

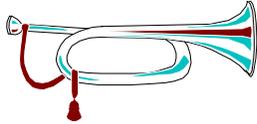


# AMC COST BUSTER\$ BUGLE



Vol. 13

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## ARL Hammers Costs

The Army Research Laboratory (ARL), the Army's primary in-house laboratory, has the mission to execute fundamental and applied research to provide the Army key technologies and analytical support necessary to assure supremacy in future land warfare. ARL is committed to identifying and providing tomorrow's Army solutions to many of today's inefficiencies and ineffective processes. Our diverse assortment of state-of-the-art facilities and our workforce of over 1,400 scientists and engineers make up the largest source of integrated science and technology services in the Army. ARL is positioned to significantly impact and improve the effectiveness of the future Army by:

- Providing weapons systems technology for the future combat system (FCS).
- Providing lighter, faster, more fuel efficient mobile platforms to enhance deployability and reduce logistics support.
- Providing Commanders unprecedented real-time situation awareness of the battlefield.
- Improving significantly the war fighter's ability to absorb information and make decisions.
- Providing technologies to protect and defend against information warfare.



In looking toward the 21<sup>st</sup> century, ARL scientists and engineers are pioneering research in such areas as information distribution and management technologies, human cognitive and sensory capabilities, simulation and virtual environments, nanoscale electro/optoelectronic devices, teleoperations, composites and ceramics, ultra-wideband radar, and lightweight rechargeable power sources.

To better capture efficiencies in all sectors of the R&D community for the Army's benefit, ARL is extending the concept of the open laboratory to combine the best of both government and private sectors and to achieve excellence through interdependency as well as intellectual collaboration. Through an aggressive leveraging and partnership program, ARL makes its unique facilities available to a variety of external organizations among DOD and other government agencies, as well as universities and industry. These cooperative mechanisms will be increasingly important in the coming years, as ARL strives to employ its personnel and technical resources in the most efficient and effective manner to support the American soldier of the 21<sup>st</sup> century.

Two initiatives resulted in ARL receipt of the coveted Hammer Award in a presentation hosted by General Johnnie E. Wilson, AMC Commanding General, on 1 July 1998. The Hammer Award recognizes significant contributions in support of these principles of reinventing government:

- putting customers first,
- cutting red tape,
- empowering employees, and
- getting back to basics.

The Award is given by the Vice President through the National Partnership for Reinventing Government (formerly the National Performance Review). Fittingly, the award consists of a \$6.00 hammer, a ribbon, and a note from Vice President Gore, all in an aluminum frame. More than 1000 Hammer Awards have been presented to teams comprised of federal, state, and local employees and citizens who are working to build "A government that works better, costs less, and delivers results for the American people." Team members also receive certificates and hammer lapel pins.

ARL won the award for the Federated Laboratory (FedLab), a unique and innovative method of partnering with the private sector. It was conceived and implemented in response to assignment to ARL, by the Chief of Staff of the Army, of a new mission area -- developing the technology underpinnings for the digitized battlefield. While ARL had some expertise in this area, it clearly did not have a critical mass of people or facilities. Moreover, the private sector had a very strong commercial interest in these technologies, and had the capabilities necessary to carry this work forward. Contracting out all the work to industry would cause ARL to rapidly lose its technical competence in this area. It would not be able to play the "smart buyer" role for the Army user. The underlying principle of FedLab is that, by the use of Cooperative Agreements, ARL could do as much work as appropriate in house, while leading an integrated program in which ARL

researchers worked side-by-side as true partners with industry and academia. Programs are jointly planned, executed, assessed, and reported on. This close working relationship between ARL and over 30 industrial and academic organizations has allowed the Army to heavily leverage the private sector's capabilities while at the same time increasing the Army's level of expertise. FedLab is halfway through the original 5-year program and is generally felt to be a win-win situation for all concerned. It is a model for how future federal research will be conducted in an increasingly "do more with less" climate.

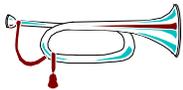
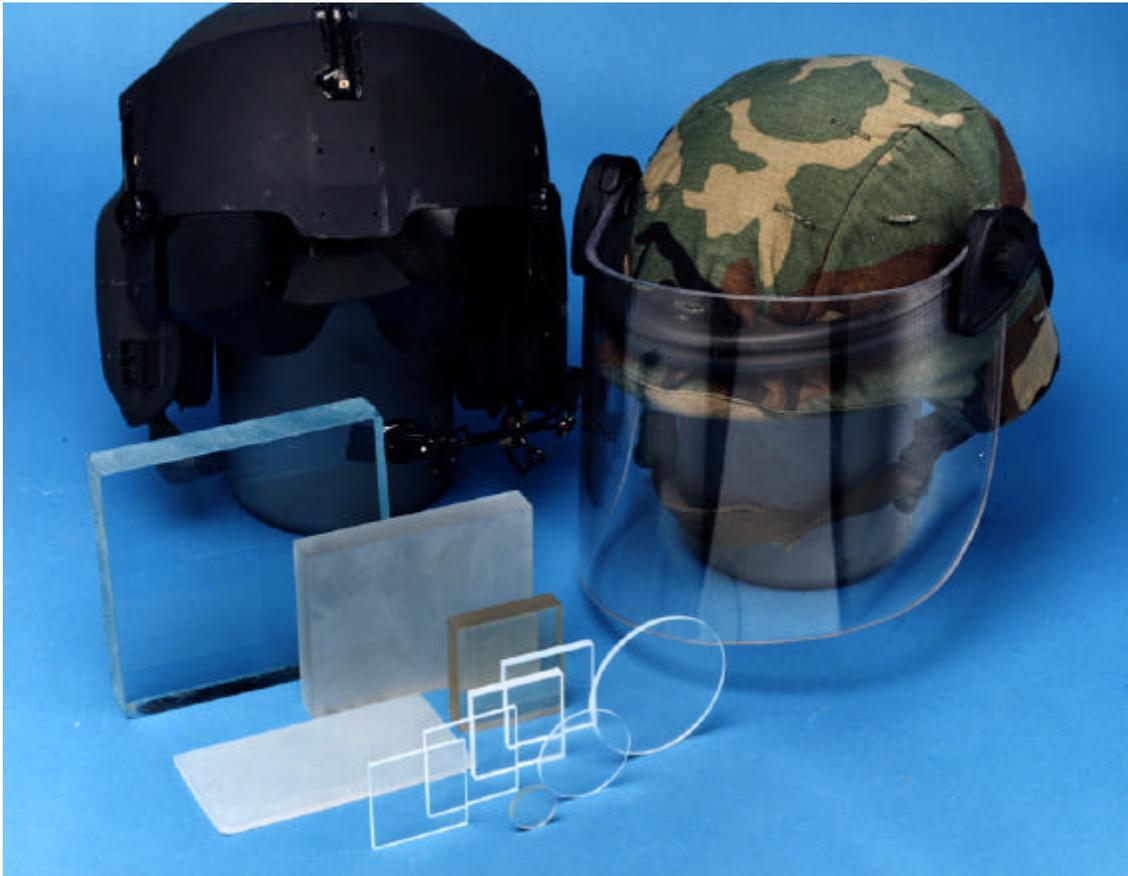
ARL also won "the Hammer" for the Turbine Engine Diagnostics (TED), which combines artificial intelligence and computer science with tank engine diagnostic and repair procedures into a user-friendly, expert diagnostic system for tank mechanics. TED was developed in response to the need for a lightweight, visual expert system for diagnosing and repairing the Abrams engine. Several cost reduction measures and increased readiness issues could not be implemented unless an expert system could be developed. TED empowers mechanics to tailor the software based upon their need for information or level of experience (expert, novice, or apprentice). Mechanics can efficiently diagnose engine faults, perform repairs, order parts, validate serviceability, and maintain necessary maintenance records. The TED team successfully transferred the technology from the laboratory to the field in large part due to its unique team approach. The TED process is now being taught at the Defense Systems Management College as part of the Advanced Program Management Course and is being considered for application to several other Army systems including the Bradley Fighting Vehicle. While the time and cost saving associated with TED are one measure of its success, its true measure can be found in its acceptance by the Army's tank mechanics. (During one exercise, a tank mechanic fondly called TED "my buddy".) The U.S. Army Ordnance Center & School (USAOC&S) estimate is that TED will save the Army between \$8M to \$12M annually in maintenance cost avoidance. It was for this warm relationship and service to our customer that the USAOC&S nominated ARL for this award.



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Visit ARL's website at  
<http://www.arl.mil>.

**Look for AMC CO\$T BU\$TER\$ on the World Wide Web at  
<http://amc.army.mil/amc/rm/costbust.html>.**

**\*\*\*SUCCESS STORIES\*\*\*****Transparent  
Armor!**

As reported in the May 26, 1998 publication of New Technology Week, researchers at the ARL Weapons and Material Directorate at Aberdeen Proving Ground, Maryland are studying the use of new materials to create thinner, lighter, transparent armor. Transparent armor offers less optic distortion resulting in better vision for those being protected. Current transparent armor technology uses plies of soda lime glass and plastic (polycarbonate) to build ballistic tolerance. ARL researchers are studying ballistically harder, single crystal and

polycrystalline materials such as ALON, an aluminum oxynitride, and magnesium aluminate spinel. Engineers are focused on creating large pieces that can be fashioned into specific uses, which in the past has been costly and difficult. Engineers are looking at less expensive materials with varying degrees of ballistic hardness such as glass, ceramics, recrystallized glass, and high hardness glass such as fused silica. Possible applications for the materials include vision blocks for tanks, windshields and windows, blast shields, canopies, randomes, face shields, and goggles.

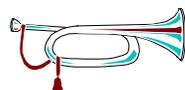
POC: Dr. James McCauley  
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## Lighter Container

In FY97, ARL developed and evaluated a new 120mm-mortar round container design that will be lighter in weight, more water resistant, and less complicated to build and use than the existing container. The new design reduces the number of persons needed to transport two mortar rounds (from 2 soldiers to 1), establishes a superior moisture seal barrier that will significantly reduce corrosion problems, and should cost no more than the existing container. In this past year, test articles and test containers were fabricated, and recommendations on future container designs were documented. The preliminary test results have prompted the Program Manager for Mortars to initiate a procurement of more than 200 mortar round containers for further evaluation, and the possibility of establishing a production program for the new containers, with the ARL design as a baseline or template, is under review.

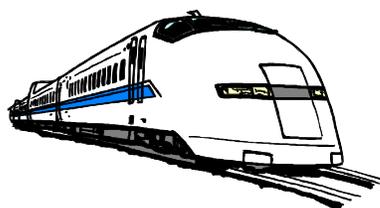
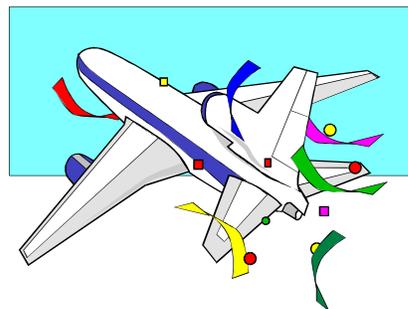
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## Automated Travel Order System

ARL has developed and is deploying a Lotus Notes based Travel system to automate, standardize and increase the efficiency of the travel practices throughout the laboratory. The system will reduce already limited administrative staff, time and resources in routing, approving, and documenting travel order requests. The system accommodates all travel orders except blanket and OCONUS travel orders. The automated system, entitled "Travel," is a web-enabled front-end system accessible to all ARL employees. Each travel order may be initiated by the customer, sent through a designated approver, and subsequently electronically transmitted through all necessary administrative approval functions such as budget and transportation. Travel has electronic connections to the DA standard system SOMARDS for funding commitment purposes.

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## Abrams APU a Hit in Bosnia

ARL in Adelphi, Maryland and the project manager for the M1A1 tank have developed an auxiliary power unit (APU). Previously, soldiers had to run the tank's main engine when they needed to be in a "quiet watch" situation. If they operated their equipment with the main engine off, the batteries quickly ran down. That was expensive. The APU greatly reduced fuel consumption and wear and tear on the engine. Recent reports from Bosnia have highly praised the APU and according to an independent cost analysis, it's saving the Army an estimated \$30K per tank per year. With 1,500 APU's installed, the annual savings is \$45M.

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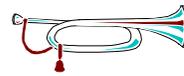
## CROP Expedites PLS Unloading

ARL's Human Research and Engineering Directorate presented several Container Roll In-Roll Out Platform (CROP) progress briefings to representatives from DA and the Combined Armed Support Command during the winter AUSA conference at Orlando in February. CROP allows the Palletized Loading System (PLS) vehicle and driver to remove loaded flatracks (16.5 tons) of

supplies from 20' containers without material handling equipment in approximately 3 minutes. This effort will provide depots and soldiers the capability of exceeding delivery mission requirements, reducing shipping costs and enhancing the total distribution system for supplies and equipment.

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## Automated Small Purchasing System



ARL has developed and is deploying a Lotus Notes based small purchasing system to standardize and increase efficiency throughout the laboratory. The system will reduce already limited administrative staff, time and resources in routing and documenting small purchases. It accommodates purchases up to and including \$100K, including bankcard purchases. The automated system, entitled "Buy It," is a front end system accessible to all ARL employees. The purchase is initiated by the customer, sent through a designated approver, and subsequently electronically transmitted through all the necessary administrative approval functions such as budget, contracting, logistics, receiving and warehouse. Additionally, it has electronic connections to any necessary special organizational approvals such as ADP authorization, HAZMIN/HAZMAT, Risk Management, Department of Public Works, External Affairs, Training, etc. Buy It has electronic connections to DA standard systems such as SOMARDS for commitment purposes and SAAACONS for validation and award.

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