

ARMY RESEARCH LABORATORY

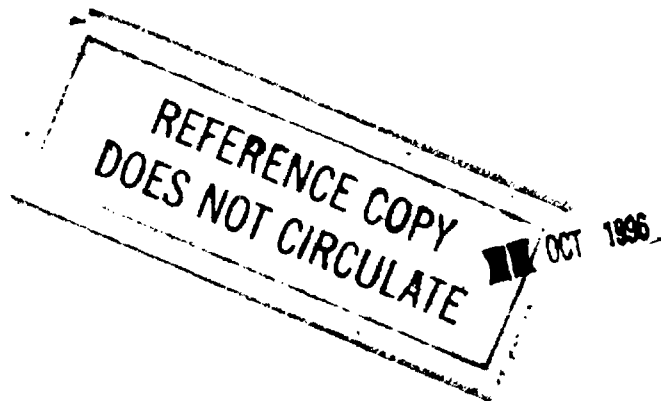


# The Proposed U.S. Army Research Laboratory Research and Technology Generation Process in the Context of the Army Budget Process

Randolph S. Coates  
Eric G. Heilman

ARL-MR-108

October 1993



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| 13. ABSTRACT (Maximum 200 words)<br><br>As part of the organizational transition to the U.S. Army Research Laboratory (ARL), a Process Action Team was formed to consider the issue of how research and technology will be generated in ARL. The result was a detailed process which accomodated transition ground rules and incorporated significant changes aimed at providing better customer service through the use of Total Quality Management Principles. The process has seven sequential subprocesses, Establish Customer Needs, Look for Solutions, Formulate Program, Obtain Approval to Execute, Technology Generation, Technology Transfer, and Accomplishments Based Evaluation. All subprocesses are fully integrated with a corporate investment strategy that serves as a guiding hand to all activities. In order to prepare this internal ARL process for implementation, it was adapted to satisfy the external global Army budget process. The status of implementation is presented and future plans are discussed. |  |  |  |  |
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### Roster of Original Research and Technology Generation Process Action Team

|                      |  |
|----------------------|--|
| Dr. Douglas Brown    | Atmospheric Science Laboratory                         |
| Mr. Randolph Coates  | Ballistic Research Laboratory                          |
| Mr. Richard Flores   | Vulnerability Assessment Laboratory                    |
| Dr. Robert Katz      | Materials Technology Laboratory                        |
| Dr. Robert Lauttman  | Electronic Technology and Devices Laboratory           |
| Dr. Patrick Narenda  | Alliant Tech Systems                                   |
| Dr. Richard Price    | Human Engineering Laboratory                           |
| Dr. Lawrence Puckett | Ballistic Research Laboratory                          |
| Dr. Joseph Sattler   | Harry Diamond Laboratory                               |
| Mr. Gary Witzling    | Armament Research, Development, and Engineering Center |

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## 1. INTRODUCTION

The U.S. Army Materiel Command (AMC) is responsible for supporting the development, production, and fielding of materiel for the U.S. Army. Products addressed by AMC range from clothing and radios to armored fighting vehicles and missiles. AMC maintains an infrastructure that can execute or support all phases of materiel development including basic research, exploratory/advanced development, production, fielding, and sustainment. Until recently, the U.S. Army Laboratory Command (LABCOM) was the basic research and exploratory development arm of AMC. A confederation of seven Army corporate laboratories, LABCOM provided critical in-house expertise in ballistics, electronic devices, electronic warfare, human factors, sensors, nuclear effects, fusing, materials, atmospheric sciences, and lethality and vulnerability assessment of Army systems.

In November 1989, a high level Army study, known as LAB21, considered the future of Army in-house research, development, and engineering activities. This study recommended that LABCOM be reorganized into a single, centralized flagship research laboratory with an adaptable structure and a multi-disciplinary approach in its research activities. On 1 October 1992, this new flagship laboratory, the U.S. Army Research Laboratory (ARL), became operational.

The ARL is led by a civilian director and consists of 12 directorates—10 technical and 2 supporting. The senior manager of each directorate is a Directorate Executive. The ten technical directorates constitute ARL's core competencies: Electronics and Power Sources; Sensors, Signatures, and Signal Processing/Information; Advanced Computing and Software; Battlefield Environments; Vehicle Propulsion; Vehicle Structures; Weapons Technology; Materials; Human Research and Engineering; and Analysis of Survivability and Lethality of Army Systems. The two supporting directorates are the Operations and the Advanced Concepts and Plans Directorates. The Operations Directorate provides all supporting functions such as security, finance, and personnel. The Advanced Concepts and Plans Directorate, or ACAPD, provides technical management support to the ARL director and directorate executives in strategic planning, technology transfer, customer needs assessment, marketing, and resource advocacy. In its end-state, to be achieved in 1997, ARL will employ nearly 3,000 people with about 50% of these being technical staff. ARL will be located at three main campus sites: Aberdeen Proving Ground, MD, Adelphi, MD, and White Sands, NM. ARL will execute a mission program and will also be allowed to accept funding from customers. The total ARL program is to be no more than 30% customer funded.

The ARL has two primary functions. The first is the generation of research and technology to satisfy the needs of Army customers. The second function of ARL is analysis in the areas of survivability/ lethality, battlefield environments, and MANPRINT. The principal customers for ARL research and technology are the Army Research, Development, and Engineering Centers or RDECs. The RDECs, which are also part of AMC, perform the higher level product development functions including advanced development and production. This construct is analogous to that often used in the private sector—a corporate R&D laboratory (i.e., ARL) supporting a number of product divisions (i.e., the RDECs).

To assist in the transition from LABCOM to ARL, and in keeping with Army directives to implement the principles of Total Quality Management (TQM), a number of process action teams (PATs) were chartered in 1991 by then LABCOM commander Major General Jerry C. Harrison. The PATs were structured to address the critical business issues of the new organization. One of these was the Research and Technology Generation Process Action Team (R&T Gen PAT).

The charter of the R&T Gen PAT is to define processes through which ARL will identify, create, and exploit research and technology to satisfy Army customer needs for better materiel. These processes must reflect the new missions and functions of ARL, accommodate ARL "ground rules," and incorporate the principles of TQM and Deming's (1991) 14 points. Some of the more important ARL ground rules are:

- An increased mission in basic research.
- Co-location of personnel to enhance synergy and reduce overhead.
- Civilian workforce reduced by 25% between 1992 and 1997.
- Institutional funding to cover the basic cost of doing business.
- A rigid personnel ceiling.
- Formation of an ARL Board of Directors, principally composed of ARL's main customers, the Technical Directors of the RDECs.

The R&T Gen PAT members were chosen as a representative slice of the entire LABCOM organization. In addition, representatives from both a customer organization and industry were included in the PAT. A good mix was obtained with membership ranging from senior managers to the journeyman level. This mix of personnel provided a multi-viewpoint perspective necessary for the development of the new ARL R&T Gen process.

The ARL R&T Gen process was created over the course of about 18 months through a series of facilitated discussions and brainstorming sessions. This report will provide an overview of the process and operational policies that have been generated in support of it. Further, harmonization of the process with the overall U.S. Army budget system will be discussed. Finally, the current status of process implementation will be summarized.

## 2. GUIDING PHILOSOPHIES

In 1990, a PAT chartered at AMC Headquarters addressed the subject of technology generation and defined the existing process followed within AMC. The ARL R&T Gen PAT accepted their results as "what is" and began defining "what should be." A substantial amount of time was spent discussing desired attributes for ARL which led to definition of the nine following guiding philosophies which the PAT attempted to instill into the new process.

1) Power Down: To minimize micromanagement, ARL leaders should communicate a clear sense of the ARL mission and then empower bench level scientists and engineers (S&Es) to formulate and execute programs to satisfy customer needs.

2) Promote Jointness: ARL technologists need opportunities to congregate. Collegial meetings enhance organizational awareness and identity. Such interactions will facilitate the inter-directorate teaming necessary to address customer needs requiring multi-disciplined solutions.

3) Enhance Communication: Direct communication between the workforce, ARL senior leadership, and ARL customers is critical. In addition, constant communication of technical needs, issues, and accomplishments is required—otherwise, opportunities will be lost.

4) Customer Orientation: The R&T Gen process must reflect the increased emphasis on customers and their satisfaction. Important questions are; Who are they? What do they need? How can ARL satisfy their need? and How do they define quality? Contracts with customers will become commonplace and must be executed with constant customer interaction.

5) World-Class Reputation: LABCOM technologists were already recognized as "world-class." As ARL, they must strive to maintain, and even enhance, this reputation despite impending resource

reductions. Effective and efficient business processes can support technologists to maintain the confidence of Army leaders and the respect of their peers.

6) Program Review: The R&T Gen PAT believes that peer reviews and reviews of customer satisfaction will assist ARL to focus on continuous quality improvement. However, reviews that create competition among the directorates of ARL or between ARL and its customers should be eliminated. Performance should be measured against an objective, consistent, and open set of standards. Reviews should be minimized to reduce the burden on bench-level S&E's.

7) Accomplishments Based Evaluation: The R&T Gen PAT maintains that an increased emphasis on accomplishments will focus ARL on the attainment of high quality, Army relevant achievements. Scientific and technical accomplishments must be key elements of organizational evaluations. A track record of solid, relevant technical accomplishments will be a basis for program support.

8) What Should Be, Not What Is: The PAT was not limited by the characteristics of the existing organization or by "conventional wisdom." An idealistic (but not naive) approach must be employed in both the development and evolution of ARL.

9) How Does this Help the Army (Soldier)?: The PAT recognizes that the primary purpose of ARL is to provide technology that enhances the performance of soldiers on the battlefield. Activities that detract from this objective should be eliminated, or at least minimized.

### 3. PROCESS OVERVIEW AND SUPPORTING POLICIES

3.1 Overview. The process defined by the R&T Gen PAT is provided as a flow chart in Figure 1. The process is composed of seven sequential subprocesses and each subprocess is composed of activities. A cross-hatched box indicates that it contains a new concept or new way of doing business. The numbers beneath boxes refer to those of Deming's 14 points embodied in the activity. A finer level of detail has been created but will not be presented at this time. While the process has a clear beginning and end, it is intended to be cyclical.

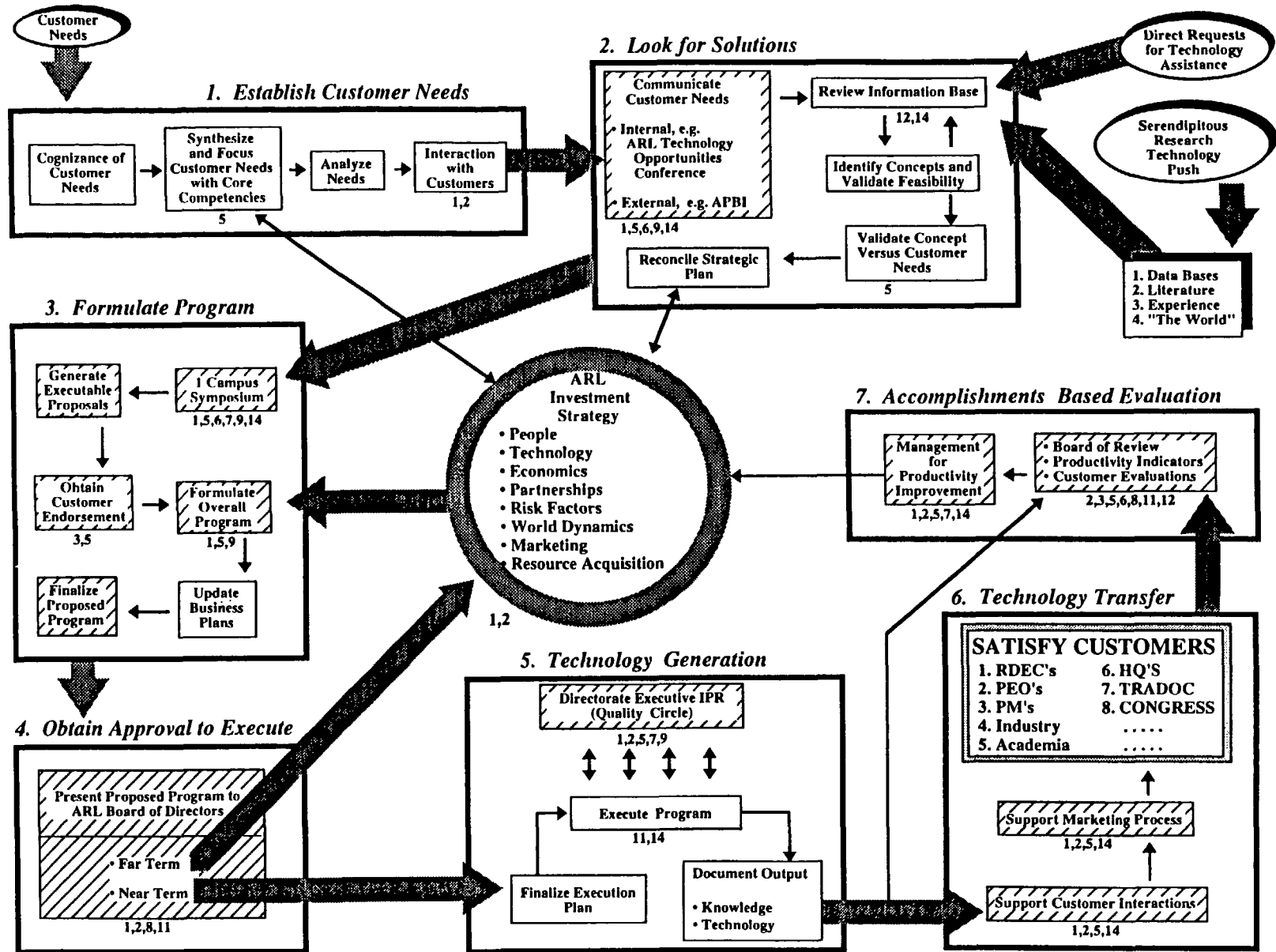


Figure 1. ARL research and technology generation process.

The structure of the process does not preclude the insertion of new technology, mid-course corrections, or the freedom to pursue innovative ideas whenever they occur. ARL S&Es will be granted greater latitude to pursue personal research relevant to Army needs. The R&T Gen PAT maintains that innovation and creativity should be fostered throughout the organization and this belief is supported by the process.

3.2. ARL Investment Strategy. The PAT identified the ARL Investment Strategy as the heart of the R&T Gen Process. The Investment Strategy is the primary responsibility of the ARL Director and will guide the evolution of ARL. A wide variety of internal and external factors must be considered during its development, some of which are listed on the flow chart in Figure 1. It considers Army needs and technology evolution. The Investment Strategy receives inputs from activities within the process and is itself an input to activities within the process. Thus, it serves as a critical link and guiding influence throughout. It promotes a long-term, visionary outlook which is expected to increase the stability of the organization and assure its continuous relevance to Army needs. It also appropriately reflects ARL's increased mission in basic applied research programs which typically have longer maturation times.

### 3.3 Subprocesses.

3.3.1 Subprocess 1 - Establish Customer Needs. The input to this subprocess is the basis of ARL's existence—Army customer needs. Cognizance of customer needs is achieved by collecting and reviewing appropriate needs documents such as the Army Tech Base Master Plan, the Battlefield Development Plan, and the DoD Critical Technologies List. Customer needs are synthesized and focused in accordance with ARL core competencies. The two-headed arrow connecting the activity "Synthesize Customer Needs..." with the ARL Investment Strategy is one of the critical links in the process. The Investment Strategy is used to preclude pursuit of customer needs which are incompatible with near-term ARL goals. Conversely, trends in customer needs will be used to evolve the Investment Strategy so that ARL will be prepared to meet future requirements. Analyses are performed to identify needs compatible with ARL goals and resource allocation. Next, personal contacts with customers are made as required to assure a complete understanding of the stated need. It shall be ARL's policy that our interpretation of customer needs statements will be validated and we shall attempt to influence our customers regarding technological opportunities and benefits. The output from this sub-process is a comprehensive listing of Army needs which could be addressed by ARL. To obtain the maximum benefit for ARL and its customers, the information gathered regarding customer needs will be shared freely throughout all levels of the organization.

3.3.2 Subprocess 2 - Communicate Customer Needs. The next step is to communicate Army customer needs to those relied on for innovative solutions—the ARL workforce. The workforce provides maximum value when it is educated on both customer needs and technical opportunities. To accomplish the former, the R&T Gen PAT has defined a new concept—the ARL Technology Opportunities Conference or ATOC. The purpose of the ATOC is to provide ARL customers a forum in which they can present their needs directly to the ARL workforce. In this original concept, the ARL director, senior staff, and key ARL customers (the RDECs) will visit the three major ARL campus sites where they will make presentations to the entire ARL scientific and engineering staff. The PAT maintains that directly exposing ARL bench level technologists to customer needs will better harness their collective creativity. The ATOC exemplifies the PATs "power down" philosophy and is the first step in the "bottom up" approach to program formulation which the PAT has built into the process. The ATOC will be held in the manner of a scientific conference, with customers providing substantive technical presentations on their requirements.

As part of ARL's "smart buyer" role, customer needs gathered during Subprocess 1 and those surfaced at the ATOC must be communicated to external sources of research and technology. This will be accomplished through such means as Advanced Planning Briefings for Industry (APBI).

Following the ATOC, ARL technologists will identify and develop concepts for satisfying customer needs. It will be ARL policy that all appropriate sources of information be considered, including the private sector and academia. One of these sources is internal serendipitous research which has resulted in a new technological opportunity not yet known to customers—a so called "technology push." Solutions will also be sought from external sources through the use of such things as Broad Agency Announcements and the Small Business Innovative Research Program. Subprocess 2 also supports direct access to ARL by customers needing specific or immediate technology assistance, foregoing Subprocess 1. Such a request might originate with a field unit facing an unexpected technical difficulty.

It shall be ARL policy that the technical feasibility and validity of a concept will be assured prior to seeking customer endorsement. Once validated, conceptual solutions will be presented to customers to obtain preliminary endorsement. The final activity is to reconcile proposed concepts with the ARL Investment Strategy. As in the first subprocess, a double headed arrow connects this activity with the Investment Strategy indicating that the strategy can be modified in response to new technological directions resulting from the search for solutions.

3.3.3 Subprocess 3 - Formulate Program. The proposed solutions to customer needs, conceived by well-informed bench level technologists, serve as a starting point for the formulation of the ARL mission program. However, the Technical Directorates of ARL should not formulate their programs in isolation. To support the LAB21 directive that ARL have a multi-disciplinary approach to problem solving, the preeminent policy in this area will be to capitalize on the collective capacity of the ARL through inter-directorate teaming. The first step will be for ARL team leaders and/or branch chiefs to meet together to discuss their proposed solutions to customer needs. This is the One-Campus Symposium, another new concept developed by the R&T Gen PAT. Gathered by business areas, they will discuss their proposed solutions to identify sound technical proposals and inter-directorate teaming opportunities. Based on these interactions, leaders are chosen, business partners are identified, and a team is formed for each proposal.

Project teams will generate executable proposals and begin formal communications with customers to create draft Memoranda of Understanding or Agreement (MOUs or MOAs). MOUs and MOAs will be contracts between ARL and its customers. The results of these activities are provided to the directorate executives for their use in program formulation.

The overall proposed ARL mission program is assembled based on the proposals, MOUs/MOAs, and in accordance with the ARL Investment Strategy. In keeping with the "power down" philosophy, the integrated ARL program will be formulated and proposed collectively by the directorate executives, a totally different procedure than that used in LABCOM in which each corporate laboratory functioned for the most part as a separate entity. In ARL, the directorate executives will be given an opportunity to formulate the program cooperatively using guidance from the Director and the ARL Investment Strategy in conjunction with their understanding of customer needs. Following this activity, the ARL Business Plan will be updated to integrate the proposed program with the ARL business strategy. The proposed program is finalized by the ARL Director who bears the ultimate responsibility for the program. The PAT believes that adherence to the process will obviate the need for substantial modifications to what the Directorate Executives propose. However, it is at this point that the ARL Director exercises strategic control over the organization through judicious allocation of resources across the core competencies (i.e., some are enhanced and some are diminished) or through the creation of new business areas for ARL.

3.3.4 Subprocess 4 - Obtain Approval to Execute. The proposed ARL mission and customer program must be approved by the ARL Board of Directors (BOD). The BOD shall control 50% of the ARL



mission program. The remaining 50% is controlled by the Director of ARL. Approval should be sought for two categories of program—the near-term program (2–3 years) and the far-term program (4+ years). The near-term program will be managed by the directorate executives and should be reviewed biannually. Formulation of the far-term program should be a joint enterprise between the ARL director, the directorate executives, and the ARL strategic planning staff. Its purpose is to secure strategic resources for out-year programs. The results of the far-term program approval process become an input to the Investment Strategy.

3.3.5 Subprocess 5 - Technology Generation. Responsibility for execution of the technical programs will lie with the directorate executives who will use resources provided to them through the approved program. Using these resources, ARL scientists and engineers will finalize plans and execute programs. It shall be the policy of ARL that program execution adhere to the highest principles of scientific research and engineering supported by a premier infrastructure. Enabling business functions are extremely important during program execution. Innovation, creativity, and productivity will be encouraged through efficient procurement, rapid hiring of employees, and a reduction of burdensome paperwork. Innovation must be pursued in all aspects of ARL business. Upon completion of a project, the output (information, technology, etc.) must be documented, (e.g., through technical reports or demonstrations in a manner that is consistent with customer expectations and requirements).

The R&T Gen PAT recommends the formation of a quality circle, composed of the directorate executives, that will meet quarterly (as indicated by the four arrows on the process flow chart). The primary objective of this group will be the continuous improvement of the research and technology products of ARL. The quality circle concept will encourage the directorate executives to work cooperatively and assure that technology advances are pursued rapidly. To encourage frank and open discussion, participation by the ARL director in this group is regarded as optional. However, important recommendations for improving the quality and execution of the program will be provided to the ARL director. All ARL leaders must adopt a philosophy of supporting the common good of the organization.

3.3.6 Subprocess 6 - Technology Transfer. The transfer of useful technology to Army customers is the primary measure of the success and value of the Army Research Laboratory. An example of a technology transfer would be the evolution of an ARL concept through basic research and exploratory development and its transition to an RDEC customer for advanced development and integration into an Army system. It shall be ARL policy that technology transfer to customers will be heavily promoted.

Close contact with customers, which has been instilled throughout the process, should result in a straightforward and hopefully seamless technology transfer. In every instance, it will be accomplished in a manner consistent with customer needs and expectations. In addition to internally generated technology, ARL bears the responsibility of identifying and exploiting external technology opportunities and transferring them to customers. The R&T Gen Process will also support processes for marketing ARL technology to new customers.

3.3.7 Subprocess 7 - Accomplishments-Based Evaluation. The process ends with an evaluation of ARL's products, in particular their quality and relevance to customer (Army) needs. It shall be ARL policy that this evaluation be based on accomplishments, not promises. The ARL director bears ultimate responsibility for ensuring that the quality, relevance, and effectiveness of ARL accomplishments are evaluated. These evaluations form a basis for management and productivity improvement. Three types of reviews are recommended by the R&T Gen PAT with the common thread among them being their focus on research and technology accomplishments.

First, a Board of Review (BOR) should be established to evaluate the technical competency and achievements of the ARL staff. The BOR is intended to be a peer review and, thus, is staffed with other world class scientists. Members of the BOR will be sought from academia, private industry, and national labs. The BOR will report to the director of ARL and will advise on the quality of the organization (personnel and facilities) and its competitive status as a world class R&D organization. The BOR will use a long-range perspective to assure an appropriate balance between near-term and long-term goals and an appropriate level of risk.

The second evaluation should be a measurement of performance in comparison with an objective standard, along the lines of the Baldrige quality award (Malcolm Baldrige National Quality Improvement Act of 1987). This should be a non-competitive evaluation so that no barriers are created between the ARL directorates, nor between ARL and its customers. Important performance indicators include: refereed papers, technical reports, patents, and successful technology transitions.

The final measure is the degree of customer satisfaction achieved to assure that ARL is responsive and relevant to its customers. One means for determining customer satisfaction will be the use of questionnaires. Other methods are being pursued as well.

The results of these three evaluations feed directly into the ARL Investment Strategy and will be one of the principle factors considered for management and productivity improvement as ARL leaders plan for the future.

#### 4. THE ARL R&T GEN PROCESS RECONCILED WITH THE ARMY PPBES

4.1 PPBES Overview. The Planning, Programming, Budgeting, and Execution System (PPBES) is a cyclical process used to develop a plan, a program, and a budget for the Department of Defense. It is also used as a framework for making decisions on current and future programs with the ultimate goal of achieving the best mix of forces, manpower, materiel, equipment, and support within resource constraints.

Conceived in 1962 by then Secretary of Defense Robert McNamara, the PPBES featured a multi-layered programmatic focus. Though there have been modifications, the PPBES remains essentially unchanged. From budgetary inception to final program execution, the entire PPBES process requires a time period of 3 years and 9 months.

The budget is a reflection of U.S. Army program priorities. Therefore, the first events in the creation of the budget occur in the form of field reviews. During the first 3 months of the budget process, the Training and Doctrine Command (TRADOC) accumulates issues for a General Officer Review. The product of this review is a white paper listing prioritized U.S. Army needs.

Data requests are then sent to various research organizations in an effort to integrate the current program with the prioritized needs. Three Infrastructure Mission Area Integration Teams meet to establish this connection. Once this integration is in place, reviews are conducted to provide guidance from the field which is formalized in the Long Range Army Materiel Requirements Plan (LRAMRP - pronounced "L- RAMP"). The LRAMRP is prepared and sent to the Department of the Army (DA).

DA inserts political realities into the field LRAMRP and forwards it to DOD as the Army Long Range Research and Development Plan (LRRDAP). At this point, 1 year and 1 month has elapsed. Next the Program Objectives Memorandum (POM) is created. This document states the position of the Office of the Secretary of Defense (OSD). After a period where the field makes minor adjustments to the POM, program descriptive summaries are written and the POM is integrated into the budget framework through the Budget Estimate Submissions (BES).

The budgetary comptroller examines the BES during the Program Budget Decision (PBD) cycle. Changes made in this cycle are final. The Congressional Research and Development Descriptive Summaries (RDDS) are then written. Two years from its inception, the Presidential Budget is delivered for the president's signature. Once signed, a period of Congressional testimony in support of the budget takes place.

The Congress then debates budgetary issues in various committees. During this time, the OSD conducts a Science and Technology Review. From this review, programs can be designated as "Must Fund" programs (or programs of the highest priority for funding). These are incorporated in a Program of Execution document that reflects all budget changes necessary for program execution. The budget is eventually passed into law by the Congress. This vote takes place 2 years and 9 months after initial budget inception. The final year of the PPBES is the year of program execution.

4.2 ARL R&T Gen Process Integration Into the PPBES. The R&T Gen PAT has harmonized the proposed process with the timing and sequence of the entire PPBES such that all DA and DOD calls for information and program formulation deadlines can be met. In addition, some of the new activities in the process provide better support to certain PPBES events. Four examples will be discussed: 1) POM submission, 2) LRAMRP data calls, 3) congressional testimony, and 4) congressional RDDS input.

The POM can be influenced by ARL R&T Gen Program planning activities. Evolving customer requirements, reflecting world events and other outside influences, are integrated into the ARL Investment Strategy. Since the POM incorporates these same events and influences, ARL will have created a source of POM data. Funding obtained via the POM Submission and the subsequent budget Program Descriptive Summaries (PDS) Cycle are an important resource for ARL.

The last three areas of budgetary support amount to programmatic data calls from DA to ARL. These data calls will be influenced and enhanced by the quarterly quality circle meetings held by the directorate executives. The cooperative nature of the quality circle meetings will act to enhance program execution which is reflected in data returned by ARL. Since the ARL R&T Gen process supports improved achievement with reduced resources, technological program data will improve as well. This data will be used to assure ARL's budgetary position in the various data calls. Further, the transfer of technological products to customer organizations will improve ARL's reputation as a world-class organization. In fact,

the ARL R&T Gen process supports the collection of programmatic data through the creation of a more centralized data collection system.

Another DOD thrust supported by the process is the inter-service RELIANCE program. RELIANCE promotes closer cooperation between the services, assures the reduction of duplicate efforts, and is part of the overall budgetary process. Data collected from ARL programs will be used as a comparison to programs supported by the other services. ARL programs that complement technology programs managed by the other services may be guided through the RELIANCE program in order to reduce duplicate efforts.

## 5. CURRENT AND FUTURE PLANS

The R&T Gen PAT was assembled to examine the current operation of LABCOM and to build a new ARL R&T Gen process based on the principles of TQM and "what should be ... not what is." The efforts of the PAT have resulted in the process described in this report. The process has been endorsed by the Acting Director of ARL, and by other senior Army leaders within AMC.

The PAT has recognized the conclusion of the developmental stage of the process. In conjunction with the Advanced Plans and Concepts Directorate (ACAPD) of ARL, the PAT has begun the implementation stage of the process. This has resulted in a natural evolution of PAT leadership to the ACAPD. There have been several meetings of the PAT under its new leadership. The focus of these meetings has been the planning of the first R&T Gen process event scheduled for execution, the ATOC.

The first ATOC was held in Baltimore, Maryland from November 30th through December 4th of 1992. During this 5-day period, over 650 personnel representing every ARL Directorate, every AMC Research and Development Center, and the U.S. Army Battle Laboratories met to discuss technical requirements and potential solutions in an environment suited for information interchange. Briefings were given by RDEC personnel detailing current and future technological needs for the battlefield. Subsequent to these briefings, ARL personnel formed working groups to develop and explore preliminary technological solutions to RDEC concerns. More than 250 solutions were proposed by the ARL working groups. In conjunction with the RDECs, ARL has initiated seven of these proposals as major mission-funded technology programs. These include 1) Human Performance in Information Rich Environments; 2) Integrated Soldiers Engagement System; 3) Battlefield Information Processing; 4) Stealthy Low-cost and Long-lived Power Sources; 5) Ultra-Wideband Radar Mine Detection; 6) Passive Millimeter Wave

Imaging; and 7) Family of Ultra-Lightweight Radars. The Acting Director of ARL has endorsed the first ATOC as successful and the next one will be held in 1994.

In the future, the PAT will plan the implementation of other R&T Gen process events. It is hoped that the entire process will be in place by the 1997 ARL end-state.

## 6. CONCLUSION

This report has chronicled the efforts of the PAT in its attempt to enhance the research and technology generation practice of the ARL. The new process has been accepted and supporting policy has been developed. The R&T Gen process has been harmonized with the DOD PPBES process to demonstrate that the new process will fit into current government business practice. Implementation of the R&T Gen process is on schedule.

The R&T Gen process is a "living" process and as such will continue to be modified as warranted. A series of informational meetings is currently being held to impart a better understanding of the process to senior ARL leaders. During these meetings, opinions and constructive criticisms are solicited in order to elicit corporate ownership and support of the process. Several suggestions have been made at these meetings and will be brought before the PAT as process enhancement issues.

Although the final operational picture of ARL can not be predicted, the R&T Gen PAT has provided a frame for the portrait and a method for brush movement. The principles and philosophies embedded in the R&T Gen process will allow ARL to provide the Army materiel development community with high quality, relevant research and technology products at a good value while maintaining the flexibility and independence needed to lead the Army into new and exciting technological frontiers.

## 7. REFERENCES

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## LIST OF ABBREVIATIONS

|         |  |
|---------|--|
| ACAPD   | Advanced Concepts and Plans Directorate                |
| AMC     | U.S. Army Materiel Command                             |
| APBI    | Advanced Planning Briefings for Industry               |
| ARL     | U.S. Army Research Laboratory                          |
| ATOC    | ARL Technology Opportunities Conference                |
| BES     | Budget Estimate Submissions                            |
| BOD     | Board of Directors                                     |
| BOR     | Board of Review  |
| DA      | Department of the Army                                 |
| DOD     | Department of Defense                                  |
| HQ      | Headquarters   |
| IPR     | In Process Review                                      |
| LABCOM  | U.S. Army Laboratory Command                           |
| LRAMRP  | Long Range Army Materiel Requirements Plan             |
| LRRDAP  | U.S. Army Long Range Research and Development Plan     |
| MD      | Maryland   |
| MOA     | Memorandum of Agreement                                |
| MOU     | Memorandum of Understanding                            |
| NM      | New Mexico   |
| OSD     | Office of the Secretary of Defense                     |
| PAT     | Process Action Team                                    |
| PBD     | Program Budget Decision                                |
| PDS     | Program Descriptive Summary                            |
| PEO     | Program Executive Officer                              |
| PM      | Program Manager  |
| POM     | Program Objectives Memorandum                          |
| PPBES   | Planning, Programming, Budgeting, and Execution System |
| RDDS    | Research and Development Descriptive Summaries         |
| RDECs   | Research, Development and Engineering Centers          |
| R&D     | Research and Development                               |
| R&T Gen | Research and Technology Generation                     |
| S&E     | Scientists and Engineers                               |
| TQM     | Total Quality Management                               |
| TRADOC  | U.S. Army Training and Doctrine Command                |

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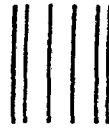
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