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AMTEX Third Quarter Report

The AMTEX Partnership™

June 1994

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The AMTEX Partnership™

Third Quarter Report

June 1994

Issued by
The AMTEX Program Office

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AMTEX Laboratory Program Office

and

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AMTEX Industry Program Office

June 1994

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EXECUTIVE SUMMARY

The AMTEX Partnership™ is a collaborative research and development program among the U.S. Integrated Textile Industry, the Department of Energy (DOE), the DOE laboratories, other federal agencies and laboratories, and universities. The goal of AMTEX is to strengthen the competitiveness of this vital U.S. industry and thereby preserve and create American jobs.

Operations and Program Management

The operational and program management of the AMTEX Partnership are provided by the Program Office. This report is produced by the Program Office on a quarterly basis and provides information on the progress, operations, and project management of the partnership.

Program Office Operations and Management (Laboratory and Industry)

The Program Office is comprised of both an industry and laboratory component and provides management oversight of the operational and project activities. The following activities were conducted this quarter.

Project Initiation

During the second quarter all the Cooperative Research and Development Agreements (CRADAs) were completed and work initiated for three additional projects: Computer-Aided Fabric Evaluation (CAFE), Textile Resource Conservation (TReC), and Sensors for Agile Manufacturing (SFAM). The plan for a Cotton Biotechnology project was completed in July and reviewed by the Industry Technical Advisory Committee. In addition, an "impact study" on the topic of flexible fiber production was conducted by an industry group led by the fiber manufacturers.

Media and Public Relations

Press releases and articles appeared in several publications on the CAFE and Demand Activated Manufacturing Architecture (DAMA) projects and a more general article about the AMTEX Partnership or AMTEX . The Program Office is preparing a display for the 1994 Bobbin Show.

Projects

Computer Aided Fabric Evaluation (CAFE)

The CAFE Project is on schedule to meet all identified first year milestones in the three main task areas: On-Line Greige Inspection, Critical Path Elements, and Printed Color.

The On-Line Greige task has made significant progress in the areas of formal definition and system criteria, greige defect set definition, machine diagnostics, image generation, sensor development, and algorithm development.

The Critical Path Elements task group has made extensive progress in support of the CAFE System. Their efforts have taken the form of an industry survey and economic model, literature search, and drafting of needed documents critical to building of the system. The industry survey details the deployment impact and system performance in terms of industry expectations.

During the first quarter, the Printed Color team developed algorithms and a conceptual design and functional description of the system. They designing a field-deployable color image system, and characterizing the printed color defect set.

Also, a loom and knitting machine has been installed at the Y-12 Plant at Oak Ridge, Tennessee. These systems are being used to develop the On-Line Greige Inspection System and automated inspection system for knitting machines. These systems are fully operational with trained technicians/engineers available for support.

Textile Resource Conservation (TReC)

This quarter has seen the initiation of the CRADAs for all of the participating national laboratories and the full commencement of TReC research efforts. National laboratory and textile industry partners have attended joint task team meetings, finalized research task details, and participated in laboratory presentations. The tasks are progressing well and collaborative work between the laboratories and the textile industry partners are going well. There is widespread involvement by the laboratories and industry with over 130 industry participants at the task team meetings, and industry, teams visiting the laboratories to view ongoing work. The feedback from the textile industry has been very positive; they are enthusiastic about the research and the expected results to follow.

Demand Activated Manufacturing Architecture (DAMA)

This has been the second quarter for DAMA as a working project. All project teams are fully underway and initial project results are beginning to emerge.

Currently, 30 companies are participating in DAMA as Research Partners. Interest has been strong; more than 120 people from these companies are involved in the task work. Plans are underway to increase the number of research partner companies by about a dozen over the next six months. Through emphasis on recruiting companies from the retail and fabricated products sectors, DAMA will achieve a better balance of participation.

Expenditure of laboratory funding is tracking well with the 1994 planned spending rate. Industry contributions are matching at the appropriate rate.

Major accomplishments during the second quarter come from across all project activities. For example, the initial version of the whole-industry model is undergoing internal review; it will be released during the next quarter. The first DAMA technical reports have been published. There were two. The first is a survey report of partner forecasting practices; the second is a report on the collaborative business tool activity, which outlines the key elements needed for new, broad-based tools for multi-enterprise business planning. E-mail and file transfer connection have been established for 75% of the people participating on the DAMA project, which is 115 out of 162. Initial technology demonstrations have been developed and reviewed for display at the 1994 Bobbin Show. These are demonstrations of current technology in electronic procurement, Internet access mechanisms, and industry-wide simulations. Finally, the initial version of the DAMA presentation, speakers kit, and DAMA brochure were released.

Embedded Electronic Fingerprinting (EEF)

Work on project tasks has commenced at Pacific Northwest Laboratory. Activities have been proceeding in three areas: 1) project management, 2) technology assessment, and 3) demonstration preparation for the Bobbin Show. Primary focus to date is on the development of a demonstration for the Bobbin Show and the needs and requirements assessment of the industry.

Rapid Cutting

The Rapid Cutting project is developing advanced methods for cutting textiles using both mechanical and optical (laser) methods. Each of the six national laboratories are investigating different technical approaches. At the close of this reporting period two of the six teams were actively engaged; we expect all teams to be well underway with their tasks by mid-August.

Sensors For Agile Manufacturing (SFAM)

All participating laboratories (Pacific Northwest Laboratory, Argonne National Laboratory, and Sandia National Laboratories) have signed CRADAs and have received funding by the end of the quarter. Early bench-scale laboratory work has begun at all the laboratories on the felled seam task.

Financial Summary (DOE $ in thousands)

	(A) Total Budget*	(B) Quarter Cost	(C) Cost to Date	(D) Remaining Balance (A-C)	(E) % Spent of Budget (C/A)	(F) Funds Authorized	(G) Remaining Balance (F-C)	(H) % Spent of Auth. (C/F)
Program Office	1,945	262	1,112	833	57	1,945	833	57
DAMA	10,370	2,480	5,038	5,332	49	7,439	2,401	68
CAFE	3,700	744	784	2,916	21	2,249	1,465	35
TReC	3,250	589	686	2,564	21	2,002	1,316	34
EEF	400	10	10	390	3	150	140	7
Rapid Cutting	1,000	0	0	1,000	0	210	210	0
Sensors	500	18	18	482	4	460	442	4
Cotton Biotech	50	0	0	50	0	50	50	0
TA Leaders	175	0	105	70	60	160	55	66
FY93 TACT Oper.	250	0	250	0	100	250	0	100
Misc. Support	150	0	150	0	100	150	0	100
Uncommitted	2,810	0	0	2,810	0	0	0	0
Total	$24,600	$4,103	$8,153	$16,447	33%	$15,065	$6,912	54%

* Total Budget is the total for current CRADAs, which will terminate between January and April 1995. (See Project Summary Reports in Appendix A in the back of this Third Quarter Report for details.)

OPERATIONS AND PROGRAM MANAGEMENT

The AMTEX Operating Committee provides the operational oversight, approves the long-range strategic plan including project priorities and budgets, and selects the program office and initiative leaders. The Operating Committee consists of representatives from the textile industry, government, and the laboratories.

Program Office Operations and Management (Industry and Laboratory)

The Program Office provides management oversight of the daily operational and project activities of the AMTEX Partnership and is comprised of both an industry and laboratory component. The following activities were conducted this quarter.

Project Initiation

- All the CRADAs were completed and all tasks underway by the end of the quarter for the DAMA project, the CAFE project, the TReC project, and the SFAM project.
- The CRADAs for the EEF and Rapid Cutting projects were about 50% completed by the end of the quarter.
- The work plan for the Cotton Biotechnology project was developed and reviewed by the laboratory and industry program office and the research partner, Cotton Incorporated. The plan was sent out to the Industry Technical Advisory Committee (ITAC) for their review before their July meeting.
- A group of fiber manufacturers, under the auspices of the Textile Research Institute and the American Fiber Manufacturer's Association, began developing a project dealing with flexible fiber manufacturing. Groups of industry researchers visited several of the DOE laboratories to assess their capabilities and develop a clearer picture of where the laboratories could have a major impact on fiber processes.

CRADA Process Benchmarking Study

A benchmarking study was conducted of the time required to develop AMTEX projects from concept proposal through start of work. Data were collected on the first six AMTEX projects from the time they were first proposed until completion of all CRADAs and start of work.

The process was divided into nine steps with each step representing the processing action of one person or organization (e.g., project manager or field office). The first three segments describe how a concept goes from an idea through an impact study and then becomes a project plan. The

last six steps describe how the project plan is implemented through a series of CRADAs between each participating DOE laboratory and an industry partner.

The study revealed several opportunities for improvement in processing time. The largest variability was a factor of four in processing times among the labs and field offices for certain CRADA processing steps.

The Program Office, the laboratories, DOE Headquarters and the DOE Operations Offices will work together to implement improvements in the project/CRADA development process.

Media and Press Relations

News releases and media outreach earned valuable coverage and exposure in important trade and popular media outlets. Among those providing coverage were Textile World, Daily News Record, Home Textiles Today, Federal Technology Report, Federal Cooperative RD&D Report, Apparel Industry Magazine, and Technology Access. The CAFE release led to coverage by the NBC-TV affiliate in Knoxville, Tennessee, and stimulated interest by the Fox TV business unit. We will be working to parlay the CAFE loom development into possible coverage by CNN's science and technology unit, depending on the project's ability to "show" the technologies publicly.

On request, advisories on AMTEX participation in the Bobbin Show were issued to several magazines. AMTEX has reserved a booth at the Bobbin show with the theme, "AMTEX -- creating a road to the future." AMTEX will sponsor the Bobbin Preview publication for which AMTEX will receive a full-color back-page advertisement and a feature article.

Dr. Thomas J. Malone, vice-chair of the AMTEX Operating Committee, gave a presentation at a Manufacturing Technology Conference sponsored by the National Institute of Standards and Technology. AMTEX also had a display booth at the meeting.

Work on an information campaign was initiated. The campaign will include a series of mailings to a selected group from the industry, laboratories, and government. The masthead for a series of "Tech Briefs" was designed and printed.

Operating Committee Activities and Actions for the Quarter

The Operating Committee did not meet this quarter.

The next AMTEX Operating Committee meeting will be held on July 21, 1994, at Sandia National Laboratories in Albuquerque, New Mexico.

PROJECT ACCOMPLISHMENTS

Accomplishments during the last quarter under the AMTEX Partnership have been numerous. A review of those accomplishments is contained in the following for each AMTEX project.

CAFE Project

The CAFE project is developing inspection systems that will provide U.S. textile manufacturers with a major leap forward in the assurance of high quality, predictable, consistent textiles. The period of performance covered under this report coincides with the actual period of performance of the Project. As such, the work that is detailed in this report represents the complete effort to date.

Project Managers: Glenn Allgood, ORNL / 615-574-5673
Marty Ellis, ITT / 803-595-0035

Performance Related to Milestones

As of the period ending June 1994, the schedule for the first year's major deliverables is on track. Currently, these deliverables are as follows:

- an April 1995 Alpha Test for the On-Line Greige Inspection System,
- a September 1994 CAFE Economic Model and Systems Architecture Document,
- a Proof-of-Principle Printed Color System ready for test and evaluation in April 1995.

Specific to these deliverables, the status of the first quarter milestones is as follows:

1. Development of Defect Sets for Printed Color Subsystem along with proper definitions. Work completed June 94.

2. Formalized Project Plan for On-Line Greige System. Work completed May 94.

3. On-Line Greige Inspection Defect Analysis with Partitioned Set. Completed June 94.

4. CAFE System Functional Description and Requirements Document. Preliminary document completed June 94.

5. Machine Descriptor for the On-Line Greige Inspection System. Work continues on this task. Final report due September 94.

Activities and Technical Accomplishments for the Quarter

During this reporting period the following activities were conducted:

1. A machine descriptor has been developed for use in loom diagnostics. Field tests continue to check validity of approach.

2. Computer vision techniques have been applied to fabric inspection and have been evaluated. Preliminary results show that a majority of defects are detectable under a constant set of operating conditions.

3. Development of non-vision sensors continues. Existing sensors have been modified to determine their effect on signal characteristics.

4. An image-to-image registration algorithm has been developed for a printed color system. Preliminary results show that the approach has merit for establishing measures for image registration.

5. An algorithm has been developed for simple color separation in the laboratory color coordinate system based on clustering around an a-priori value. The concept was successfully tested on a scanned sample print color pattern.

6. A loom and knitting machine have been installed at ORNL to support the CAFE Project. The machines are fully operational and are being used to support the development of the On-Line Greige Inspection system and the Knitting Initiative proposed for FY 1995.

7. Defect class structures have been identified and implemented as base-line system defects for system development. These defects are for both Greige and Printed Cloth.

8. A Preliminary Functional Description and Requirements Document has been drafted for the Greige, Printed Color, and Knit Systems.

9. Task coordinating meetings for each task team (Laboratory & Industry Partners/Greige, Printed Color, Critical Path Elements, Knitting, Yarn) have provided focus and attention to specific requirements for each subsystem.

Issues, Major Problems, and Actions to Resolve Them

There has been a change in the delivery date of the Machine Descriptor for the On-Line Greige Inspection System Document. It is now scheduled for September 1994. The change is due to an increase in the development efforts that have resulted from the preliminary field visits and discussion with the Industry Partners working on this task.

There is still an issue associated with Intellectual Property Rights and the impact of the issue on CRADA Protected information. This issue will be addressed at the July AMTEX Operating Committee meeting to be held in Albuquerque, New Mexico.

Explanation of Variances

None to report this quarter.

Plans for Next Quarter

The main focus areas for next Quarter are:

1. Completion of the Cost/Benefits Analysis of Defect Vs. Sensor Suite Vs. Defect Set Coverage for the On-Line Greige Inspection System and the supporting Machine Diagnostics suite. This is important in determining which sensors are viable from the perspective of number of defects detected and the projected cost for implementing a sensor-based system.

2. Completion of the Functional Description and Requirements Document for the CAFE Inspection Systems. This will identify the system's operational characteristics that need to be developed and designed.

3. Develop the formal working definition for the On-Line Greige Inspection System Alpha Test. This document will contain the Industry's concept and expectations for the test. It will provide the score sheet by which the system will be judged.

4. Completion of the CAFE System Architecture Document. This represents the design criteria and guidelines for developing the CAFE subsystems.

5. Completion of the Printed Color System Design Concept Document. This analysis will detail the preliminary findings of needs and functionality for the system.

6. Completion of the Preliminary CAFE Economic Model. This will be used to support the final decision by the Industry as to which sensor/sensor suite combination to pursue for the Alpha Test configuration.

Invention Disclosures

None.

Publications/Presentations

Publications

1. Preliminary Defect Analysis, Draft Report (July 1994).

Presentations

No formal presentations have been made outside the CAFE Project Team meetings.

TReC Project

The objective of the TReC project is to define, develop, integrate and deliver processes, devices, and techniques to be used by all elements of the U.A. "Textile and soft Goods" product chain to enhance environmental quality and minimize the production of wastes.

This quarter has been a milestone for the TReC Project with the beginning of work on the project tasks. We are encouraged by the proof-of-concept work and excited about the technical potential these first efforts have shown.

Project Managers: Paul Farber, ANL/708-252-6522
Don Alexander, ITT/803-595-0035

Performance Related to Milestones

Progress toward meeting milestones has been satisfactory. Dye samples for the Recovery of Colorants task and lists of high priority Volatile Organic Carbons (VOCs)for the Air Emissions Monitoring and Reduction task have been obtained and are now in the hands of the principal investigators, though obtaining the samples and lists caused some variances. Progress in other areas is contingent on processing CRADA agreements.

Activities and Technical Accomplishments for the Quarter

The Recovery of Colorants task team has received some of the dye samples needed for it to begin to evaluate the recovery concepts being investigated. Initial testing (proof-of-concept) has shown positive results for recovering salts used in spent dye baths. It has shown similarly positive results in the separation of dyes and colorants from simulated dye bath mixtures and the recovery of the dye for potential reuse. A Dye Chemistry course was arranged by the CRADA Partner, The Institute of Textile Technology, North Carolina State University, and the Ciba-Giegy Co. This course was attended by many of the researchers on the Recovery of Colorants Task as well as other AMTEX investigators.

The Alternative Cleaning Technologies task group has commenced its proof-of-concept experiments. Based on parts acquired from several textile companies, initial testing has shown promising results for cleaning of end-caps, twist stops, and spinnerette heads. One set of experiments performed on spinnerette heads has determined that cleaning these heads (contaminated with hardened polymer) was accomplished in under 3 hours compared to a standard cleaning time (from the company supplying the part) of 12 hours.

The Recovery of Fibrous Solid Waste task group has commenced its efforts at Argonne National Laboratory and the Pacific Northwest Laboratory. The Argonne task team has as its goal the recovery of polyester from dyed polyester and dyed polyester/cotton blends. Initial experiments reported to the Industrial Research Partners have indicated success in recovery from undyed samples with almost quantitative yields being achieved. The Pacific Northwest Laboratory team has been determining the feasibility of recovering cotton, or useful cellulosic materials from dyed cotton and dyed polyester/cotton blends. Results to date have indicated that the recovery of cotton and cellulosic materials is technically feasible, and scaling tests are being performed to determine the parameters of operation.

The task group for Metals Speciation - Analytical Development is concentrating its efforts on the development of methods for the speciation of copper, based on input from the Industrial Research Partners. Dye samples have been received at Sandia National Laboratory and Argonne National Laboratory, and the formulation of these samples into surrogate waste dye streams has been performed. Initial indications are that the procedures for copper speciation can be developed and quantified.

Low Waste Chemical Applications has commenced its proof-of-concept studies. Bench-scale experiments at the Oak Ridge National Laboratory have given positive results for the application of chemicals on fabrics with a maximum of chemical utilization and a minimum consumption of water. Pacific Northwest Laboratory staff have been concentrating on the modeling of the chemical application process and Lawrence Livermore personnel have been performing bench-scale measurements of a method to increase the transport of chemicals through fabrics. An industry -directed change of emphasis on the Argonne National Laboratory efforts is aimed at developing a sensing and control system for the new application process.

The Air Emissions and Monitoring task participants have received a list of compounds that the Industrial Research Partners feel are of primary interest to the industry. Researchers are performing calibration and scaling experiments on sensors existing in the Laboratories in order to determine the sensor response to the gases of interest to the textile industry.

Efforts in the Energy Conservation Task continue to focus on the development of an updated and accurate picture of energy consumption patterns within the industry. All previous studies were based on a

common database that is about 15 years old. This collection of energy consumption information will be used by the Task Team to develop projections of energy use and, with participation of the Industrial Research Partners, estimates of the impact of directed energy conservation and process changes on the overall consumption of energy in the textile industry. These estimates will be used not only to help quantify the targets of opportunity, but to answer a request from the DOE Office of Energy Efficiency as well.

The Task Team of Strategic Planning for Source Reduction has, based on textile industry input, issued a draft report outlining a process for industry task participants to use in estimating the total cost of waste generated in the textile industry. These estimates will be produced by industry sectors (fiber, textile, apparel, retail) and used to identify the highest payback areas for source reduction.

Issues, Major Problems, and Actions to Resolve Them

The only issue/major problem that has been encountered this quarter has been the delay encountered by the individual Laboratories in processing their CRADAs.

Explanation of Variances

Variances in milestones and deliverables from the Project Plan are minor. Some variances in the Recovery of Colorants has been due to delivery problems with dye samples to the principal investigators. Other variances in the project have been due to delayed signing of CRADAs.

Plans for Next Quarter

During the next quarter (July - September 1994) a TReC Project Review meeting will be held (August 23-24, 1994) at Argonne National Laboratory. This two-day meeting will allow all of the principal investigators an opportunity to present the progress made in their tasks to the Industrial Research Partners. Industrial Research Partners will be able to assess the progress of the task efforts and their applicability to the needs of the textile industry. They will then be able to develop their opinions as to the viability and extent of future work.

DAMA

The objective of the DAMA project is to define, develop, integrate, and deliver an electronic marketplace system/structure that can be used by all elements of the U.S. fibers, textiles, and fabricated products production and retailing chain. DAMA will enable companies to reduce the current time to market from fiber-to-consumers, increase customer and consumer responsiveness, resemi-custom apparel--"apparel on demand," and establish new markets and strategic

alliances that create business opportunities. These steps will enhance their productivity and competitiveness in the world marketplace.

This has been the second quarter for the DAMA project. All project teams are fully underway and initial project results are beginning to emerge.

Project Managers: Lee Cheatham, PNL / 509-375-2674
Jim Lovejoy, $[TC]^2$ / 919-380-2184

Performance Related to Milestones

Progress has been made toward the four 1994 deliverables as outlined below.

1. Baseline model document -- The initial systems mapping was completed this quarter as a preliminary step in developing the baseline industry model. This result was gained by a small product team (four industry members and two laboratory staff) examining the full cycle process on a single product: men's wrinkle-free slacks sold through a department store. The relevant process, time and cost information is being captured in a business model.

2. Opportunities Assessment Document – The second version of the DAMA opportunities assessment document was completed this past quarter. This document serves as one of the drivers for determining the priorities for investigations within DAMA.

3. Demonstrations -- Initial versions of three demonstrations have been completed. These are demonstrations of technology in the areas of 1) electronic procurement, 2) network access to business-related information, and 3) an initial simulation of the apparel pipeline. The first demonstration is based on work that has been done in the national laboratories for the U.S. Department of Defense to implement a paperless system for procuring commodity goods. It demonstrates the key point in DAMA of broad access and notification, electronic exchange of business transaction data, and methods to support commerce with small enterprises. The second demonstration is intended to display the potential of using network (Internet) based tools for broad dissemination of retail and business data. Finally, the pipeline simulation allows users to adjust the parameters, such as reordering strategies, inventory levels, and shipping delays to see the effect on the overall buildup of inventory in the pipeline. Each of these demonstrations well be presented at the 1994 Bobbin Show in Atlanta in September.

4. DAMA Plans -- The 1994 One Year and 1994-1998 Five Year DAMA plans were completed in the first quarter of 1994. Initial planning has begun on the 1995-1996 project plan.

Activities

In addition to the activities described above, related project work has taken place in the following areas:

Work to ensure that all research partners (and ultimately others) can easily connect electronically is well underway. Within DAMA, this activity is referred to as the AMTEX Collaborative Information System (ACIS). Included are an established help desk with both telephone and e-mail connection, investigation into video conferencing as a mainstream communications technique, and effective use of servers as tools for e-mail communication and document exchange.

The work on developing a national sourcing database with an easy-to-use interface is well underway. It should be available for initial demonstration in the Fall of 1994.

The DAMA general presentation and speaker's kit was released this past quarter. It included a full set of overhead charts describing DAMA, background information on the project, feedback and promotional material on DAMA for use in discussing DAMA with professional groups, and copies of the relevant DAMA documents. In addition, a tri-fold brochure has been developed describing the DAMA concept. Finally, an e-mail address has been established to allow requests for information by the general public.

Planning for the 1995/1996 period has begun. A small group was chartered to develop a more concise and complete description of the DAMA project, relating the vision and objectives to the planned task activities. The results of this first group will serve as the basis for the more complete development of the 1995-1996 plan in August.

Issues, Major Problems, and Actions to Resolve Them

Several management-related issues have been raised and resolved over the past quarter.

Issue: The DAMA Steering Committee is too large to effectively prepare for quality decision making.

Action/Resolution: A small advisory group has been elected to act on behalf of the overall steering committee. The two primary functions of this group are 1) to work project issues with the management team and adequately prepare the steering committee for decisions that must be made and 2) to provide counsel to the project managers. This small group is made up of 10 members of the steering committee, two each from retail, fabricated products, textiles, fibers, and the laboratories.

Issue: The large number of laboratories on the Enterprise Understanding task leads to an overly complicated management challenge.

Action/Resolution: The number of laboratories participating on the task was narrowed to two.

Issue: Retail participation in DAMA needs to be greater to gain the balanced perspective from across the value chain.

Action/Resolution: A DAMA retail workshop was held to discuss the issues related to retail participation in the DAMA project. From that meeting a recruiting plan was developed to solicit participation of approximately six retail companies.

Explanation of Variances

No significant variance to report.

Plans For Next Quarter

Next quarter, the DAMA team will concentrate on completing deliverables related to the industry model, the Bobbin Show demonstrations, and several technical reports as preliminary work to new tools to be demonstrated in 1995. In addition, the project plan for the period January 1995 through September 1996 will be drafted and approved.

Invention Disclosures

None.

Publications / Presentations

DAMA Forecasting Tools Practices Survey, DAMA-S-1-94 (CRADA Protected).

Electronic Embedded Fingerprints (EEF)

The EEF project is developing miniature electronic devices as permanent identification and information markers for textiles and apparel. Activities have been proceeding in three areas: 1) project management, 2) technology assessment, and 3) demonstration preparation for the Bobbin Show.

Project Managers: Mike Riley, LLNL/510-422-3045
Jim Caldwell, $[TC]^2$/919-380-2156

Performance Related to Milestones

We are on schedule for meeting the first milestone of demonstrating RF tagging at the 1994 Bobbin Show in September.

Activities and Technical Accomplishments for the Quarter

Existing RF tagging vendors have been contacted regarding existing technology. The Bobbin Show demonstration is nearly complete.

Issues, Major Problems, and Actions to Resolve Them

The LLNL CRADA is still being processed and Mike Riley, the Project Manager, remains unfunded.

Explanation of Variances

LLNL is behind schedule due to lack of funding.

Plans for Next Quarter

Complete the Bobbin Show demonstration, attend the Bobbin Show in September, and continue the technology assessment.

Invention Disclosures

None.

Publications/Presentations

None.

Rapid Cutting

The Rapid Cutting project is developing a new generation of cutting systems and technological advancements in current systems that will improve cutting quality and efficiency. Such systems will enable true demand activated manufacturing of apparel to be realized. The Rapid Cutting project is teamed by six national laboratories, each having in hand technologies appropriate for the mechanical cutting of textiles through new materials and photonics cutting through several laser sources and optical projection approaches.

At the close of this reporting period, two of the six teams have started work on their project task. We expect all teams to be actively underway with their tasks by mid-August 1994.

Project Managers: Craig Fong, LBL/510-486-5298
Jim Caldwell, [TC]^2/919-380-2156

Performance Related to Milestones

This project is partitioned into an initial Phase One lasting six months to be followed by ensuing phases. An aggregate team start date is August 1, 1994. Most Phase One CRADAs will end January 15, 1995. We have identified the following milestones:

1. Lab/Industry Partnering Meeting	August 24, 1994
2. Fabricate Initial Mechanical Blades for Bobbin Show	September 26, 1994
3. Perform Initial Photonics Cuts	September 26, 1994
4. Generate Next Phase Development Plan	December 15, 1994
5. Lab/Industry Phase One Review	December 15, 1994

Activities and Technical Accomplishments for the Quarter

Only limited technical work was underway this quarter.

Issues, Major Problems, and Actions to Resolve Them

None to report.

Explanation of Variances

Not yet applicable.

Plans for Next Quarter

A laboratory/industry meeting is planned for August 23, 1994 at the Textiles Clothing Technology Corporation in Raleigh, North Carolina. There we will review the goals of the project, define initial tasks, identify industry task leaders, and determine a future schedule for lab/industry interaction and tours. Trial cuts using varying laser wavelength, pulse shape, and effective power levels are planned. Blades of nickel aluminide, nitrides, and composite materials will be fabricated for both evaluation at an industry site and for display at the Atlanta Bobbin Show, September 26-30, 1994. Based on these results, a detailed development plan that resolves ensuing phases will be completed.

Sensors For Agile Manufacturing (SFAM)

The SFAM project team are developing sensors that will allow the automation of sewing processes associated with garment assembly to improve product quality and process productivity in the apparel manufacturing sector of the U.S. Textile Industry.

All participating laboratories (Pacific Northwest Laboratory, Argonne National Laboratory, and Sandia National Laboratory) have signed CRADAs and have received funding by the end of the quarter. Early bench-scale laboratory work has begun at all the laboratories on the felled seam task.

Project Managers: Kevin Widener, PNL/509-375-2487
Jim Caldwell, $[TC]^2$/919-380-2156

Performance Related to Milestones

The projects were started this quarter. No other milestones have been reached.

Activities and Technical Accomplishments for the Quarter

Researchers at the laboratories have begun measuring fabrics with their respective technologies. This work is very preliminary and no accomplishments are ready to be reported.

Kevin Widener attended AMTEX Project Manager's training in July. This was an excellent opportunity for all of the AMTEX project managers to discuss their respective problems and issues.

Issues, Major Problems, and Actions to Resolve Them

None.

Explanation of Variances

None.

Plans for Next Quarter

Kevin Widener will present the project to the DOE national laboratory directors in Albuquerque, New Mexico on July 19. This will be followed on July 21 by a project status presentation at the AMTEX Operating Committee meeting.

Because the laboratories are now funded, it is essential to bring together the laboratory and industry members. A meeting will be held in late August at $[TC]^2$ in Raleigh, North Carolina.

FINANCIAL SUMMARY (DOE funding)

Appendix A contains program financial summary information.

APPENDIX A

AMTEX FINANCIAL SUMMARY

PROGRAM SUMMARY REPORT

1. IDENTIFICATION (CONTRACT NO.)	2. TITLE	3. REPORTING PERIOD
21286	AMTEX PROGRAM	3RD QUARTER FY 1994

4a. PARTICIPANT NAME AND ADDRESS	4b. CLIENT NAME AND ADDRESS	5. START DATE
AMTEX LABORATORY PROGRAM OFFICE PACIFIC NORTHWEST LABORATORY RICHLAND, WASHINGTON 99352	U.S. DEPARTMENT OF ENERGY WASHINGTON, DC 20585	OCTOBER 1993 6. COMPLETION DATE SEPTEMBER 1994

7. PROJECT YEAR: FY 1994

8. COST STATUS

a. $ EXPRESSED IN: THOUSANDS

b. BUDGET & REPORTING NO./SUB. ACCT NO.: KU-01-00-000; GB-01-06-010

c. FIN. NO.:

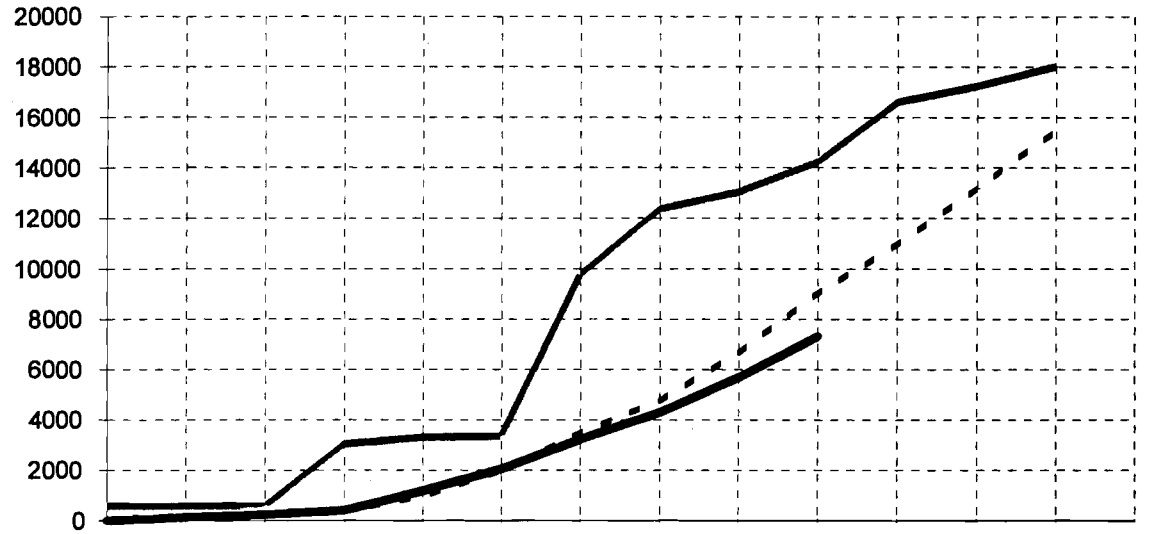
d. ACTUAL COSTS PRIOR YEARS: $818

e. ER BUDGET: $13,782

f. DP BUDGET: $10,000

g. ER FUNDS AUTH: $10,921

h. DP FUNDS AUTH: $3,303



LEGEND: PLANNED ▪ ▪ ACTUAL ——— PROJECTED - - - - - - - FUNDS AUTH ——— 90% SPENT ▷

		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
i. ER COSTS	PLANNED	146	97	137	400	600	900	900	1200	1600	1400	1600	1600
	ACTUAL	146	98	175	612	631	799	699	1018	1250			
	VARIANCE	0	-1	-38	-212	-31	101	201	182	350			
	CUM PLANNED	146	243	380	780	1380	2280	3180	4380	5980	7380	8980	10580
	CUM ACTUAL	146	244	419	1031	1662	2461	3160	4178	5428			
	CUM VARIANCE	0	-1	-39	-251	-282	-181	20	202	552			
j. DP COSTS	PLANNED	0	0	0	200	400	600	400	700	750	550	600	700
	ACTUAL	0	0	0	153	238	380	370	383	403			
	VARIANCE	0	0	0	47	162	220	30	337	347			
	CUM PLANNED	0	0	0	200	600	1200	1600	2300	3050	3600	4200	4900
	CUM ACTUAL	0	0	0	153	391	771	1141	1504	1907			
	CUM VARIANCE	0	0	0	47	209	429	459	796	1143			
k. TOTAL COSTS	PLANNED	146	97	137	600	1000	1500	1300	1900	2350	1950	2200	2300
	ACTUAL	146	98	175	765	869	1179	1069	1381	1653			
	VARIANCE	0	-1	-38	-165	131	321	231	519	697			
	CUM PLANNED	146	243	380	980	1980	3480	4780	6680	9030	10980	13180	15480
	CUM ACTUAL	146	244	419	1184	2053	3232	4301	5682	7335			
	CUM VARIANCE	0	-1	-39	-204	-73	248	479	998	1695			

9. MILESTONES

(REFER TO INDIVIDUAL PROJECT REPORTS)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep

10. NAME OF PARTICIPANT'S PROGRAM MANAGER

DOUGLAS K LEMON

PROJECT SUMMARY REPORT

1. IDENTIFICATION (CONTRACT NO.)	2. TITLE	3. REPORTING PERIOD
21286	AMTEX PROGRAM OFFICE	3RD QUARTER FY 1994

4a. PARTICIPANT NAME AND ADDRESS	4b. CLIENT NAME AND ADDRESS	5. START DATE
AMTEX PROGRAM OFFICE PACIFIC NORTHWEST LABORATORY RICHLAND, WASHINGTON 99352	U.S. DEPARTMENT OF ENERGY WASHINGTON, DC 20585	OCTOBER 1993
		6. COMPLETION DATE SEPTEMBER 1994

7. PROJECT YEAR: FY 1994

8. COST STATUS

a. $ EXPRESSED IN: THOUSANDS

b. BUDGET & REPORTING NO./SUB. ACCT NO.: KU-01-00-000

c. FIN. NO.:

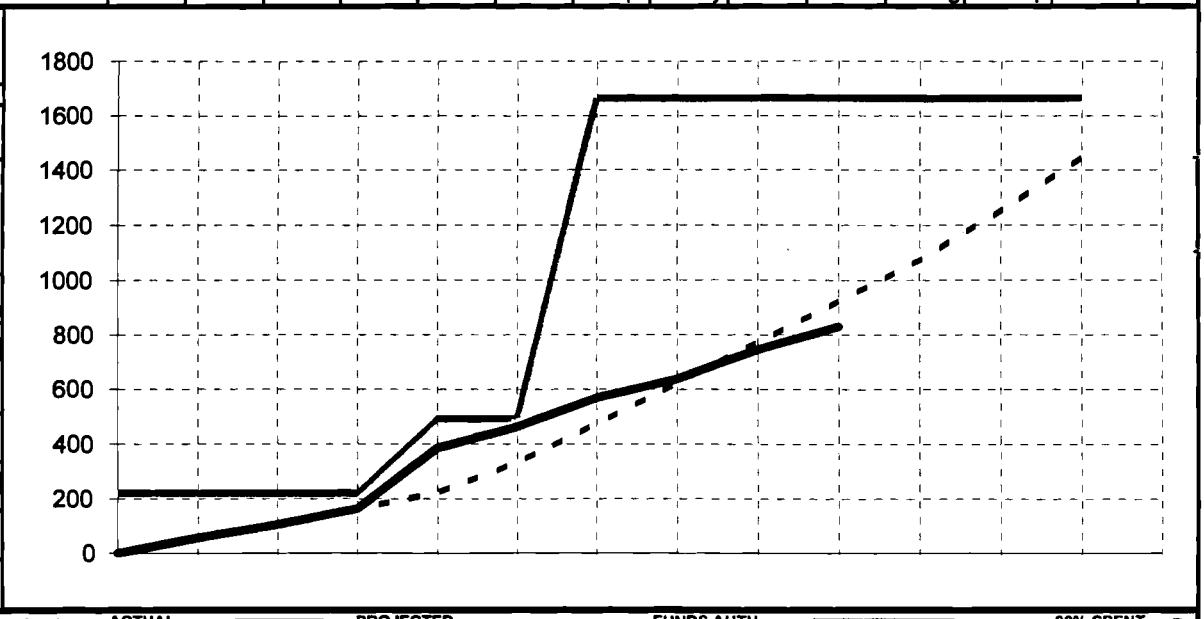
d. ACTUAL COSTS PRIOR YEARS: $281

e. ER BUDGET *: $1,664

f. DP BUDGET *: $0

g. ER FUNDS AUTH: $1,664

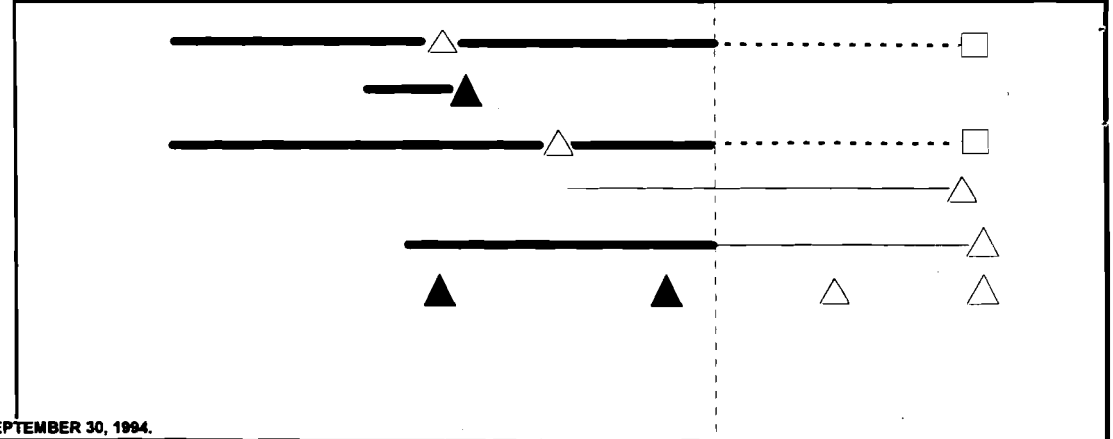
h. DP FUNDS AUTH: $0



LEGEND: PLANNED ACTUAL PROJECTED FUNDS AUTH 90% SPENT

		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
i. ER COSTS	PLANNED	56	48	59	60	110	140	150	150	150	150	180	192
	ACTUAL	56	48	59	223	78	106	69	108	85			
	VARIANCE	0	0	0	-163	33	34	81	42	65			
	CUM PLANNED	56	104	163	223	333	473	623	773	923	1073	1253	1445
	CUM ACTUAL	56	104	163	386	463	569	638	746	831			
	CUM VARIANCE	0	0	0	-163	-130	-96	-15	27	92			
j. DP COSTS	PLANNED	0	0	0	0	0	0	0	0	0	0	0	0
	ACTUAL	0	0	0	0	0	0	0	0	0			
	VARIANCE	0	0	0	0	0	0	0	0	0			
	CUM PLANNED	0	0	0	0	0	0	0	0	0	0	0	0
	CUM ACTUAL	0	0	0	0	0	0	0	0	0			
	CUM VARIANCE	0	0	0	0	0	0	0	0	0			
k. TOTAL COSTS	PLANNED	56	48	59	60	110	140	150	150	150	150	180	192
	ACTUAL	56	48	59	223	78	106	69	108	85			
	VARIANCE	0	0	0	-163	33	34	81	42	65			
	CUM PLANNED	56	104	163	223	333	473	623	773	923	1073	1253	1445
	CUM ACTUAL	56	104	163	386	463	569	638	746	831			
	CUM VARIANCE	0	0	0	-163	-130	-96	-15	27	92			

9. MILESTONES



* BUDGETS COVER EFFORTS THROUGH SEPTEMBER 30, 1994.

LEGEND: SCHEDULED △ TIMELINE ——— PROPOSED DEVIATION - - - - - -

COMPLETED ▲ DEVIATION □ PROGRESS ——— APPROVED DEVIATION — — — —

10. NAME OF PARTICIPANT'S PROJECT MANAGER

DOUGLAS K LEMON

PROJECT SUMMARY REPORT

1. IDENTIFICATION (CONTRACT NO.)	2. TITLE	3. REPORTING PERIOD
21286	DEMAND-ACTIVATED MANUFACTURING ARCHITECTURE (DAMA)	3RD QUARTER FY 1994

4a. PARTICIPANT NAME AND ADDRESS	4b. CLIENT NAME AND ADDRESS	5. START DATE / 6. COMPLETION DATE
AMTEX LABORATORY PROGRAM OFFICE PACIFIC NORTHWEST LABORATORY RICHLAND, WASHINGTON 99352	U.S. DEPARTMENT OF ENERGY WASHINGTON, DC 20585	5. START DATE: OCTOBER 1993 6. COMPLETION DATE: SEPTEMBER 1994

7. PROJECT YEAR: FY 1994

8. COST STATUS

a. $ EXPRESSED IN: THOUSANDS

b. BUDGET & REPORTING NO./SUB. ACCT NO.: KU-01-00-000; GB-01-06-010

c. FIN. NO.:

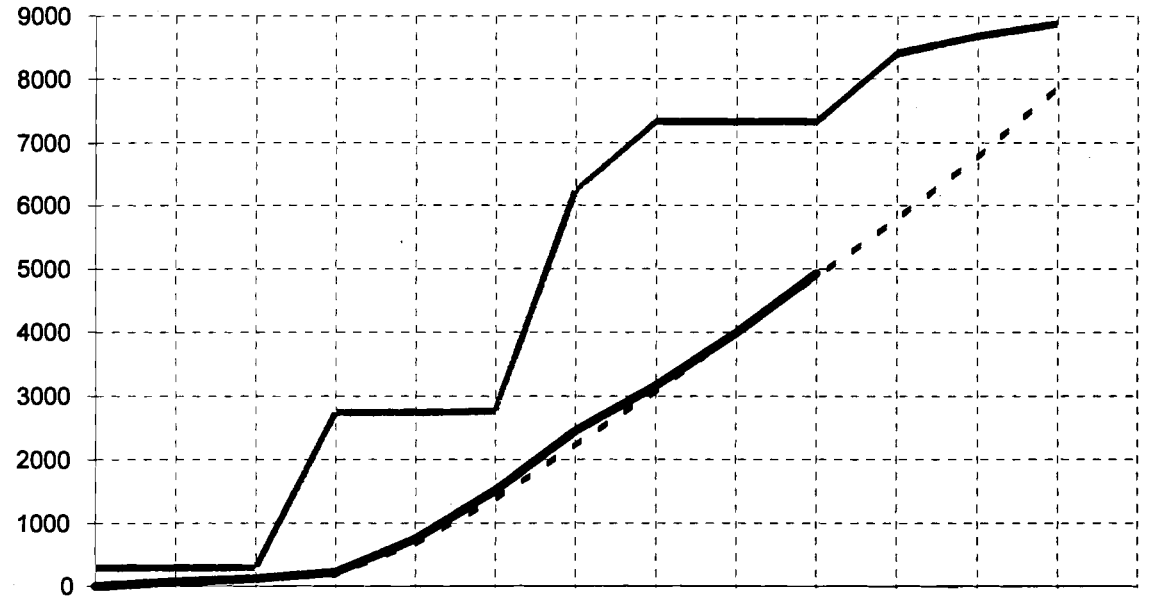
d. ACTUAL COSTS PRIOR YEARS: $111

e. ER BUDGET *: $6,949

f. DP BUDGET *: $3,310

g. ER FUNDS AUTH: $5,279

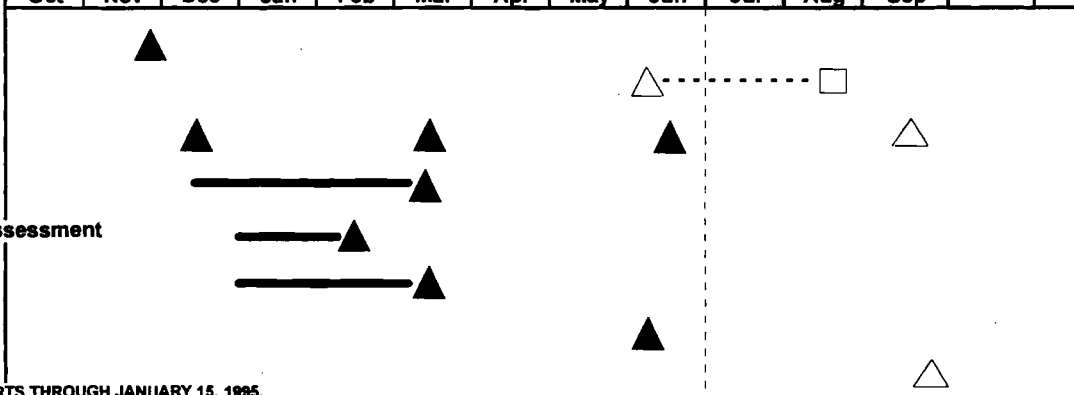
h. DP FUNDS AUTH: $2,049



LEGEND: PLANNED ACTUAL PROJECTED FUNDS AUTH 90% SPENT

		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
i. ER COSTS	PLANNED	71	44	67	300	400	500	550	600	600	600	700	753
	ACTUAL	71	46	105	371	530	580	422	525	669			
	VARIANCE	0	-2	-38	-71	-130	-80	128	75	-69			
	CUM PLANNED	71	115	182	482	882	1382	1932	2532	3132	3732	4432	5185
	CUM ACTUAL	71	117	222	593	1123	1702	2124	2649	3318			
	CUM VARIANCE	0	-2	-40	-111	-241	-320	-192	-117	-186			
j. DP COSTS	PLANNED	0	0	0	200	300	350	300	300	300	300	300	328
	ACTUAL	0	0	0	153	238	353	295	303	266			
	VARIANCE	0	0	0	47	62	-3	5	-3	34			
	CUM PLANNED	0	0	0	200	500	850	1150	1450	1750	2050	2350	2678
	CUM ACTUAL	0	0	0	153	391	744	1039	1342	1608			
	CUM VARIANCE	0	0	0	47	109	106	111	108	142			
k. TOTAL COSTS	PLANNED	71	44	67	500	700	850	850	900	900	900	1000	1081
	ACTUAL	71	46	105	524	768	933	717	828	935			
	VARIANCE	0	-2	-38	-24	-68	-83	133	72	-35			
	CUM PLANNED	71	115	182	682	1382	2232	3082	3982	4882	5782	6782	7863
	CUM ACTUAL	71	117	222	746	1514	2447	3163	3991	4927			
	CUM VARIANCE	0	-2	-40	-64	-132	-215	-81	-9	-45			

9. MILESTONES



* BUDGETS COVER CURRENT CRADA EFFORTS THROUGH JANUARY 15, 1995.

LEGEND: SCHEDULED △ COMPLETED ▲ DEVIATION □ TIMELINE ——— PROGRESS ━━━ PROPOSED DEVIATION - - - - - - APPROVED DEVIATION — — — —

10. NAME OF PARTICIPANT'S PROJECT MANAGER

R LEE CHEATHAM

PROJECT SUMMARY REPORT

1. IDENTIFICATION (CONTRACT NO.)	2. TITLE	3. REPORTING PERIOD
21286	COMPUTER-AIDED FABRIC EVALUATION (CAFE)	3RD QUARTER FY 1994

4a. PARTICIPANT NAME AND ADDRESS	4b. CLIENT NAME AND ADDRESS	5. START DATE / 6. COMPLETION DATE
AMTEX LABORATORY PROGRAM OFFICE PACIFIC NORTHWEST LABORATORY RICHLAND, WASHINGTON 99352	U.S. DEPARTMENT OF ENERGY WASHINGTON, DC 20585	5. START DATE: OCTOBER 1993 6. COMPLETION DATE: SEPTEMBER 1994

7. PROJECT YEAR: FY 1994

8. COST STATUS

a. $ EXPRESSED IN: THOUSANDS

b. BUDGET & REPORTING NO./SUB. ACCT NO.: KU-01-00-000; GB-01-06-010

c. FIN. NO.:

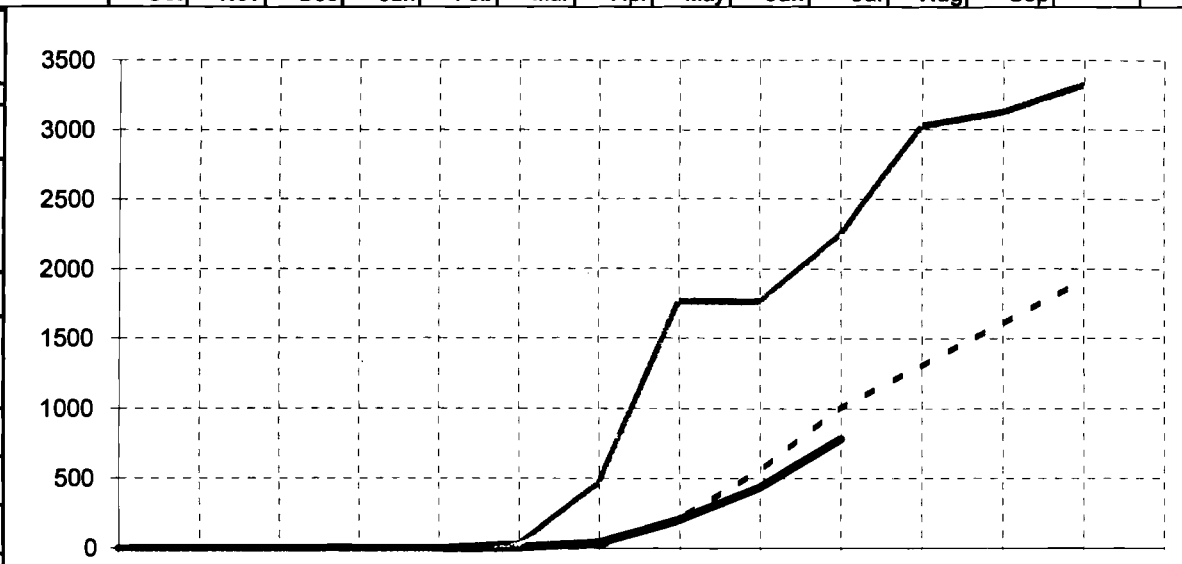
d. ACTUAL COSTS PRIOR YEARS: $0

e. ER BUDGET *: $2,450

f. DP BUDGET *: $1,250

g. ER FUNDS AUTH: $1,575

h. DP FUNDS AUTH: $674



LEGEND: PLANNED ACTUAL PROJECTED FUNDS AUTH 90% SPENT

		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
i. ER COSTS	PLANNED	0	0	0	0	7	6	100	150	200	190	190	190
	ACTUAL	0	0	0	0	7	6	88	175	233			
	VARIANCE	0	0	0	0	0	0	12	-25	-33			
	CUM PLANNED	0	0	0	0	7	13	113	263	463	653	843	1033
	CUM ACTUAL	0	0	0	0	7	13	101	276	509			
	CUM VARIANCE	0	0	0	0	0	0	12	-13	-46			
j. DP COSTS	PLANNED	0	0	0	0	0	0	100	200	250	110	110	110
	ACTUAL	0	0	0	0	0	27	75	60	113			
	VARIANCE	0	0	0	0	0	-27	25	140	137			
	CUM PLANNED	0	0	0	0	0	0	100	300	550	660	770	880
	CUM ACTUAL	0	0	0	0	0	27	102	162	275			
	CUM VARIANCE	0	0	0	0	0	-27	-2	138	275			
k. TOTAL COSTS	PLANNED	0	0	0	0	7	6	200	350	450	300	300	300
	ACTUAL	0	0	0	0	7	33	163	235	346			
	VARIANCE	0	0	0	0	0	-27	37	115	104			
	CUM PLANNED	0	0	0	0	7	13	213	563	1013	1313	1613	1913
	CUM ACTUAL	0	0	0	0	7	40	203	438	784			
	CUM VARIANCE	0	0	0	0	0	-27	10	125	229			

9. MILESTONES

MILESTONES	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
CAFE Economic Model, Final Report												△
CAFE Systems Architecture Document, Final Report												△
Functional Description & Requirements Document, Prelim. Rpt.											△	
Machine Descriptor for On-Line System, Final Report												△
Costs/Benefits Analysis of Defects vs. Sensor Suite vs. Defect Set Coverage for On-Line Subsystem, Prelim. Rpt.												△
On-Line Greige Inspection Defect Analysis with Partitioned Set, Final Report											△	
Preliminary Report on Color Printed Pattern Goods Defect List and Definitions									▲			
System Design Concept Document												△

* BUDGETS COVER CURRENT CRADA EFFORTS THROUGH APRIL 15, 1995.

LEGEND: SCHEDULED △ TIMELINE PROPOSED DEVIATION

COMPLETED ▲ DEVIATION □ PROGRESS APPROVED DEVIATION

10. NAME OF PARTICIPANT'S PROJECT MANAGER

GLENN ALLGOOD (ORNL)

PROJECT SUMMARY REPORT

1. IDENTIFICATION (CONTRACT NO.)	2. TITLE	3. REPORTING PERIOD
21286	TEXTILE RESOURCE CONSERVATION (TReC)	3RD QUARTER FY 1994

4a. PARTICIPANT NAME AND ADDRESS	4b. CLIENT NAME AND ADDRESS	5. START DATE
AMTEX LABORATORY PROGRAM OFFICE PACIFIC NORTHWEST LABORATORY RICHLAND, WASHINGTON 99352	U.S. DEPARTMENT OF ENERGY WASHINGTON, DC 20585	OCTOBER 1993 6. COMPLETION DATE SEPTEMBER 1994

7. PROJECT YEAR: FY 1994

8. COST STATUS

a. $ EXPRESSED IN THOUSANDS

b. BUDGET & REPORTING NO./SUB. ACCT NO.: KU-01-00-000 / GB-01-06-010

c. FIN. NO.

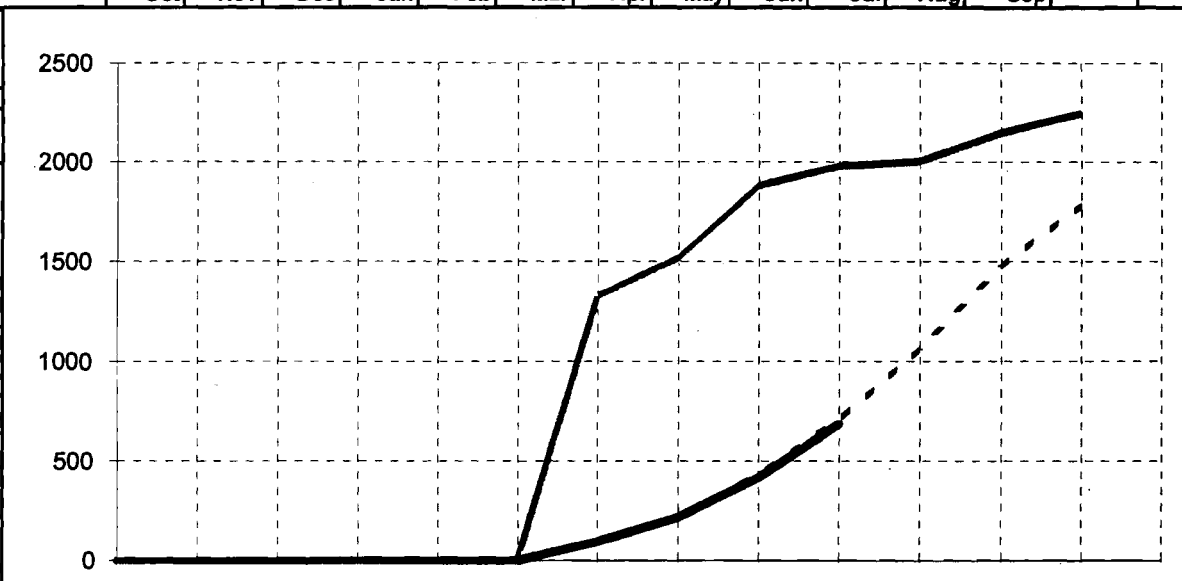
d. ACTUAL COSTS PRIOR YEARS: $0

e. ER BUDGET *: $2,675

f. DP BUDGET *: $575

g. ER FUNDS AUTH: $1,658

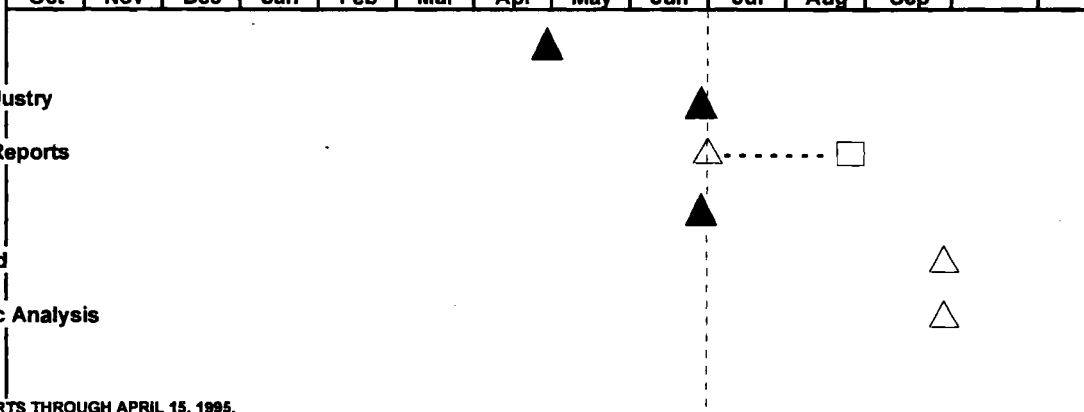
h. DP FUNDS AUTH: $320



LEGEND: PLANNED ACTUAL PROJECTED FUNDS AUTH 90% SPENT

		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
i. ER COSTS	PLANNED	0	0	0	0	0	100	120	170	200	250	350	200
	ACTUAL	0	0	0	0	0	97	120	198	247			
	VARIANCE	0	0	0	0	0	3	0	-28	-47			
	CUM PLANNED	0	0	0	0	0	100	220	390	590	840	1190	1390
	CUM ACTUAL	0	0	0	0	0	97	217	415	662			
	CUM VARIANCE	0	0	0	0	0	3	3	-25	-72			
j. DP COSTS	PLANNED	0	0	0	0	0	0	0	40	80	100	70	100
	ACTUAL	0	0	0	0	0	0	0	0	24			
	VARIANCE	0	0	0	0	0	0	0	40	56			
	CUM PLANNED	0	0	0	0	0	0	0	40	120	220	290	390
	CUM ACTUAL	0	0	0	0	0	0	0	0	24			
	CUM VARIANCE	0	0	0	0	0	0	0	40	96			
k. TOTAL COSTS	PLANNED	0	0	0	0	0	100	120	210	280	350	420	300
	ACTUAL	0	0	0	0	0	97	120	198	271			
	VARIANCE	0	0	0	0	0	3	0	12	9			
	CUM PLANNED	0	0	0	0	0	100	220	430	710	1060	1480	1780
	CUM ACTUAL	0	0	0	0	0	97	217	415	686			
	CUM VARIANCE	0	0	0	0	0	3	3	15	24			

9. MILESTONES



* BUDGETS COVER CURRENT CRADA EFFORTS THROUGH APRIL 15, 1995.

LEGEND: SCHEDULED △ COMPLETED ▲ DEVIATION □ TIMELINE ——— PROGRESS ——— PROPOSED DEVIATION - - - - - - APPROVED DEVIATION — — —

10. NAME OF PARTICIPANT'S PROJECT MANAGER

PAUL S FARBER (ANL)

PROJECT SUMMARY REPORT

1. IDENTIFICATION (CONTRACT NO.)	2. TITLE	3. REPORTING PERIOD
21286	ELECTRONIC EMBEDDED FINGERPRINT (EEF)	3RD QUARTER FY 1994

4a. PARTICIPANT NAME AND ADDRESS	4b. CLIENT NAME AND ADDRESS	5. START DATE / 6. COMPLETION DATE
AMTEX LABORATORY PROGRAM OFFICE PACIFIC NORTHWEST LABORATORY RICHLAND, WASHINGTON 99352	U.S. DEPARTMENT OF ENERGY WASHINGTON, DC 20585	5. START DATE: OCTOBER 1993 6. COMPLETION DATE: SEPTEMBER 1994

7. PROJECT YEAR: FY 1994

8. COST STATUS

a. $ EXPRESSED IN: THOUSANDS

b. BUDGET & REPORTING NO./SUB. ACCT NO.: KU-01-00-000 / GB-01-06-010

c. FIN. NO.:

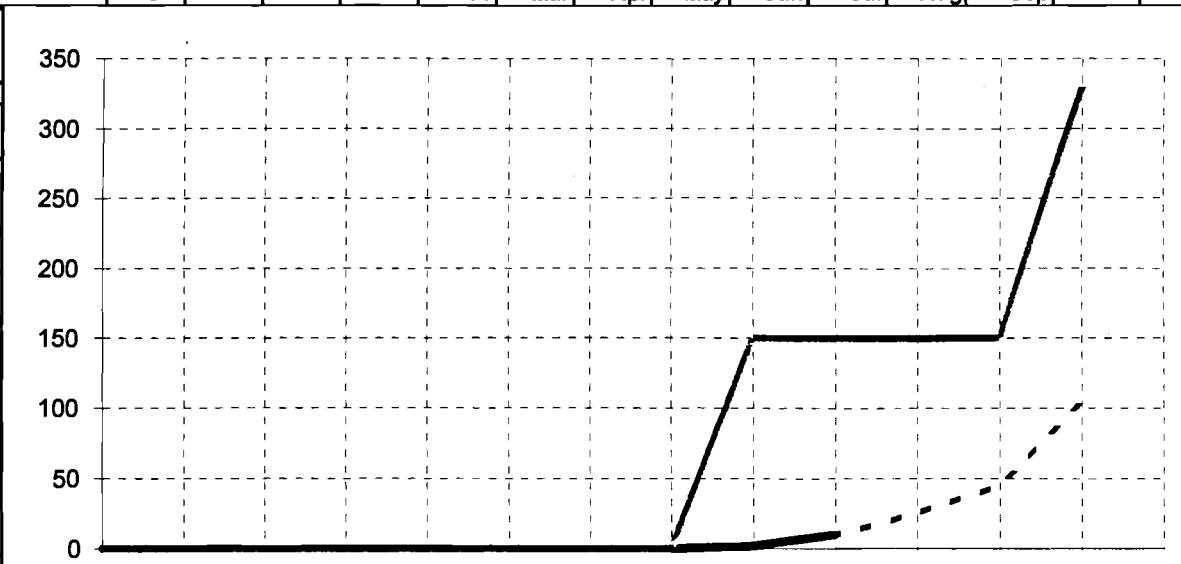
d. ACTUAL COSTS PRIOR YEARS: $0

e. ER BUDGET *: $150

f. DP BUDGET *: $250

g. ER FUNDS AUTH: $150

h. DP FUNDS AUTH: $0



LEGEND: PLANNED ▬ ▬ ACTUAL ▬▬ PROJECTED - - - - - - - FUNDS AUTH ▬▬ 90% SPENT ▷

		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
i. ER COSTS	PLANNED	0	0	0	0	0	0	0	2	8	15	20	20
	ACTUAL	0	0	0	0	0	0	0	2	8			
	VARIANCE	0	0	0	0	0	0	0	0	0			
	CUM PLANNED	0	0	0	0	0	0	0	2	10	25	45	65
	CUM ACTUAL	0	0	0	0	0	0	0	2	10			
	CUM VARIANCE	0	0	0	0	0	0	0	0	0			
j. DP COSTS	PLANNED	0	0	0	0	0	0	0	0	0	0	0	40
	ACTUAL	0	0	0	0	0	0	0	0	0			
	VARIANCE	0	0	0	0	0	0	0	0	0			
	CUM PLANNED	0	0	0	0	0	0	0	0	0	0	0	40
	CUM ACTUAL	0	0	0	0	0	0	0	0	0			
	CUM VARIANCE	0	0	0	0	0	0	0	0	0			
k. TOTAL COSTS	PLANNED	0	0	0	0	0	0	0	2	8	15	20	60
	ACTUAL	0	0	0	0	0	0	0	2	8			
	VARIANCE	0	0	0	0	0	0	0	0	0			
	CUM PLANNED	0	0	0	0	0	0	0	2	10	25	45	105
	CUM ACTUAL	0	0	0	0	0	0	0	2	10			
	CUM VARIANCE	0	0	0	0	0	0	0	0	0			

9. MILESTONES

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Bobbin Show Demo												△

NOTE: BUDGETS COVER CURRENT CRADA EFFORTS THROUGH JANUARY 15, 1995.

LEGEND: SCHEDULED △ TIMELINE ——— PROPOSED DEVIATION - - - - - - - - - - -

COMPLETED ▲ DEVIATION □ PROGRESS ▬▬ APPROVED DEVIATION ▬ ▬ ▬ ▬

10. NAME OF PARTICIPANT'S PROJECT MANAGER

MIKE RILEY (LLNL)

PROJECT SUMMARY REPORT

1. IDENTIFICATION (CONTRACT NO.)	2. TITLE	3. REPORTING PERIOD
21286	RAPID CUTTING	3RD QUARTER FY 1994

4a. PARTICIPANT NAME AND ADDRESS	4b. CLIENT NAME AND ADDRESS	5. START DATE
AMTEX LABORATORY PROGRAM OFFICE PACIFIC NORTHWEST LABORATORY RICHLAND, WASHINGTON 99352	U.S. DEPARTMENT OF ENERGY WASHINGTON, DC 20585	OCTOBER 1993 6. COMPLETION DATE SEPTEMBER 1994

7. PROJECT YEAR: FY 1994

8. COST STATUS

a. $ EXPRESSED IN: THOUSANDS

b. BUDGET & REPORTING NO./SUB. ACCT NO.: KU-01-00-000 / GB-01-06-010

c. FIN. NO.:

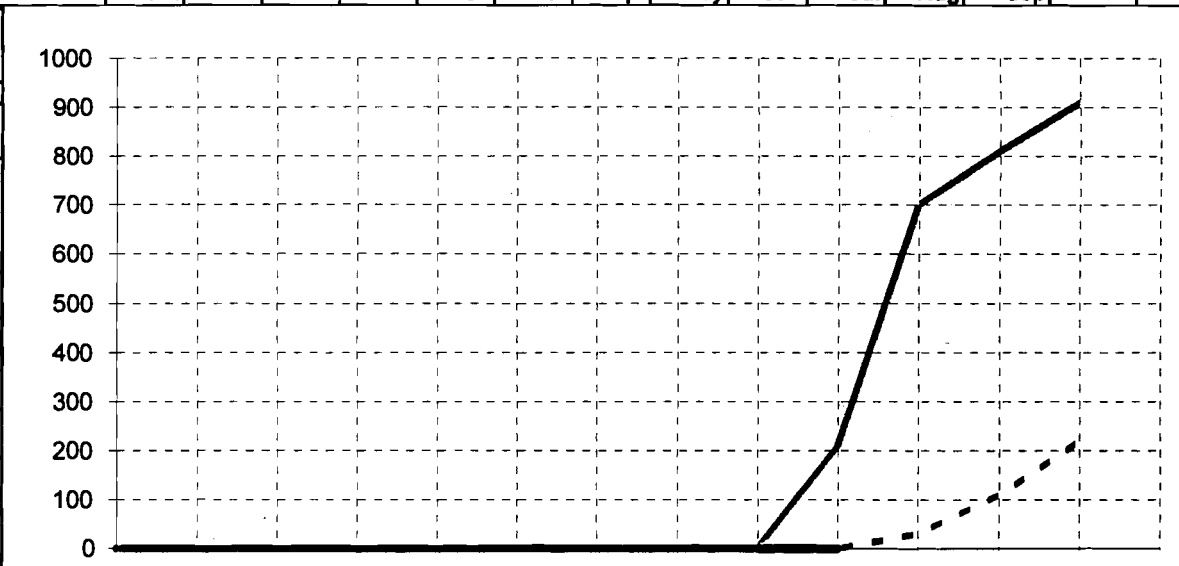
d. ACTUAL COSTS PRIOR YEARS: $0

e. ER BUDGET *: $650

f. DP BUDGET *: $350

g. ER FUNDS AUTH: $130

h. DP FUNDS AUTH: $80



LEGEND: PLANNED ACTUAL PROJECTED FUNDS AUTH 90% SPENT

		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
i. ER COSTS	PLANNED	0	0	0	0	0	0	0	0	0	20	60	80
	ACTUAL	0	0	0	0	0	0	0	0	0			
	VARIANCE	0	0	0	0	0	0	0	0	0			
	CUM PLANNED	0	0	0	0	0	0	0	0	0	20	80	160
	CUM ACTUAL	0	0	0	0	0	0	0	0	0			
	CUM VARIANCE	0	0	0	0	0	0	0	0	0			
j. DP COSTS	PLANNED	0	0	0	0	0	0	0	0	0	10	20	30
	ACTUAL	0	0	0	0	0	0	0	0	0			
	VARIANCE	0	0	0	0	0	0	0	0	0			
	CUM PLANNED	0	0	0	0	0	0	0	0	0	10	30	60
	CUM ACTUAL	0	0	0	0	0	0	0	0	0			
	CUM VARIANCE	0	0	0	0	0	0	0	0	0			
k. TOTAL COSTS	PLANNED	0	0	0	0	0	0	0	0	0	30	80	110
	ACTUAL	0	0	0	0	0	0	0	0	0			
	VARIANCE	0	0	0	0	0	0	0	0	0			
	CUM PLANNED	0	0	0	0	0	0	0	0	0	30	110	220
	CUM ACTUAL	0	0	0	0	0	0	0	0	0			
	CUM VARIANCE	0	0	0	0	0	0	0	0	0			

9. MILESTONES

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Lab/Industry Partnering Meeting											△	
Fabricate Initial Mechanical Blades for Bobbin Show												△
Perform Initial Photonics Cuts												△

NOTE: BUDGETS COVER CURRENT CRADA EFFORTS THROUGH JANUARY 15, 1995.

LEGEND: SCHEDULED △ TIMELINE PROPOSED DEVIATION

COMPLETED ▲ DEVIATION □ PROGRESS APPROVED DEVIATION

10. NAME OF PARTICIPANT'S PROJECT MANAGER

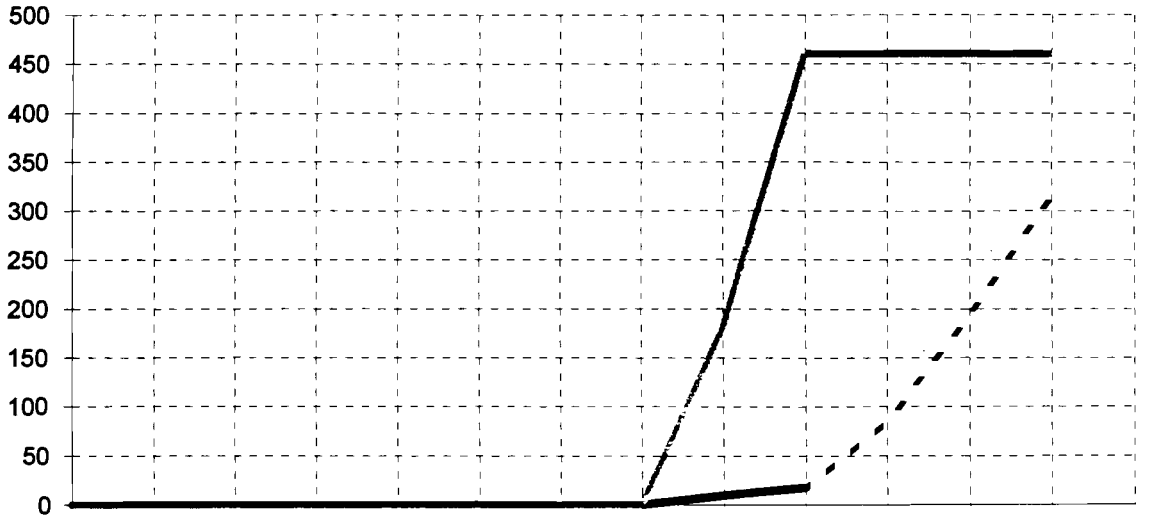
CRAIG FONG (LBL)

PROJECT SUMMARY REPORT

1. IDENTIFICATION (CONTRACT NO.)	2. TITLE	3. REPORTING PERIOD
21286	SENSORS FOR AGILE MANUFACTURING	3RD QUARTER FY 1994

4a. PARTICIPANT NAME AND ADDRESS	4b. CLIENT NAME AND ADDRESS	5. START DATE / 6. COMPLETION DATE
AMTEX LABORATORY PROGRAM OFFICE PACIFIC NORTHWEST LABORATORY RICHLAND, WASHINGTON 99352	U.S. DEPARTMENT OF ENERGY WASHINGTON, DC 20585	5. START DATE: OCTOBER 1993 6. COMPLETION DATE: SEPTEMBER 1994

7. PROJECT YEAR	8. COST STATUS	a. $ EXPRESSED IN	b. BUDGET & REPORTING NO./SUB. ACCT NO.	c. FIN. NO.	d. ACTUAL COSTS PRIOR YEARS	e. ER BUDGET *	f. DP BUDGET *	g. ER FUNDS AUTH	h. DP FUNDS AUTH
FY 1994		THOUSANDS	KU-01-00-000 GB-01-06-010		$0	$280	$220	$280	$180



LEGEND: PLANNED ▬ ▬ ACTUAL ▬▬ PROJECTED - - - - - - - FUNDS AUTH ▬▬ 90% SPENT ▷

		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
i. ER COSTS	PLANNED	0	0	0	0	0	0	0	10	8	40	70	75
	ACTUAL	0	0	0	0	0	0	0	10	8			
	VARIANCE	0	0	0	0	0	0	0	0	0			
	CUM PLANNED	0	0	0	0	0	0	0	10	18	58	128	203
	CUM ACTUAL	0	0	0	0	0	0	0	10	18			
	CUM VARIANCE	0	0	0	0	0	0	0	0	0			
j. DP COSTS	PLANNED	0	0	0	0	0	0	0	0	0	26	40	46
	ACTUAL	0	0	0	0	0	0	0	0	0			
	VARIANCE	0	0	0	0	0	0	0	0	0			
	CUM PLANNED	0	0	0	0	0	0	0	0	0	26	66	112
	CUM ACTUAL	0	0	0	0	0	0	0	0	0			
	CUM VARIANCE	0	0	0	0	0	0	0	0	0			
k. TOTAL COSTS	PLANNED	0	0	0	0	0	0	0	10	8	66	110	121
	ACTUAL	0	0	0	0	0	0	0	10	8			
	VARIANCE	0	0	0	0	0	0	0	0	0			
	CUM PLANNED	0	0	0	0	0	0	0	10	18	84	194	315
	CUM ACTUAL	0	0	0	0	0	0	0	10	18			
	CUM VARIANCE	0	0	0	0	0	0	0	0	0			

9. MILESTONES

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Lab/Industry Kick-off Meeting											△	
Participate in Bobbin Show												△

NOTE: BUDGETS COVER CURRENT CRADA EFFORTS THROUGH JANUARY 15, 1995.

LEGEND: SCHEDULED △ TIMELINE ——— PROPOSED DEVIATION - - - - - - - - - - -
COMPLETED ▲ DEVIATION □ PROGRESS ▬▬ APPROVED DEVIATION ▬ ▬ ▬ ▬

10. NAME OF PARTICIPANT'S PROJECT MANAGER

KEVIN WIDENER (PNL)

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