Standardization Group (USRDSG), which covers all European and Middle Eastern countries. The Army Research Office-Far East (ARO-FE), in Tokyo, covers Pacific Asian countries including Australia and India.

Objectives:

- Monitor technological activities within their geographical area of operation and make the Army R&D community aware of all significant developments and/or research results relevant to the needs of the Army in particular and the DoD in general.
- Promote the exchange of scientific information and collaboration between Army scientist, and those in the geographical area of operation.
- Arrange exchange visits of selected scientists and sponsor or co-sponsor technical meetings and workshops on topics of interest to the Army's R&D program objectives.
- Respond to requests for technical information or assistance from Army laboratories and scientists.
- Coordinate activities with overseas U.S. military service offices such as the Office of Naval Research and the Air Force Office of Scientific Research and other national and international agencies.

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U.S. ARMY
Army Research Laboratory

The Army Research Laboratory (ARL) is the Army's corporate laboratory for combat materiel. The mission of ARL is to execute fundamental and applied research to provide the Army the key technologies and analytical support necessary to assure supremacy in future land warfare. Currently, we are organized into 11 technical directorates that are focused in five business areas. Our five business areas are:

1. **Digitization and Communications:** ARL provides basic and applied research in digitization and communications science for Force XXI. Battlefield digitization gives tomorrow's Army two distinct advantages. The first is a shared situational awareness among all friendly elements, giving each system and its command cells a common view of the total picture. This real-time access to accurate battlefield information, coupled with high-speed computational capabilities, will allow the commander to decide the best course of action. The second advantage is real-time force synchronization, which effectively multiplies the combat power brought to bear on the enemy. Digitization ensures that the common picture viewed by the front line unit is shared by combat and service support elements and that the picture is transmitted instantaneously and without error. At ARL, four technical goals - assimilation, analysis, distribution, and sensing - are part of a balanced program that will ultimaTely reduce the uncertainty with which the commander must deal, enabling him to follow the principles of warfare and take advantage of the enemy's weaknesses.
2. **Armor/Armaments:** Research and development in armor and armaments are critical to the success of the Army's modernization objectives of protecting the force, conducting precision strikes on enemy forces throughout the battlefield, and dominating the maneuver battle. Lighter-weight armor systems with reduced vulnerability, and armaments with improved hit probability and lethality, will enable the Army to dominate the future battlefield, enhance deployability and mobility of Army combat systems, and reduce ammunition logistics burdens.
3. **Soldier System:** The soldier system mission area will assure that soldiers can operate effectively on the high-tech battlefield and survive in its lethal environment while reducing their equipment weight and workloads. A reduced force structure now mandates increases in soldier capabilities to maintain or improve effectiveness. The increasing technical sophistication of Army systems places enormous burdens on the individual soldier to perform complex tasks with complex systems. Consequently, the Army's current soldier system initiative must be expanded to encompass the anticipated range of soldier missions. For the 21st century land warrior, large numbers of computer systems and components must be developed and fielded as major components of the future soldier system.
4. **Air and Ground Vehicle Technology:** The air and ground vehicle technology mission area will develop the technologies needed to extend the life of current combat vehicles, provide components for future systems, and shorten the design and development cycle by enabling flexible, affordable manufacture of the next generation of equipment. The Army needs research advances in vehicle propulsion, structures, manufacturing technology, and related areas to assure effective, survivable, and affordable air and ground vehicle systems for the future Army. Lightweight, fuel-efficient systems with increased component durability will give the future field soldier aircraft and ground vehicles that have the performance edge to win on the battlefield and a reduced wartime "logistics tail", with lower peacetime operating and support costs.

5. **Survivability/Lethality Analysis:** ARL is responsible for the development of vulnerability and lethality assessments of all fielded and developmental Army weapon systems and soldiers. The survivability and lethality analysis mission area provides vulnerability, lethality, and survivability assessments of all fielded and developmental Army weapon systems and soldiers, integrated across all battlefield threats and conditions, as well as developing the tools, techniques, and methodologies to predict battlefield performance that allow these assessments to be performed efficiently and the results to be authoritative. Survivability/lethality analysis is a DoD regulatory requirement for systems that proceed through the materiel development cycle to production and fielding.

ARL Directorate Locations

Over the next 2 years, ARL will consolidate its elements into two primary locations. Adelphi Laboratory Center and Aberdeen Proving Ground, both in Maryland. In addition to the two primary locations, ARL will maintain specific activities at White Sands Missile Range as well as at NASA-Langley in Hampton, Virginia, and NASA-Lewis in Cleveland, Ohio.

Primary Locations

Adelphi, Maryland
- Battlefield Environment
- Physical Sciences
- Information Science & Technology
- Sensors

Aberdeen Proving Ground, Maryland
- Advanced Simulation and High Performance Computing
- Human Research and Engineering
- Survivability/Lethality Analysis
- Technology
- Materials

White Sands Missile Range
- Survivability/Lethality Analysis

NASA Lewis Research Center, Cleveland, Ohio
- Vehicle Propulsion

NASA Langley Research Center, Hampton, Virginia
- Vehicle Structures

International Programs

The resources of the Army are coupled with those of other countries for joint development of technologies useful both to the Army and to our international partners which will increase the effectiveness of allied forces by making the most efficient use of collective research and development. Research and development activities are being leveraged by emphasizing bilateral and multilateral R&D to increase international technology base cooperation. Through the cooperative initiatives the development

costs of weapons systems and combat support equipment can be reduced and systems inter-operability with our allies enhanced.

The ARL international R&D programs have been primarily directed toward Australia, Canada, Central Europe, the former Soviet Union, France, Germany, Israel, Japan, Korea, Scandinavia, South America, and the United Kingdom. The scientists and engineers have participated in exchange programs at foreign laboratories and initiated many joint international technology base projects under Nunn program legislation. Technology working Groups have been established with France, Israel, and Germany to facilitate the technical review of existing Data Exchange Annexes, technical cooperation proposals and other international agreements.

ARL has completed an International Program Guidebook which was prepared to aid and stimulate ARL S&E participation in international program activities. Areas covered include the following:

- Proposing and Conducting New Cooperative Programs: The Memorandum of Understanding
- Nunn Cooperative R&D Programs
- Foreign Comparative Testing
- International Loan Program
- Engineer and Scientist Exchange Program
- Summer International Exchange Program for Scientists and Engineers
- Data Exchange Annex: Initiating/Implementing DEAs
- Setting-up and Conducting Technical Working Groups

ARL personnel participate in the following Multinational Forums:

NATO

- Conference of National Armaments Directors (CNAD)
  The Defense Research Group (DRG)
  NATO Army Armaments Group (NAAG)
- Four Power Senior National Representatives (SNR)
- Advisory Group for Aerospace Research and Development (AGARD)

English Speaking

- The Technical Cooperation Program
- American, British, Canadian, Australian (ABSA) Armies

Other

- Conference of American Armies (CAA)

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http://info.arl.army.mil/

UNITED STATES ARMY
Army Materiel Command
International Cooperative Program Activity

On 1 October 1994, the U.S. Army Materiel Command International Cooperative Programs Activity (ICPA) was formally established. Mr. Michael Fisette is the Director of the ICPA, while also serving as the Principal Deputy for Technology, reporting to Deputy Commanding General, AMC.

The ICPA is composed of the Bilateral Programs Division and Multilateral Programs Division located at Headquarters, U.S. Army Materiel Command in Alexandria, VA, the International Materiel Evaluation Division located at Aberdeen Proving Ground, MD, and the U.S. Army Research, Development and Standardization Groups (USARDSG) in Australia, Canada, France, Germany, and the United Kingdom.

The ICPA is the Army Center of Excellence for international cooperative programs solutions to the U.S. Army's needs for battlefield interoperability, superior materiel and world-class research and technology.

The mission of the ICPA is to:

- Provide centralized management and guidance of Army international cooperative programs
- Provide overseas presence in selected countries
- Promote multinational force compatibility
- Negotiate and monitor international agreements
- Identify opportunities for cooperation
- Facilitate U.S. access to foreign research, technology, and materiel
- Provide linguistic services

The ICPA international activities as of 1 January 1996:

- 28 countries with Master Data Exchange Agreements
- 257 Defense Data Exchange Annexes
- 30 Cooperative Research and Development MOUs
- 1,240 NATO Standardization Agreements (STANAGs)
- 400 ABCA Quadripartite Standardization Agreements (QSTAGS)
- 19 Equipment Loans
- 32 Scientist and Engineer Exchanges
- 11 Nunn Amendment Cooperative R&D Projects

In addition, the ICPA provides support to TRADOC's Bilateral Staff Talks, simultaneous interpretation, translation, and linguistic certification to Army users worldwide, matrix support to the Army's PEO and PM community, and coordination of Army participation in numerous international fora to include:

- NATO
- Advisory Group for Aerospace R&D (AGARD)
- Defense Research Group (DRG)
- America, Britain, Canada, Australia (ABCA)
- The Technical Cooperation Program (TTCP)

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Dr. Rodney Smith, Chief, Bilateral Programs Division
Mr. Aaron Mahr, Chief, Multilateral Programs Division
Mr. Robert Bloom, Chief, International Materiel Evaluation Division
LTC Charles Hintze, Commander, USARDSG-Australia
LTC Ron Janowski, Commander, USARDSG-Canada
Ms. Theresa Norman, Administrative Officer

AMC HomePage: http://www.dtic.dla.mil/amc/

UNITED STATES NAVY
Office of Naval Research

The Chief of Naval Research (CNR) maintains two field offices:

Office of Naval Research European Office (ONREUR), in London, England
Office of Naval Research Asian Office (ONRASIA), in Tokyo, Japan

In carrying out it mission to keep the American scientific community informed of progress in foreign science and technology, the foreign offices establish and maintain liaison with scientific research and development agencies throughout the world; seek out and report accomplishments and trends in research; and evaluate implication and possible applications to U.S. research programs. To these ends, the office emphasizes numerous activities: identifying new directions in research of potential interest to ONR and the Navy; monitoring progress in technical areas closely aligned with ongoing and planned research programs of ONR and the Navy; interpretive reporting of current and planned S&T programs of importance (potential importance) to ONR and the Navy; comparing of foreign S&T to related work in the United States; identifying new directions for foreign S&T efforts as well as identifying upcoming leaders and investigators abroad in technical areas of significance to ONR and the Navy; representing the Chief of Naval Research in various international bilateral, multilateral and NATO Cooperative RDT&E programs and scientific and technical information exchange programs; and cooperating with other U.S. Government S&T agencies and establishments (as resources permit).

The ONREUR is headed by a commanding officer and a scientific director. Technical staff consists of three civilian scientists/engineers, typically from academe or Navy laboratories, and one military officer. The ONRASIA is composed of a civilian Technical Director with four civilian scientists/engineers drawn from the same sectors as for ONREUR. Support staff serve each office. Appointments are typically for two years, with candidates identified from various technical disciplines, depending on current Navy S&T requirements. In addition, several short term focussed assessors are identified by ONR Program Officers each year to conduct studies of six months or less.

All scientific personnel for these offices must have a current awareness on an international scale of their technical areas, including the content of relevant U.S. Navy programs. These scientists and engineers are charged to pursue liaison activities (as described above) primarily where S&T is done, i.e., at foreign research laboratories and institutes. Staff scientists report their findings directly via e-mail to their ONRHQ sponsors, and also place their unclassified reports on the Internet at the addresses listed on the following page. In addition to these reports, co-located Air Force and Army scientists and technologists also compile their reports into a common database maintained by each office, accessible via the Internet.

The foreign field offices may be contacted at:

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