

FLC NewsLink

Federal Laboratory Consortium for Technology Transfer
The Only Government-wide Forum for Technology Transfer

T² Events

American Society of Mechanical Engineers
Nov. 17-22, 2002
New Orleans, La.

American Nuclear Society
2002 Winter Meeting
Nov. 17-21, 2002
Washington, D.C.

Partners in Environmental Technology Technical Symposium & Workshop
Dec. 3-5, 2002
Washington, D.C.

National Design Engineering Show
March 3-6, 2003
Chicago, Ill.

FLC National Meeting
May 5-9, 2003
Tucson, Ariz.

BIO 2003 Annual Convention
Washington, D.C.
June 22-25, 2003

Go to:
<www.federallabs.org>
for a complete calendar of events

T² Fact

The first proven-to-work calculating machine was invented by Frenchman Blaise Pascal in 1642. The 21-year-old designed the first number-cruncher to assist his father, a tax collector.

Today, the transfer of Pascal's technology seems, well... incalculable.

- [Calculating Machine Home Page](#)

Inside

2 Fed Labs Flash

2 Lab Work

3 Tech Watch

5 FLC File

5 Regional Roundup

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www.federallabs.org

World's Best Shine in Pittsburgh

On September 26, the inaugural World's Best Technologies Showcase (WBT02) brought to the forefront tomorrow's technologies and the people behind them.

The FLC and the National Association of Seed and Investor Funds (NASVF) invited seed investors and corporate licensing partners to explore outstanding networking, software, biotech, nanotech, energy, and material science technologies, all prescreened by leading technology investors from Intel Capital, Arch



MeshNetworks' Terrell Brown accepts his WBT02 first place award from FLC Chair Ann Rydalch in Pittsburgh, Pa., Sept. 26, 2002.

Ventures, Battelle New Ventures, Draper Triangle, InterSouth, and

Emergent Technologies. WBT02 showcased and presented awards to the most promising technologies developed at federal labs, leading universities, and rising high-tech companies.

Attendees judged the submissions based on breakthrough or platform potential, their proprietary position, the size of the market opportunity, and the value proposition to strategic partners or investors.

Thomas Harlan, principal of Emergent Technologies of Austin, Texas, said of WBT02, "I'm delighted you guys are here putting on this event. You are a

See WBT02, page 4

Congress Debates R&D Funding for Homeland and Security

by Dave Appler

On the topic of homeland security and defense, considerable dialogue, documentation, and thought have surrounded the role of R&D. In addition, much legislation has been drafted. What does this flurry of activity really mean in Washington? A good foundation has been laid, and many people inside and outside the government are working on technology to meet the need.

Everyone is waiting for the final legislation that will create a Department of Homeland Security, as well as the various appropriation bills that will fund it. Let me summarize what has been done in the technology arena.

DC Dispatch

Government R&D spending Down, CRADA Opportunities Up

by Dave Appler
FLC Washington, DC Representative

In most years, this would be a perfect time to discuss the results of congressional efforts on the R&D portions of authorization and



Dave Appler

appropriation bills for various federal agencies. However, not much has been passed in final form. I guess one could cite many reasons for the lack of congressional action, including the impact of 9/11 on the legislative calendar, the close partisan division in both the House and

See DC Dispatch, page 5

The National Research Council conducted a study and prepared an extensive report entitled *Making the Nation Safer: The Role of Science and Technology in Countering Terrorism*. This 300+ page report outlines much of the technology road map on this important subject. The report was presented to a joint congressional hearing in June, and the information communicated to the members was well-received. (A copy of the report can be obtained from the National Academy Press.)



FLC Washington, DC Representative Dave Appler discusses the role of federal T² during the Homeland Security Tech Expo in D.C., Sept. 18-19, 2002.

In July, President Bush issued a "National Strategy for Homeland Security."
See R&D Debate, page 4

Lab in the Limelight

Aiming High with Hi-tech Photonics

Materials! It's a word that has often summed up research at the U.S.

Department of Energy's Ames Laboratory. This reputation goes back to the 1940s, when Ames Laboratory purified over two million pounds of pure uranium metal for the Manhattan Project. Today the laboratory, located on the campus of Iowa State University (ISU),

specializes in newer materials, which include high-purity, high-tech magnetic and photonic materials.

"Ames, like other DOE laboratories, is moving toward new materials with emphasis at the molecular level," said Bruce Harmon, Deputy Director of the lab



Ames Laboratory, located on the Iowa State University campus, in Ames, Iowa

and Program Manager of the Condensed Matter Physics Group. Research in molecular biology is advancing at the same time as research in the nanoscience and technology of materials is receiving increased funding at DOE

See Lab in the Limelight, page 4

Fed Labs Flash

Technology Transfer Notes from Within the Federal Laboratory Community

Alice Hamilton NIOSH Award

The U.S. Centers for Disease Control and Prevention's (CDC) National Institute for Occupational Safety and Health (NIOSH)

presented the Alice Hamilton Award for 2002 to four NIOSH publications of superior scientific merit produced in 2001. The NIOSH winners were:

- *Ultrafine Beryllium Number Concentration as a Possible Metric for Chronic Beryllium Disease Risk*
- *Care and Maintenance of the SR-100 Self-Contained Self-Rescuer*
- *Association of Tumor Necrosis Factor - (alpha) and Interleukin-1 Gene Polymorphisms with Silicosis*
- *Distributions and Determinants of Pre-emergent Herbicide Exposures Among Custom Applicators*

More Info: 1-800-35-NIOSH,
<http://www.cdc.gov/niosh>



Alice Hamilton (1869-1970), pioneering physician of industrial toxicology

and will be funded entirely by USEC. Lab officials note, however, that the significance of the agreement extends beyond the funding.

"This represents a commitment to a proven technology that was developed by the Department of Energy over more than two decades," said Gil Gilliland, ORNL associate director for Energy and Engineering Sciences.

Winning Women of Color

Information Technology Management Analyst **Charlene Malloy** of NASA's Goddard Space Flight Center was the recipient of the Women of Color Government and Defense Technology "All Star" Award. She develops library information web sites, manages Goddard's database and web site and, as the library's computer security officer, ensures that library systems comply with agency and federal laws and regulations.



Charlene Malloy

The award recognizes the superior achievements and accomplishments of minority women leaders in the fields of math, science, technology, and engineering.

Held in Washington D.C., the second annual Women of Color Government and Defense Technology Awards Conference also identified exceptional women who are making outstanding contributions in their field.

NASA is the proud employer of 11 other minority women who were honored for their achievements in government and defense at the July conference.

Those women are **Debra Johnson, Eileen Saenz, Michelle Amos, Gena Baker, Barbara Brown, Hortense Blackwell Burt, Dawn Elliot, Yolanda Hicks, Robbie Hood, Stacie Smith, and Karen Hickman.**

More Info: Renee Juhans, 202-358-1712

Perlmutter Wins E.O. Lawrence in Physics Award

Saul Perlmutter, a member of Lawrence Berkeley National Laboratory's (LBNL) Physics Division and leader of the international Supernova Cosmology Project, has won the DOE's 2002 E. O. Lawrence Award in the physics category. Perlmutter is LBNL's 25th recipient of the prestigious award, which includes a gold medal and \$25,000.

Perlmutter will be cited at the awards ceremony in Washington, D.C., on October 28 "for his leading contributions to an unexpected discovery of extraordinary importance: the determination, through the careful study of distant supernovae, that the expansion of the universe is speeding up rather than slowing down." The announcement of the "accelerating universe" in 1998 was named scientific "breakthrough of the year" by the *Journal of Science*.

"We are all enriched by the contributions these researchers have made, ranging from

understanding the genetic code to measuring the expansion of the universe itself," said Secretary of Energy **Spencer Abraham**.

Said LBNL's Lab Director **Charles V. Shank**, "We are proud that the techniques for measuring cosmic expansion were developed and proven at Berkeley Lab under Saul's leadership of the Supernova Cosmology Project. His Lawrence Award recognizes the kind of imaginative basic research done here to address the most fundamental questions about nature, yielding knowledge whose benefits we may only begin to imagine."

More Info: Paul.Preuss@lbl.gov



Saul Perlmutter

ORNL & USEC Sign R&D Agreement

Oak Ridge National Laboratory (ORNL) and USEC Inc. have signed an agreement worth \$121 million to develop and demonstrate a highly efficient uranium enrichment technology that could greatly reduce the United States' dependence on foreign energy sources.

The Cooperative Research and Development Agreement with USEC, a supplier of enriched uranium fuel for commercial nuclear power plants, is the largest ever for ORNL. The agreement extends through 2007



USEC, a supplier of enriched uranium fuel for commercial

Lab Work

Federal Agencies, Universities, & Labs Collaborate at Fermi Lab

by Kurt Riesselmann

Scientists of the Booster Neutrino Experiment (BooNE) collaboration announced on September 9 that a new detector at the DOE's Fermi National Accelerator Laboratory has observed its first neutrino events. The BooNE scientists identified neutrinos that created ring-shaped flashes of light inside a 250,000-gallon detector filled with mineral oil.

The major goal of the MiniBooNE experiment, the first phase of the BooNE project, is either to confirm or refute startling experimental results reported by a group of scientists at Los Alamos National Laboratory (LANL). In 1995, the Liquid Scintillator Neutrino Detector collaboration at LANL stunned the particle physics community when it reported a few instances in which the antiparticle of a neutrino had presumably transformed

into a different type of antineutrino, a process called neutrino oscillation. "Today, there exist three very different independent experimental results that indicate neutrino oscillations," said **Janet**

"MiniBooNE is an example of a successful partnership among federal agencies, universities and national laboratories."

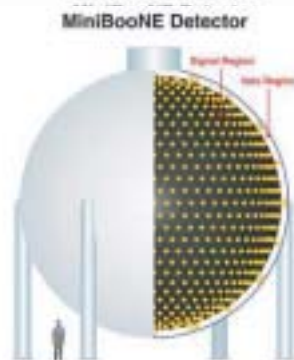
—**Marvin Goldberg, NSF program director**

Conrad, a physics professor at Columbia University and spokesperson of the BooNE collaboration. "Confirming the LANL result would suggest the existence of an additional kind of neutrino beyond the three known types. It would require physicists to rewrite a large part of the theoretical framework called the Standard Model."

Over the next two years, the BooNE collaboration will collect and analyze approximately one million particle events to study the quantum behavior of neutrinos. Neutrinos play an integral role in decay and fusion processes. The sun, for example, sends out an incredible amount of neutrinos, which are invisible to the naked eye. Although neutrinos are among the most abundant particles in the entire universe, little is known about the role of these ghostlike particles in nature.

"It is an exciting time for neutrino physics," said DOE's Office of Science Director **Raymond Orbach**. "In the past few years, experiments around the world have made extraordinary neutrino observations, shattering the long-standing view that neutrinos have no mass. The MiniBooNE experiment has the potential for advancing the revolution of our understanding of the building blocks of matter."

More Info: www.fnal.gov



This 250,00-gallon tank of mineral oil detects collisions between neutrinos and carbon nuclei.

NewsLink

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Tech Watch

Federal Laboratory Technologies Ready for Transfer

Biotechnology

Stopping the Spread

Carolyn Larabell, Paul

Alivisatos, and colleagues have discovered a powerful tool for studying cell motility and migration—behaviors that are responsible for metastases of primary cancers. The LBNL researchers compared the motions of cancerous and healthy human breast cells, as well as several other cell types, as they migrated across a layer of colloidal semiconductor nanocrystals. As they move, they engulf the quantum dots and leave



behind a phagokinetic track that yields information about the health of the cells. Migration of cells and their metastatic potential are well known to be correlated.

Colloidal quantum dots are robust and efficient light emitters that have been used for static biological labeling.

Larabell's lab has shown that these nanocrystals



A wide variety of mammalian cells engulf quantum dots when migrating. This migration is correlated to the cell's metastatic potential. After 24 hours, dark clearings in the nanocrystal layer are observed around motile tumor cells.

are spontaneously ingested by a wide variety of cells while remaining fully luminescent, enabling researchers to examine live cells over extended periods. The improved cell motility studies and rapid assaying of metastatic potential enabled by this quantum dot method will provide improved diagnostics and enhanced information for cancer drug development.

More Info: www.lbl.gov

Transportation

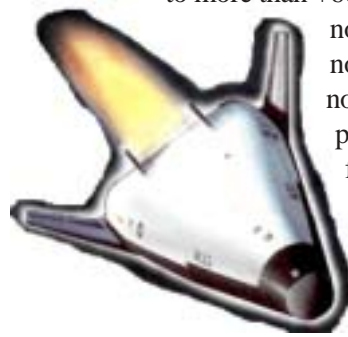
Creating a Safer, Lighter Spacecraft...and More

A NASA patented technology licensed to **Sordal Inc.** of Holland, Mich., is poised to send the next generation of space shuttles a long way.

Sordal Inc. CEO **Dale Danver** said his SOLREX® advanced lightweight composite material—a cutting-edge, fire-resistant, polyimide foam that can withstand extreme temperature—will reduce the cost of space flight.

Scheduled to launch its next generation of space shuttles by 2010, NASA's **Langley Research Center** researchers were in search of a material that could withstand extreme environments while at the same time could be molded to the specifications of the spacecraft. They found the solution with Solrex.

SOLREX® is a new generation polyimide foam. It has exceptional resistance to temperature changes, maintains property stability from -423°F to more than +600°F, and is



develop these new technologies as a method to reduce the cost of space flight.



Dale Danver, CEO of Sordal Inc., displays his award-winning composite technology during the World's Best Technology Showcase in Pittsburgh, Pa., on Sept. 26, 2002.

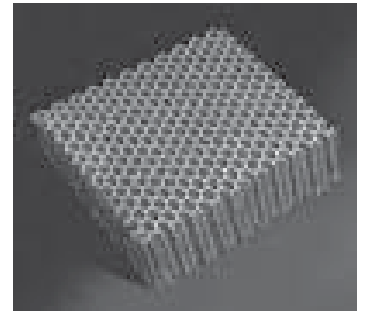
Space flight currently costs about \$10,000 per pound; the long-term goal (by 2050) is to reduce this to about \$10 per pound. Normal airline travel cost today is one dollar per pound. Both open and closed cell versions of these products can be made. Production will start shortly, and material is now available for testing and trials. Many commercial applications are available, including shipbuilding, aircraft, medical prosthetics, vibration damping pads, weight reduction, acoustical insulation, and thermal protection systems. The material

is now ready for commercialization and

is applicable for a number of uses, including

general thermal management, acoustic insulation, thermal protection systems, cryogenics, vibration damping pads, and weight reduction. Other commercial applications include electronic and electrical building materials, ovens, humidity chambers, and liquid gas storage and transport.

More Info: www.sordal.org, 616-994-6000



SOLREX® advanced composite material

Proven to Work

Innovative Technology Predicts and Avoids Petroleum Flooding

Petroleum refiners use advanced process tools to prevent the flooding of distillation columns at refineries. Typically, these controls are used in conjunction with multivariable predictive-control technologies that are either licensed through a vendor or developed inhouse. These conventional control strategies are column delta pressure; however, they allow damage and lost productivity because they are based on raw data.

A new control technology provides a more accurate estimation of distillation column flooding. The distillation column flooding predictor is a pattern-recognition system that identifies patterns of transient tower instabilities, which have been discovered to precede tray flooding. This nonintrusive technology processes signal data obtained from existing column instrumentation.



2ndpoint's Mark Senak (center) and George E. Dzyacky (left) discuss their petroleum flood predictor technology with FLC president Ann Rydalch during the World's Best Technology Showcase in Pittsburgh, Pa., on September 24, 2002.

Once the pattern is identified, it is modeled and coded into the plant's distributed control system. The control system is programmed to briefly

unload the tower each time the pattern appears by momentarily reducing temperature input to the tower.

2ndpoint, LLC is developing and acquiring public data for this new technology with the help of a grant funded by the Inventions and Innovative Program in the

DOE's Office of Industrial Technologies.

Tests conducted at the Separations Research Program, Center for Energy and Environmental Resources, the **University of Texas at Austin**, concluded that "the pattern recognition software works well with both packing and trays" and "it can be installed on nearly any process control computer, in addition to and working with any

other software packages already on the computer."

Although financial, environmental, and legal considerations make it unlikely that new refineries will be built in the United States, expansion at existing refineries will likely increase total U.S. refining capacity in the long run. These expansions could lead to the need for exactly the type of technology 2ndpoint has produced.

Within the refining industry, proprietary versions of the technology have been applied to fluid catalytic cracker (FCC) units, gas absorber columns, FCC main fractionators, stripper columns, and H₂S₂ scrubber columns.

This concept is potentially applicable in other areas of pattern-intensive diagnostics, such as cardiac telemetry units and blood glucose monitoring devices, and potentially anywhere the assessment of raw data is primarily dependent on interpretation of datasets or patterns.

More Info: [Lisa Barnett, lisa.barnett@ee.doe.gov](mailto:lisa.barnett@ee.doe.gov)



Predictor inventor George Dzyacky (right) and 2ndpoint representative Mark Senak

WBT02 from page 1

tremendous source of deal flow. It works two ways if you have scientists and technologies that fuel and validate your scientists," by bringing them together with investors.

Terrell Brown of **MeshNetworks**, headquartered in Maitland, Fla., took first prize with a mobile technology designed to shift network intelligence from infrastructure to clients. The technology allows clients with laptops and PDAs to recognize and communicate directly. This enables users to form private networks without any infrastructure. Transmissions will be able to hop through one client to another, extending range and improving capacity.

Second prize went to **Libby Alumbaugh**, CEO of **Compass A.I. Inc.**, for IntelliBot. This award-winning software product significantly reduces the manual effort, risks and cost associated with



Richard Cass, president of Advanced Ceramics Inc., showcases his fiber technology at WBT02.

software analysis, version control, product documentation and integration, and adapter development. The software eliminates the complications that result from the evolutionary nature of software, databases, and enterprise applications.

The third place winner was **Richard Cass**, president of **Advanced Ceramics**. His VSSP technology produces fiber from nearly any ceramic material in an inexpensive, scalable process. Fibers in development and commercialization include use for active control of structures, antennas, and biocompatible reinforcements.

The premier show was a huge success and promises to be one the technology community will not want to miss in future years.

The FLC and the NASVF, a national organization concerned with building access to capital for entrepreneurs, are honored to have hosted this event.

Lab in the Limelight from page 1

laboratories. Harmon added, "We see tremendous opportunity in a few years when the overlap will start paying off."

Photons vs. Electrons

Ames Laboratory has helped pioneer the "booming" new field of photonic band-gap materials. This new technology uses light instead of electrons. Light is less susceptible to interference, less affected by temperature, faster, and less noisy than electrons. As applications develop, photonic devices will enable more effective telecommunications and hopefully lead to controlling light on microchips. The laboratory already has a patent application for using photonic band gap materials to optimize directional antennas.

Sensors

More specifically, Ames scientists, in conjunction with **University of Michigan (UM)** scientists, recently developed a novel fluorescence-based chemical sensor that is more compact, versatile, and less expensive than existing technology. This collaboration may have created a new paradigm in sensor technology with its basis of integrating low-cost organic light-emitting devices (OLED) as the light source with the fluorescent sensor. With uses in medical testing, high-throughput drug discovery and detection of pathogens and other warfare agents, the Ames/ISU/UM discovery may assist in monitoring oxygen, inorganic gases, volatile organic compounds, biochemical compounds and biological organisms.

Ames Laboratory has also found great success with biosensor chips. A new, unique biosensor



Ames Lab's new lead-free solder is an environmentally friendly replacement for the tin-lead solders that often end up contaminating landfills.

technology may ease the process of determining an individual's risk for getting cancer by providing immediate information about DNA damage from carcinogens—a critical first step in the development of cancer.

A small DOE laboratory of 500 or so employees, including researchers and ISU faculty members, Ames participates in the university's graduate programs, and both laboratory and grad students benefit—and collect awards. In 2001, Ames won an R&D 100 Award—its fifteenth—for an advance in chemical separation technology called multiplexed capillary electrophoresis using absorption detection, a process for rapid DNA

mapping. With its ability to decipher the genetic code faster, more accurately and less expensively than conventional instrumentation, this technology could assist in the diagnosis of diseases and treatment development.

New Products

Operated for the DOE by ISU, Ames

Laboratory has also developed technologies that are commercial products—including an environmentally friendly, lead-free solder, licensed for manufacture by three companies. One Wisconsin company is developing a magnetic refrigeration process that may keep refrigerators Freon-free and is, therefore, with its simple mechanical assembly, much cleaner.

More info: Bruce Harmon, Harmon@ameslab.gov

R&D Debate

from page 1

Security," which was prepared by the White House Office of Homeland Security. You can view it at <http://www.whitehouse.gov/homeland>. The president's Science Advisor, Dr. John Marburger, worked with many people in the R&D community to develop and incorporate a section on science and technology in this document. A review of the major initiatives in the Science and Technology part of the plan certainly reinforces some things the FLC has tried to promote and can be an important part of the FLC's agenda for the future.

Some items of interest among the major initiatives include improving the technical

capabilities of first responders (something the FLC Fire Fighting Task Force has been working on), establishing mechanisms for rapidly producing prototypes, and conducting demonstrations and pilot deployments that can transfer federal technology to state and local users. This four-page chapter is an interesting read.

Once a new Homeland Security Department is established, a looming question remains: How is its R&D going to be conducted? Congress would like to see an Undersecretary for R&D, whose office would manage a significant budget. At the same time, there does not appear to be a plan to build a large in-house R&D capability. Therefore, it seems as if the new department will invest its R&D funds in those federal laboratories,

The FLC National Meeting

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Contact Mike Driscoll at:
MDriscoll@reedexpo.com

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Looking for a capability?



Looking to Collaborate?

Contact **Sam Samuelian**
856-667-7727

or Visit Sam on the Web at
www.federallabs.org

universities, and companies that can best meet homeland security technology requirements. A model that seems to fit this scenario is the way the Defense Advanced Research Projects Agency (DARPA) operates.

Those people who responded to 9/11 and others who have dealt with terroristic threats and acts have stated that the local community is largely responsible for taking action in the first three days following an incident. But at the same time, communities often need new technologies that they cannot develop on their own. There exists, therefore, an important role for the federal labs and federal technology transfer to play in meeting this critical national priority.

ETC...

FLC T² Training Project Pooling Resources

by Joan Miller

The last issue of *NewsLink* outlined the goals and objectives of the Education and Training Committee's FLC T² Training Resources Project. This month's progress update focuses on the approaches the project team is using to gather input from the FLC membership regarding training needs and existing resources. The team's first task has been to define mechanisms for raising awareness of the project and gathering needed data without unduly burdening respondents. It was decided that team member attendance at regional FLC meetings could initially help accomplish these objectives, as would attendance by the E&T Committee chair at meetings of the Inter-Agency Working Group on Technology Transfer (IWGT²). A brief overview of the project was prepared to enlist meeting attendees' cooperation with the effort. Four key questions were defined in areas where the team needs input.

- Specific areas in which your lab requires/desires training. (For a list of such topics, contact Mike Permenter at <mpermenter@westminstercollege.edu>).
- Categories of lab personnel who should/would benefit from training (a list of personnel types is also available from Mike at the e-mail above).
- Whether awarding of continuing education credits (CEUs) is a significant benefit to your personnel and a factor in the decision to undertake training, or is just "nice."
- Whether you are interested in receiving copies of the updated *FLC T² Desk Reference* for use/distribution to various personnel in your laboratory and, if yes, the number of copies needed.

Team members **Dr. Kelvin Willoughby**, **Kevin "Mike" Permenter**, and **Joan Miller** participated in the joint FLC Mid-Continent/FarWest/NASA MCTTC regional meeting held in Jackson, Wyo., September 17-20. **Lynn Murray**, who is the Department of Transportation's representative to the IWGT², shared information on the project as part of the FLC Northeast regional meeting held in Newport, R.I., September 24-26. The interest and

response to the project has been uniformly enthusiastic, and input is arriving regularly!

Responses will be used to help the team prioritize the gathering of training resources information, as well as to formulate recommendations about training options for the 2003 FLC national meeting.

To provide input or request information, e-mail Mike.

Other team activities over the past month have centered on creating the "shell" structure

for the database into which the training resource records will be loaded. Each entry will be linked to the providing laboratory, agency, or other organizational entity. Mike Permenter, the ETAP apprentice, reported that "The database is coming along nicely and that is due, in no small part, to the support we are getting from the team members and others in the FLC." His supervisor and mentor, Dr. Willoughby, added, "Everyone on the team is focused on providing the field with a helpful resource for technology transfer. The end goal is to add a valuable resource that will ultimately help the various agencies achieve their missions."

If you are interested in submitting training resource information or want to contact the team, please e-mail Mike.

Watch for our next update in a future issue of *NewsLink*!



From left: Mike Permenter, Lynn Murray, and Steve Boardman brainstorm the future of the FLC T² Training Resources Project.

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