DEFENSE LOGISTICS AGENCY

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LOGLINES

Science and Research

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from the

DIRECTOR

Navy Vice Adm. Mark Harnitchek, USN
Director, Defense Logistics Agency

Science and new technologies play an integral part in our everyday lives. They also are vital in how we here at DLA provide the best service to warfighters day in and day out.

It's crucial that we stay ahead of the curve when it comes to new technologies that can improve product performance for our customers and reduce costs, storage and transportation requirements and environmental impact. The inventive strategies outlined in this issue help make DLA a leader in efficient warfighter support as well as a dedicated steward of taxpayer dollars.

This issue of Loglines shares insight into many of the new science and research programs that DLA is actively involved in.

DLA Strategic Materials is partnering with academic institutions such as Penn State, Yale and MIT to research storage and transportation of precious materials. Many of these raw materials are needed to build military equipment.

DLA chemists play an important part in the agency's success by researching new technologies for solutions to challenges and creating new products. Chemists in DLA not only work together throughout the enterprise, but also reach outside the agency to collaborate with military service research facilities, foreign militaries and academia. They share information with civilian and government science organizations to stay current on issues that could affect DLA customers.

Alternative fuel development is crucial to DLA Energy customers. A new waste-to-liquid-fuel project was developed in conjunction with the Community Power Corporation to find solutions to ease the military's dependence on fossil fuels and highlights the customer-focused initiatives being developed in DLA Energy.

DLA Troop Support is working with two military bases to provide biodegradable food service items in a pilot program to determine the best way to meet the Army's net-zero waste initiative by 2020. Some items included in the pilot are biodegradable cups, plates, bowls, lids, clamshell containers and utensils.

We would not be able to take on these innovative projects without each and every team member's knowledge of customer needs. These unique projects may not be well-known, but your dedication to warfighters is evident in everything you do. Thank you for what you do every day for our customers around the globe.

LOGLINES

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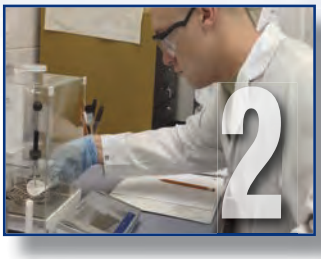

DEFENSE LOGISTICS AGENCY

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BEHIND-THE-SCENES CHEMISTRY

Story by Christopher Goulait and Trinace Johnson

For many people, chemistry is a subject left behind in high school. But behind the scenes at Defense Logistics Agency field activities, chemists are working in a variety of ways to support the agency, from researching new products to advising on disposal and environmental concerns.

At DLA Energy, chemists act as a link that helps suppliers and customers work together to meet technical requirements while also researching new products and energy solutions. These chemists perform many different functions, all of which revolve around quality and technical support, said Dan Baniszewski, chief of the Product Technology and Standardization Division in the DLA Energy Quality/Technical Support Office.

"Our main role in supporting DLA Energy is acquisition support with respect to the technical evaluations and exceptions, deviations and waivers process," Baniszewski said.

The Product Technology and Standardization Division advises on technical matters relating to petroleum fuels, lubricants, additives, alternate-source fuels, missile fuels, coal, and other related products and services, said Mike Domen, a chemist with the division. Chemists within this division, which is located in DLA Energy headquarters, work with regional chemists to collect routine test results for the Petroleum Quality Information System and coordinate further testing required because of off-specification properties or other concerns observed during operations, he said. In addition to this testing, DLA Energy chemists provide technical evaluations for acquisition, assist defense fuel support points, gather research and information, and work with external agencies and organizations, he said.

> To get the job done, it's important for chemists to have good working relationships with quality managers and quality assurance representatives, as well as the service control points, to coordinate technical responses and product dispositions.

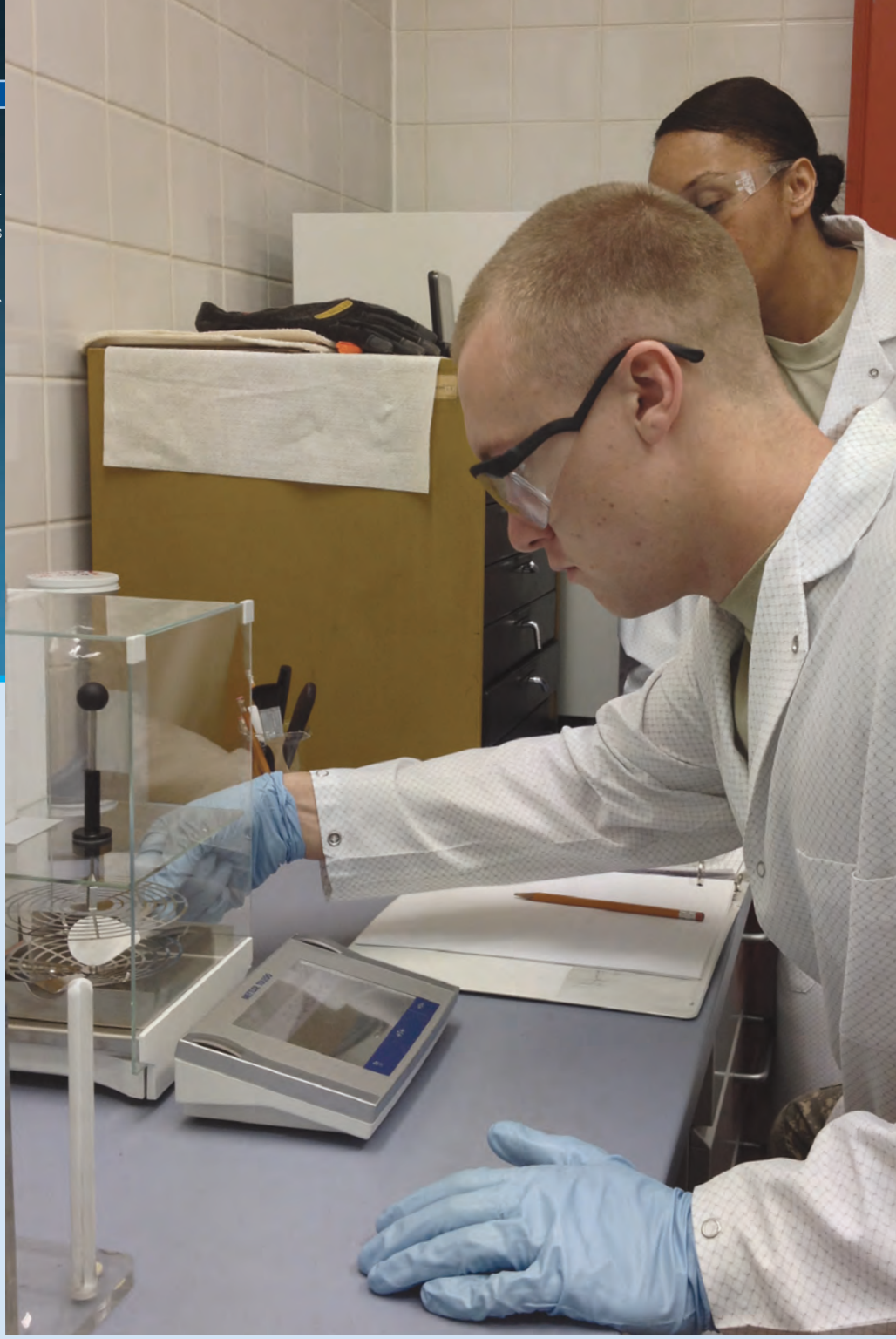
"We perform technical evaluations in support of source selections prior to contract award, as well as consider any product quality requests from the contractor during post award and delivery," Domen said. "Frequently, a supplier will notify us that they require a change to a quality aspect that was either stated in the solicitation or was agreed to during contract award."

These requests for changes, known as exceptions, deviations and waivers, include anything related to quality, Domen said. Suppliers' requests usually involve delivering a product that doesn't meet a certain property as detailed in the specification, but other requests can include proposing an alternate test method or testing location, including a previously unapproved additive, or even wanting to substitute a whole different product, he added. Exceptions are something contractors ask for during pre-award negotiations, whereas deviations before product production and one-time allowance waivers occur after contracts are awarded.

In addition to direct support for procurement and operations, chemists also gather research, data and information to either seek out solutions to customer problems, find new cost-saving measures, or track product quality and trends, Domen said. In this area, chemists

Christopher Goulait is a public affairs specialist with DLA Energy. Trinace Johnson is a public affairs specialist with DLA Aviation.

Photo courtesy DLA Energy Europe and Africa



Chemists at the DLA Energy headquarters support the activities of their regional counterparts, such as these chemists undergoing training in Kaiserslautern, Germany.

function as project managers for DLA Energy-funded research and development programs for work typically performed by military research facilities, he said. They also maintain the Petroleum Quality Information System database, a worldwide comprehensive data repository for product test results, as well as act as the lead standardization activity for DLA Energy-owned national stock numbers.

At DLA Energy headquarters, chemists work with many different divisions and offices, including the bulk petroleum products office, bulk petroleum supply chain services office, direct delivery contracting office, inventory and requirements division, and the transportation/tankers group, Domen said. Internal support is also extended to defense fuel supply points and various customer locations using DLA Energy-owned products, he said.

To get the job done, it's important for chemists to have good working relationships with quality managers and quality assurance representatives, as well as the service control points, to coordinate technical responses and product dispositions, Domen said.

"We also maintain contact with our counterparts at DLA Aviation in Richmond [Va.] since we have quite a bit of common ground with some of the fuel additives and lubricants DLA buys and the specifications and NSNs we manage," he said. "Plus, part of our team located in San Antonio handles missile fuel-related matters."

The chemists also support DLA Counsel Energy and DLA Finance Energy by helping with definitions and applications of technical terms in documents and by reviewing prices associated with products DLA Energy sells to the services.

The duties of a DLA Energy chemist also extend outside the agency. Along

with each of the service control points, chemists work with the services' military research facilities: the Air Force Research Laboratory, Naval Air Systems Command, the Naval Research Laboratory, Southwest Research Institute, and the Army Tank and Automotive Research, Development and Engineering Center.

Chemists also maintain contact with foreign militaries through NATO, the Air and Space Interoperability Council, International Air Transport Association, and the English-speaking navies of America, Britain, Canada, Australia and New Zealand, as well as industry partners like refiners, suppliers and the International Fuel Quality Center. They monitor updates to national energy policies and environmental regulations through forums like the Commercial Aviation Alternative Fuels Initiative and the Clean Air Act Services Steering Committee, Domen said.

"There is active participation in military and non-governmental standards organizations by attending meetings and conferences from the previously mentioned organizations, just to name a few, where our chemists can network with government and industry representatives to discuss current issues and ensure the needs of DLA Energy's customers are represented and considered," he said.

Working with organizations outside the agency can also provide additional training and education to build on the formal four-year chemistry or chemical engineering degrees that form the base of a chemist's knowledge, Domen said. Aside from a degree or Defense Acquisition University courses, engaging in constant technical evaluations is the best way for chemists to keep their expertise and problem-solving skills fresh, he said. On-the-job experience enhances the basic principles learned from formal education, as does attending technical presentations and discussions at conferences or external meetings.

Keeping these skills honed is the difference between business as usual and a breakdown in communication between DLA Energy and the military services' technical offices, Baniszewski said. DLA Energy's chemists prevent large delays when it comes to resolving technical issues and setting technical requirements for fuel-related solicitations.

"We often serve as the conduit and link between the contracting offices and the technical point of contact in the service control points," Baniszewski said. "DLA Energy would have little expertise to resolve issues in a way most beneficial to the agency without our chemists, since any outside guidance and assistance would come with a different perspective."

At DLA Aviation, chemists are also hard at work, advising DLA employees and customers on the environmental impacts of products, hazardous material requirements and technical requirements.

The DLA Aviation Engineering Hazardous Information Program Division employs 15 chemists and chemical engineers who perform one of these three functions, said Calvin Lee, the division chief. Chemists who work on environmental issues focus on helping customers procure sustainable products that reduce the use of hazardous materials, he said. Chemists in the DLA Aviation engineering hazardous minimization and green products branch perform this function, collaborating with the military services considering developing or using green products.

Air Force Airman 1st Class Michael Shoemaker

An Airman disconnects a flash point tester that provides the exact temperature at which the jet fuel ignites.

"For the people who are using products that have hazardous components to them, we make sure they have the information necessary so they can safely use the product, store and sometimes dispose of the products."

— Angela Johnson

"If [customers] find a green product and want to find out if it meets the green requirements, they contact us and we go ahead and fund their project," said Iris "Maria" Garcia Labuda, a chemist with the hazardous minimization and green products branch. "They do all the testing, demonstrations and validations."

DLA Aviation chemists often go to military installations to work with service members during testing and validation phases, Labuda said. Once a green product is approved, the chemists put it into the supply system and assign it a national stock number, which allows it to be used by the military services.

When it comes to hazardous material, chemists in DLA Aviation's engineering section perform a vital role as information gatekeepers, said Angela Johnson, a chemical engineer with DLA Aviation's Department of Defense Hazardous Material Information Resource System.

"For the people who are using products that have hazardous components to them, we make sure they have the information necessary so they can safely use the product, store and sometimes dispose of the products," Johnson said.

The Hazardous Material Information Resource System is a valuable resource maintained by the chemical engineers, Johnson said. The engineers input information about potential hazards and proper use of products, and customers or users with a subscription to HMIRS can search in a variety of ways to find that information, she said. In addition to providing this information, Johnson's division checks the manufacturer-provided material safety data sheets for mistakes and requests that the companies correct and reissue the data sheets, she said.

In yet another function for DLA Aviation chemists, William Lizik works as an adviser for employees and customers about technical, safety and health requirements.

"I am a technical support helpline for the customer," Lizik said. "It could be the user [or] people transporting or disposing of hazardous materials. We talk to all branches of the services. We deal with anything that could be hazardous, from radioactive materials to batteries."

Lizik said he receives questions about many different topics, like whether a certain product is hazardous, how to properly use products, and how to dispose of products. He and the other chemists who work with him contact the company that manufactured the product and can forward customers to technical advisers if needed, he said.

"We consult the technical people, and that's when it's useful being a chemist," Lizik said. "We can make the educated assessments of people's questions."

Lizik said he has received questions about whether certain products contain asbestos, whether an air filter is hazardous, and what hazardous materials might be found in an aircraft survival kit. His experience as a chemist helps him bridge the gap between technical experts and customers with questions, ensuring the health and safety of everyone involved, he said.

"At the end of the road, someone will use the information we have," he said. "The warfighter has to have the information right now, and it's our job to get it right."

Navy Petty Officer 3rd Class Billy Ho

Navy Petty Officer 3rd Class Brett Aamold examines fuel aboard the guided missile destroyer USS Laboon during a replenishment at sea with the fleet replenishment oiler USNS John Lenthall in the Atlantic Ocean.

TURNING WASTE INTO FUEL

Story by Amanda Neumann

Military forward operating bases generate large amounts of solid waste, including everything from kitchen scraps to packaging. A new research and development project is helping Defense Logistics Agency Energy turn that waste into fuel. The mobile waste-to-liquid-fuel project, developed in conjunction with the Community Power Corporation, has produced a prototype system that can extract 40 gallons of fuel from a ton of dry waste

"We wanted to develop a mobile system that could be applied to FOBs overseas to take advantage of any type of carbonaceous waste, such as paper, plastic, cardboard and wood, they regularly generate," said Lindsey Hicks, chemist and strategic energy program manager in DLA Energy. "It's not only a waste management system for them, but it also produces enough usable fuel to supplement DLA Energy's deliveries to those FOBs, easing some of the burden of getting fuel to those locations."

The project is one of several the agency procured using funds from the 2009 American Recovery and Reinvestment Act, Hicks said.

"Originally the project was a cooperative effort ... for the Army, but the project fell through," he said. "Once we had ARRA funds, we applied them to the new effort and put out a competitive statement of work for a bid. CPC won, and

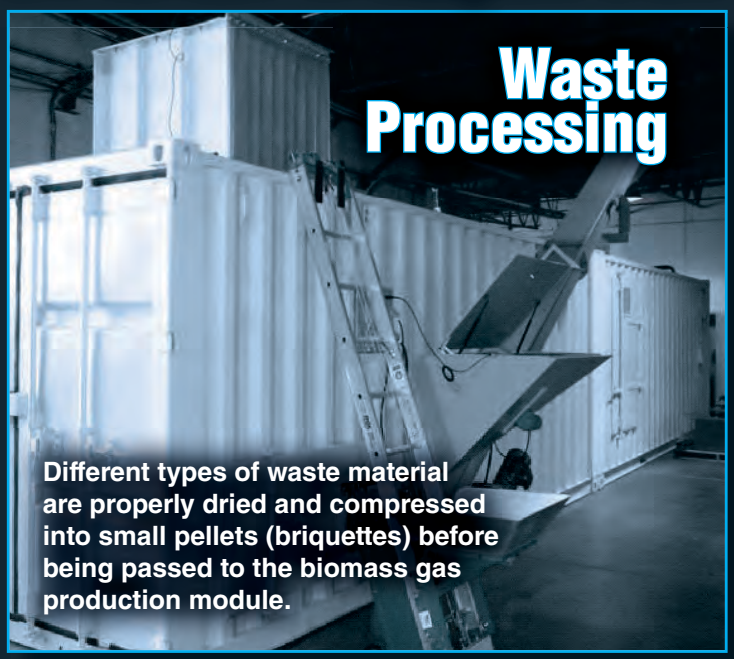
"We wanted to develop a mobile system that could be applied to FOBs overseas to take advantage of any type of carbonaceous waste, such as paper, plastic, cardboard and wood, they regularly generate."

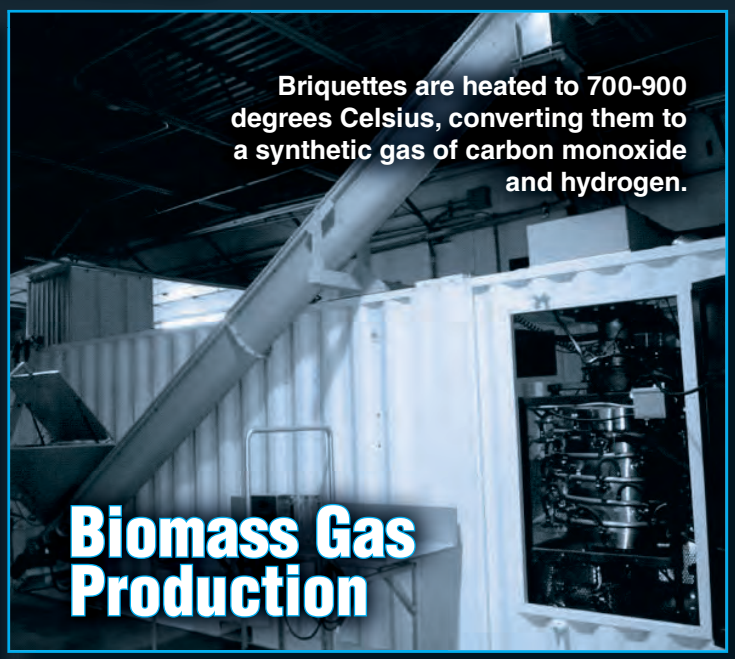
— Lindsey Hicks

A front loader deposits trash into the compactor unit at a solid waste transfer station in Kirkuk, Iraq, in November 2009. A new waste management prototype aims at helping reduce waste at forward operating bases by turning it into liquid fuel, easing the burden of DLA Energy's fuel deliveries.

— Photo by Michael Scheck

The Waste-to-Liquid-Fuel Process



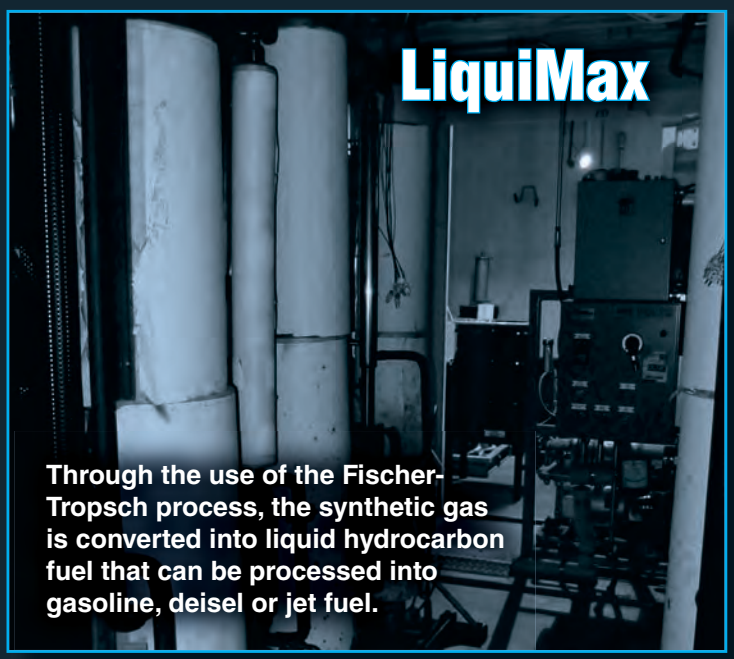


we had a contract signed in September 2010. Although the CPC waste-to-fuel study was our only project developed in-house that was covered by ARRA funding, there were four procurement contracts for fuels derived from algae oil that were also funded through ARRA."

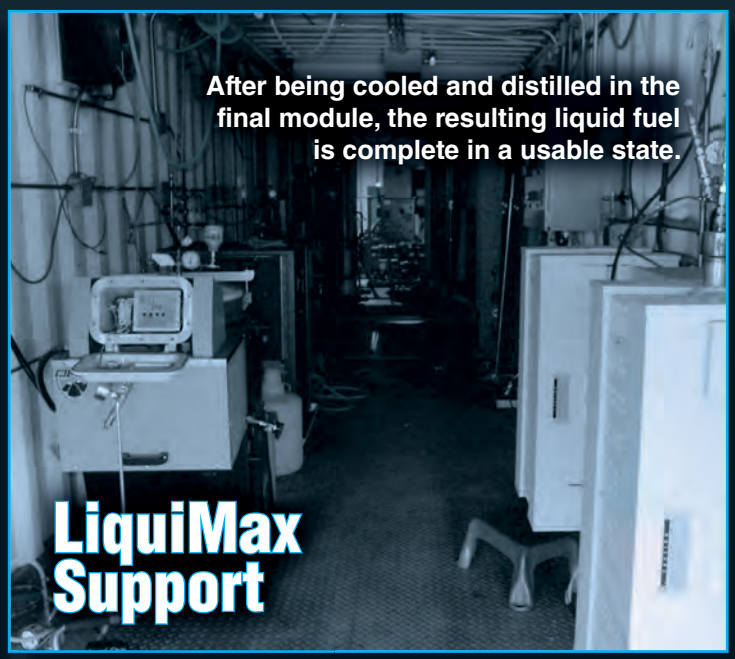
Although the waste-to-liquid-fuel process is unique, the quest to explore alternative waste management options is not a new one, said Jeanne Binder, strategic energy analyst and former research and development program manager in DLA Energy.

"CPC had done previous work with the Army converting waste to synthetic gas and to energy, like electricity, but this DLA Energy project was specifically to take that technology and modify it so that we could produce a fuel we can use in the battlefield environment," she said. "To be

Air Force Staff Sgt. Sharon Singer



Through the use of the Fischer-Tropsch process, the synthetic gas is converted into liquid hydrocarbon fuel that can be processed into gasoline, deisel or jet fuel.



After being cooled and distilled in the final module, the resulting liquid fuel is complete in a usable state.

able to go from doing a simple waste-to-energy [conversion] to making a fuel wasn't simple, but it was feasible. To do that, they built additional modules for the fuel conversion."

In developing the prototype, which can produce about 25 gallons of fuel per day, DLA Energy and CPC had to consider several factors, such as size and mobility.

"The method CPC uses is the most viable way to do it," Hicks said. "Although the process is open technology, the configuration CPC uses is proprietary, so we had to look at the overall cost of development and the type of materials we could work with, like if it could handle many types of material or only one or two. Plus the size of the module being developed: Could it be handled by base personnel or did it require technical expertise to handle it?"

Housed at CPC's Littleton, Colo., facility, the prototype consists of four modular containers. The first, the waste processing module, is known as the drier.

A new mobile waste-to-liquid-fuel system turns unusable waste materials, such as pallets, cardboard and plastic, into fuel for forward operating bases. Developed by Defense Logistics Agency Energy and the Community Power Corporation, the system was procured using stimulus funding.

"CPC had done previous work with the Army converting waste to synthetic gas and to energy, like electricity, but this DLA Energy project was specifically to take that technology and modify it so that we could produce a fuel we can use in the battlefield environment."

— Jeanne Binder

It ensures the waste, such as wood chips, walnut shells or cardboard boxes, is dried properly, then sends it to a compressor where it's compressed into small pellets called briquettes.

"Even though the materials [in the demo] wouldn't be particularly what you would find overseas, the main issue is the ability to pelletize different types of waste materials into a form that can be handled by the system," Hicks said. "You don't want to use too much food waste, because when you have too much water involved, the oxygen in the water interferes too much during the conversion. But this basically simulates what you would be doing overseas once you would apply this system."

After they are pelletized, the briquettes are passed to the second module, the biomass gas production module. There, at operating temperatures of 700 to 900 degrees Celsius, the briquettes are converted to a synthetic gas made up of carbon monoxide and hydrogen. In a regular waste-to-energy project, that gas would go directly into generators to produce energy. Instead, the gas goes onto the next module, called "LiquiMax." This module uses the "Fischer–Tropsch process," a set of chemical reactions, to turn the gas into a liquid fuel.

"Basically we're heating the material without combustion in the presence of controlled oxygen under pressure," said Jose Maniwang, engineer and strategic energy program manager in DLA Energy. "The carbon and the hydrogen separate out, and you're producing two gasses: carbon monoxide, which is carbon and oxygen, and straight hydrogen gas. This mixture of gas can be used as a fuel or can be processed under the Fischer–Tropsch system to produce a liquid

hydrocarbon fuel, which is what we're doing. Depending on how you mix those [gases] together, you can come up with the proper fuels you need, whether it be gasoline, diesel or jet fuel."

The last step, the LiquiMax support module, contains a compressor and liquid fuel distillation subsystem that cools the liquid fuel, making it usable.

"We're not producing a whole lot of fuel, not the large amounts to fly planes or to operate convoys of vehicles, because this is a mobile system," Hicks said. "You want it at a scale where you can get it in and out in a fairly rapid pace, so it's producing relatively small volumes. This is basically a smaller scale of other alternative fuel initiatives that use municipal solid waste generated by local and state governments. In fact, the fuel produced will mostly be used just for generator operations, but it beats trucking in the additional fuel."

During CPC's six-month demonstration phase, the module was tested for its ability to produce small amounts of fuel from three types of waste, with hopes that the fuels produced could meet the commercial specifications of the fuels they are meant to replace, Hicks said.

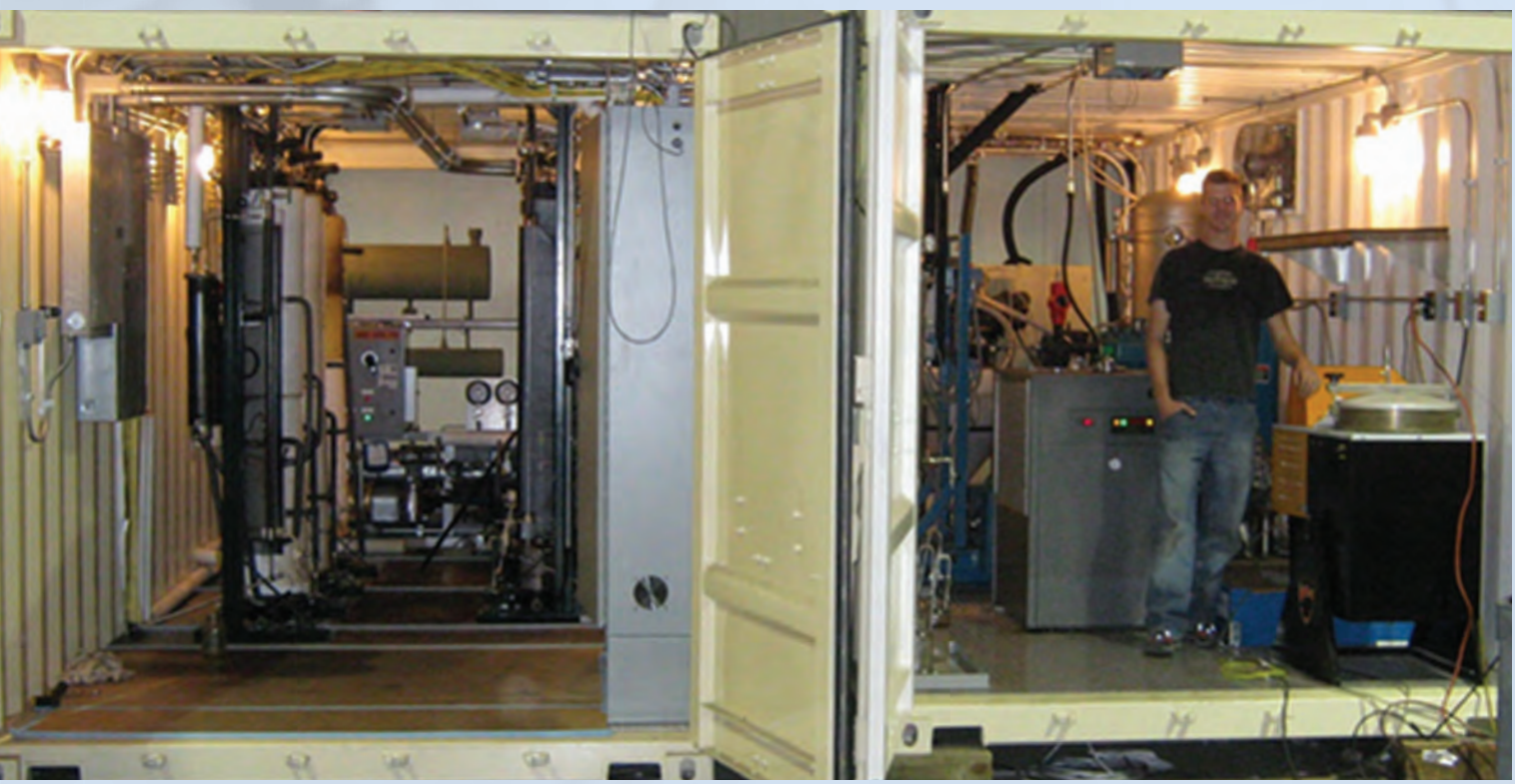
"The results were positive; everything passed," he said. "They were able to produce samples of commercial [aviation] fuel and commercial diesel fuel. Those samples were tested by our contractor lab in San Antonio, and we've sent the [results] to CPC for their review and input. Now we're just waiting on CPC to develop their final report."

As for now, any plans for the program to move from an R&D project into a program of record, with further production and deployment, depends on the military services, which will be able to access the report through the Defense Technical Information Center, Binder said.

"DLA doesn't have the ability to create a program of record for this equipment; the services have that ability," she said. "With a lot of our research that involves systems, we share the data from our research with the military services and then they decide whether they want to pick it up and move forward with it or not. We're a facilitator for them in a way."

With the major developments of biodiesel and ethanol in recent years, DLA Energy is no stranger to the procurement of alternative fuels, Binder said.

Two of four modules that produce liquid hydrocarbon fuel and prepare it for final use. Fuel from these rapidly deployed systems will be used primarily for generator operations.



Courtesy Photo

Kingsbury Browne

Fuel extracted from a new mobile waste-to-liquid-fuel prototype will run generators like this one at forward operating bases worldwide. The prototype is a smaller scale of other alternative fuel initiatives that use municipal solid waste generated by local and state governments.

"DLA Energy has been procuring alternative fuels for quite a while for the military services to meet their Energy Policy Act of 2005 goals, which started the big push to buy the alternative fuels we have," she said. "But [earlier fuels] require a different type of infrastructure to handle them, and only certain engines can burn them. These next generation fuels, the advanced 'drop-in' replacement biofuels and alternative fuels, can be burned without any modifications. They're used in blends with petroleum, and the end user doesn't notice a difference. Eventually, once these fuels are certified and able to be produced in sufficient quantities, they have the potential to become competitive with petroleum."

With promising results and a need to explore alternative "greener" fuels, DLA Energy plans to support several initiatives aimed at finding the best fit for the military services, Binder said.

"A lot of different services are looking into alternative energy using waste, algae, alcohol to jet, etc.," she said. "There are a lot of different ways, especially depending on the type and nature of the feedstock, to do that. Although biomass fuels are not new, they've been evolving. I think you'll see these advanced alternative fuels become increasingly available over the next five, 10, 20 years. Most, but not all, emit less greenhouse gasses, so they're environmentally friendlier. They'll never 100 percent replace petroleum, but some of their sources, like crops, are more sustainable, renewable and well managed. For me, working with R&D projects, it's an eye opener. It's amazing technology."

FORT DRUM

To further support the advancement of the Army's renewable energy goals, DLA Energy issued a competitive request for proposal for biomass power to be delivered to Fort Drum, N.Y., home of the 10th Mountain Division. Under a long-term power purchase agreement, the RFP included a requirement for the design, installation, test, commission, operation and maintenance of an on-site or contiguous biomass generation facility that can deliver at least 100,000 megawatt hours of electric energy annually. As an alternative to the on-site biomass power requirement, the RFP also included a request for the 10-year supply and transmission of electricity generated from other renewable energy facilities. DLA Energy is currently reviewing and evaluating proposals.

— Amanda Neumann

CONSUMER RESEARCH

Story by Bill Addison

A Defense Logistics Agency Troop Support pilot program is putting biodegradable food service ware into the hands of troops at two installations to see if the new products cut the mustard.

Soldiers at Joint Base Lewis-McChord, Wash., and Fort Bragg, N.C., began using cups, plates, bowls, lids, clamshell containers and utensils approved through the Department of Agriculture's BioPreferred program in order to test the products' reliability and safety, said John Woloszyn, deputy director of the supplier support division for DLA Troop Support Subsistence.

Bill Addison is a public affairs specialist with DLA Troop Support.

Photo courtesy DLA Troop Support

Participants in the pilot program were asked to take surveys to rate the quality and usefulness of the BioPreferred products. Users could rate the products in the DLA sponsored test either through on-site surveys or online.

Woloszyn said traditional "to-go" service ware products were removed from the dining facilities and replaced with the BioPreferred items. Signs were added that ask customers to rate the new products.

Customers can rate the items they use one of two ways, either through a paper survey provided with the products or an online survey, he said. An array of educational materials is also displayed throughout the dining facilities to explain the products and their advantages.

Woloszyn said selecting the right products for the pilot was a key component to its eventual success. They needed to be of good quality, American-made and comparable in price to products customers are currently buying.

Each dining facility has enough products to conduct a six- to eight-week trial of the new items.

While it will take weeks to compile data and determine the results, Woloszyn said the reaction he saw from customers at the facilities was overwhelmingly positive.

"Most of the customers I talked to were really excited to know that these products were biodegradable," he said. "Even though we're trying to meet a government requirement, most of the folks I spoke with seemed to just think it made more sense to go with a biodegradable product."

If successful, the products will help fulfill federally mandated green procurement requirements for both DLA and its Army customers, he said.

"I think this is a win-win for both sides," Woloszyn said.

The BioPreferred program was created through the Farm Security and Rural Investment Act of 2002 and further expanded by the Food, Conservation, and Energy Act of 2008. The program, which is managed by the Department of Agriculture, designates categories of bio-based products that are required for purchase by federal agencies and their contractors, according to the USDA's website on the program, http://www.biopreferred.gov/.

To meet USDA BioPreferred guidelines, products must be manufactured using a certain percentage of bio-based

Photo courtesy DLA Troop Support

BioPreferred products, like the utensils shown here, replaced the non-biodegradable plastic food service ware at the pilot locations. The pilot will test the reliability, durability and overall usefulness of the bio-preferred products as a means to decrease solid waste production at military installations.

materials, which varies depending on the category of item. Disposable cutlery must contain a minimum of 48 percent bio-based content. Bowls, plates, napkins and other tableware items must contain at least 72 percent, according to the USDA.

But being manufactured with bio-based materials alone does not make items biodegradable, which is a key component to helping DLA's Army customers meet their additional green procurement goals, Woloszyn said.

Biodegradable products would help Army installations meet their net-zero waste initiatives, which aim to eliminate the solid waste installations ship to landfills. Joint Base Lewis-McChord was one of six installations identified in 2011 to pilot the net-zero waste initiative, according to a Defense Department news release.

"The Army is looking for us to meet that net-zero goal by 2020," said Ben Saddoris, sustainable acquisition program coordinator for the joint base.

The installation is one of only a handful of DoD installations to have its own composting facility, and base officials are aggressively seeking ways to increase the waste that can be processed there, he said.

A big part – 20 to 30 percent – of what the joint base currently diverts to landfills is post-consumer food waste. Replacing plastic and Styrofoam food service products with biodegradable ones would have a large impact on JBLM's goal, Saddoris said

"That would not only help us meet the policy requirement, but would also be a cost savings from not landfilling, and also provide us some cost recovery from the compost product," he said. "Most of the items are comparable, some are even priced lower than what our customers are using. So they're looking at products that would be nearly identical in price to what they're paying now."

Woloszyn stressed the additional cost savings that would come if more installations turned to DLA to purchase the products.

"If we're able to get this to take off throughout the continental United States through our prime vendors, we'll really be able to leverage our buying power and reduce the price for our customers even more," he said.

BioPreferred®

RESEARCH AND DEVELOPMENT

Story by Beth Reece

If somebody, somewhere is working on substitutes for critical materials used in military equipment, Gary Gulino wants to know.

"If a material is really critical, chances are good someone in a laboratory or school is looking for a substitute or alternative," the projects administrator for Defense Logistics Agency Strategic Materials' Strategic Planning Directorate said.

Gulino and 90 other employees in DLA Strategic Materials ensure the Defense Department has access to raw materials that are needed to build military equipment. And while they receive constant feedback from the services on specific materials, they also work to stay on top of industrial trends and breaking technologies.

In February 2012, DLA Strategic Materials began offering up to $150,000 for research and development initiatives geared toward increasing domestic mining and refining capabilities of critical materials such as yttrium and titanium, as well as solutions toward conserving and substituting other materials.

The request went out in a broad agency announcement, a technique government agencies use to contract for research and development conducted by industry and academia. Those interested are asked to respond with a short description of the study and how it relates to the government's needs.

DLA Strategic Materials' request generated 18 responses in the first year. Four were accepted, and one from Pennsylvania State University has already been adopted, Gulino said. The school delivered a programmable process for mapping the location of mineral deposits within the United States.

"It gives us another method for researching the potential of domestic mineral deposits. It's kind of easy to find the ones that people are actively mining, but harder to find the ones that people have either abandoned or those that have never been tapped," he said.

Extracting yttrium from ores is an expensive, complicated process that usually generates lots of hazardous waste. U.S. companies continue to search for low-cost methods of extraction that minimize hazardous waste by-products.

Input from academia is good because it's not driven by the need to make a profit, Gulino added. He expects input later this year from Yale University partnering with Oak Ridge National Laboratory, a facility in Tennessee managed by the Department of Energy on comprehensive supply chain decomposition and mid-tier materials processing.

Two of the other three submissions accepted involved rare-earth mining and processing; the third study assesses domestic rare earth magnets, the strongest permanent magnets made and which are widely used in defense platforms. The studies are important, Gulino said, because most of the patents or intellectual property needed to build the large blocks from which individual magnets are cut are held by foreign companies. As a result, elements used to produce these magnets are not mined in significant quantities within the United States.

"We can buy a block and get it tomorrow, but our job is to look at it from the perspective of what would happen if our global supply sources ... stopped selling to us," he said.

Landmark Alaska LLC, a subsidiary of UCORE Rare Metals Inc., is examining the feasibility of mining yttrium, a chemical

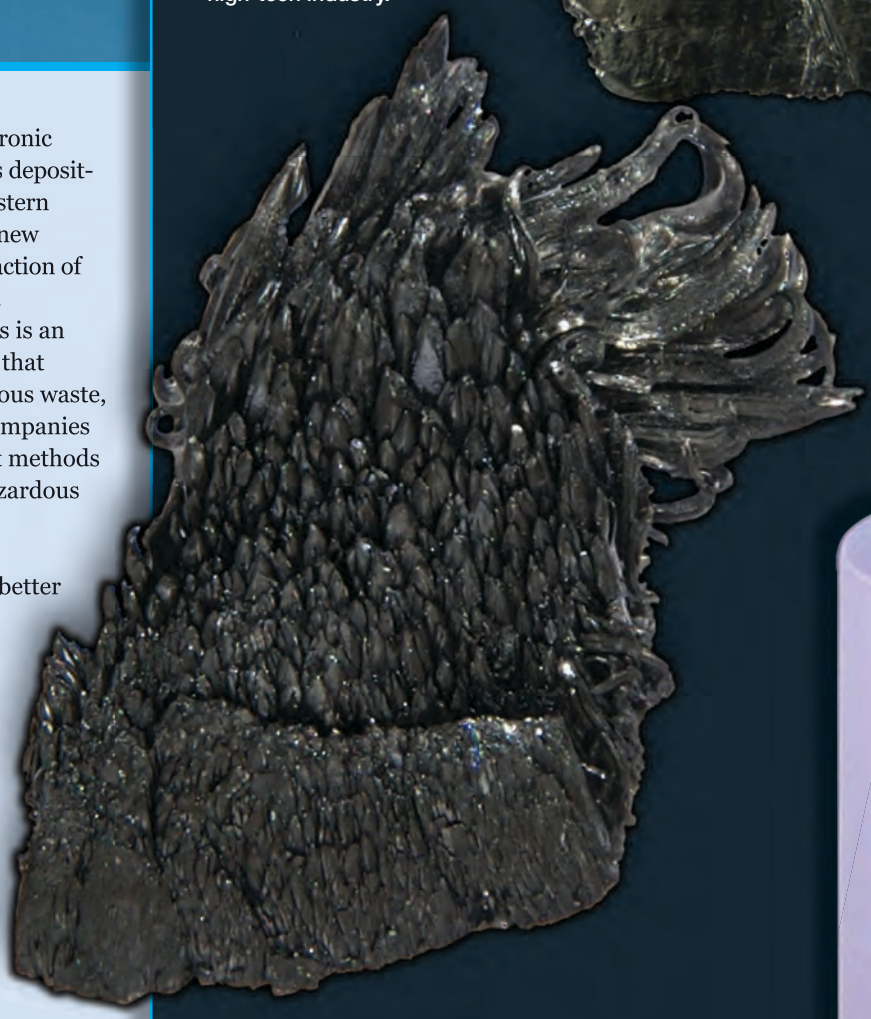
This ultrapure yttrium crystal is shown from two sides. The original size is 2 x 3 cm. Yttrium is a soft and reactive metal that has many applications in high-tech industry.

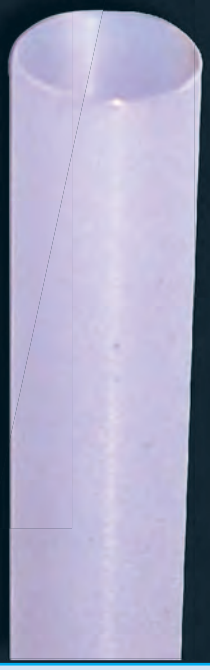
element commonly used in electronic devices and lasers, from Alaska's deposit-rich Bokan Mountain. Great Western Technologies is also assessing a new process called single-phase extraction of yttrium for defense applications.

Extracting yttrium from ores is an expensive, complicated process that usually generates lots of hazardous waste, Gulino said, adding that U.S. companies continue to search for low-cost methods of extraction that minimize hazardous waste by-products.

Working with industry and academia will hopefully lead to better solutions on managing raw materials for military use and limiting America's dependence on foreign sources of supply, he continued.

"What we want to do is capture what everybody is thinking and what they're up to," he said. "Industry will talk a lot about what they're doing today, and academia tends to explore the future; the combination provides considerable insight into the strengths and potential vulnerabilities of the U.S. defense and essential civilian industrial bases."





Yttrium is widely used as a host material in lasers.

A Conversation with . . .

Army Lt. Col. Van Sher

DLA's Staff Entomologist Talks about the Science of Preventive Medicine and What DLA Team Members Can Do To Head Off Pests

You're one of about 70 entomologists in the Army. Why is your particular science important to the Defense Department?

Throughout history, overwhelmingly more soldiers have been casualties from disease and non-battle injuries than due to bombs and bullets. Some of these epidemic diseases, such as malaria, typhus, yellow fever, have been a real devastating feature and shaped the outcome of many conflicts. We all would probably be speaking French today if Napoleon's army hadn't been decimated from epidemic typhus, a louse-borne disease. Common body lice, more than the bitter winter or Russian soldiers, are what defeated his army. So that's the real driving force for having preventive medicine personnel in the military today, about 70 of whom are also trained as entomologists. Disease transmission systems are all around us, and insects often play a role in that transmission. That's the bottom line.

Why did you decide entomology was the specialty you wanted to go into within preventive medicine?

It's been my experience that opportunities and circumstances often dictate your path. I first enlisted in the Army as a forward observer in the field artillery, so basically I was an infantry foot-soldier who called in artillery fire. With that experience under my belt I was drawn to a more healing side of the military. It happened that the military was actively recruiting for entomologists, and since I already had a bachelor's degree in zoology, I was able to take the opportunity to move from combat arms to the Army Medical Department as a preventive medicine officer. I went on to receive a master's degree in medical entomology, and that was how I made the transition.

How does DLA benefit from having a preventive medicine specialist on its staff?

I think the good thing about having a variety of backgrounds and disciplines anywhere is that everyone brings their own perspectives, and oftentimes that

Jonathan Stack

Army Lt. Col. Van Sherwood, DLA staff entomologist, gives a presentation on bed bugs during an Earth Day observance at the McNamara Headquarters Complex.

wood

helps jumpstart good collaboration, creative solutions, and innovation among related disciplines. From a preventive medicine standpoint, Benjamin Franklin said, "An ounce of prevention is worth a pound of cure." So it's better to be proactive and try to stop disease processes before they start. We want to prevent a threat before it has time to impact a mission. That's the value of preventive medicine in general, and being part of that field is quite gratifying. And it's a mindset that's not restricted to just health and overall fitness. Perhaps it has an influence in some of the other things we do, like preventing things that can be detrimental to the mission or operations.

What are some of the more general pest problems DLA has had to deal with?

Common pests can just show up anywhere, and in this regard DLA is not alone and we're not particularly unique. These may include invasive weeds, rodents, ants, roaches, biting flies and mosquitoes, filth flies, and even bed bugs. Where we are a bit unique is in some aspects of our mission. Storage warehouses of military rations and other commodities, for example, are great targets for stored product pests. Stored product pests are essentially certain weevils, beetles, and moths that make a living finding and eating our bulk or packaged food. They can decimate vast quantities of food. Some of these pests, like the khapra beetle, can cause internal injury and death if they're ingested. You might have to quarantine and destroy whole silos or warehouses of goods based on what kind of pest got into something.

These all present unique sets of issues that have to be dealt with, and they're all handled differently as far as treatment. For example, some can be fumigated and others can't, depending on the circumstances.

Another mission problem area is the unavoidable shipment of equipment and material around the world. We try to be careful, but shipments overseas and retrograde operations back home have the potential to transport invasive species. The pinewood nematode is a classic example. It's microscopic and kills trees. To prevent the possibility of transporting this destructive pest worldwide, DLA must heat-process all wood pallets bound for OCONUS destinations. The pallet gets a special "DLA burn stamp" to certify it is nematode free, and it's all to prevent the transmission of this destructive parasite.

When someone comes to you with a pest problem, what kind of research do you have to do to come up with a solution?

Good question! That's certainly one of my concerns and probably a common concern in many consulting positions — keeping up with current research and published literature, which is adversely impacted by the current travel and budget restrictions. But that's the wonderful thing about the Internet and technology today in that so many resources are available online and remotely.

In addition, the field of entomology, perhaps due to its rather low density and quirky nature, seems to enjoy an unusually high level of camaraderie that extends beyond just the military. There's generally a great response of collaboration and support when requested. Entomologists really seem to go out of their way to help out. In a recent beetle infestation, for example, multiple entities — a state university, the Army Public Health Command, USDA, a retired army entomologist — all contributed resources and expertise to help us out. They all had a hand in resolving the situation, from identifying the pest species, to advice and references on the proper treatment, to future preventive measures. It's all very reassuring to know that kind of support network exists.

How have the sciences of both preventive medicine and entomology evolved in your 17 years in the field?

I think primarily in two fundamental areas: a general philosophical shift toward a more holistic, integrated approach, and also in the way treatments have become much more specialized and

targeted. Both of these trends are very positive.

As an entomologist, integrated pest management has created the most striking difference in practice between when I started and now. Pest control used to be, for example, a simple matter of deciding what pesticide will eliminate pest "X" the quickest and cheapest. With an integrated approach, we now think in terms of eliminating the root cause of a pest problem, what measures can be taken before or instead of pesticide application, and, more generally, how we can do the greatest good with the least harm. In many ways, we try to think of chemical application as a measure of last resort.

And this idea of specialization is a particularly exciting area, because it allows us the ability to directly treat a causative agent and not affect an untargeted species, the immediate surroundings, or the environment in general. In weed control, for example, research and advances in nanotechnology can target plants at a molecular level, so a pesticide will only stick to a particular leaf or texture, or be activated by a certain molecule specific to that plant. So when applied, it will impact the invasive species you're trying to target and not the native plant sitting next to it.

Here's an insect example that I think is really neat. The military has done quite a lot of research on topical insect repellents over the years. DEET is a military product, in use since the 1950s, and is a wonderful ingredient for preventing mosquito bites, ticks, and other biting insects. But it also has negative properties, a strong odor for example, so there's room for improvement. At the USDA research lab in Gainesville, Fla., DoD is currently funding research and testing for the next generation of repellents. One such chemical doesn't repel mosquitoes in a traditional sense, but rather takes you off the dinner menu. What I mean by that, is that the chemical specifically targets a mosquito's sensory feeding trigger, so that when it lands on your skin, it won't feed because it doesn't recognize you as a host. You can, quite literally, stick your hand into a cage of hundreds of hungry mosquitoes, and they will land on your hand but won't feed. It's an eerie feeling, and it takes a bit of self- control to calmly allow mosquitoes to literally blanket your hand, but the net result is zero bites. And that's what's exciting about much research today. We're learning to manipulate our environment in very precise and less-invasive ways.

> From a preventive medicine standpoint, if we do everything perfectly and foresee every possible outbreak and attack before the fact, then the best that happens is that nothing bad happens.

No one really wants to work themselves out of a job, but what can DLA team members do to make the pest control side of your job easier?

I think people in general, and our DLA community in particular, are more informed and committed today than ever before regarding preventive measures. Pest prevention is just one aspect of preventive medicine, and there is a growing awareness of both.

We know that pests, like rodents or roaches, are looking for food, water and harborage. As a result, we make sure, whether it's around our desk areas or homes or elsewhere, that we keep our areas relatively clean and free of crumbs and trash. Generally people are very good about keeping candy, snacks and food wrapped and in sealed containers. We don't let garbage accumulate in our working and living areas. As an established practice, we cover our outside garbage bins, and it's picked up once a week to break the breeding cycle of filth flies. We're increasingly aware about smothering our coughs with a cloth or sleeve and washing our hands more frequently. We're more sanitation and prevention conscious than we ever have been.

But pests are extremely resourceful, and they're very good at making a living. They will find gaps in our armor and find ways to make it to the next generation. Make no mistake, as diligent as we are or can be, there will always be opportunities for pests to flourish.

So don't worry about working us out of a job. From a preventive medicine standpoint, if we do everything perfectly and foresee every possible outbreak and attack before the fact, then the best that happens is that nothing bad happens. It's one of those thankless types of occupations and is just the nature of the business. We'd love it if everyone thought environmentally and with a view toward reducing opportunities for pests and diseases, and I am encouraged by the number of people in our workforce who seem to be doing just that.

QUOTABLES

"It seems almost unbelievably obvious that it's the people that make it great, but we forget that. So it's important, vitally important that we do this every year to recognize what all of you ... and your shipmates that were inducted in prior years, both military and civilian [have done]. I tell you, you have left me a fabulous organization."

— DLA Director Navy Vice Adm. Mark Harnitchek, speaking July 30 at the annual DLA Hall of Fame induction ceremony.

"If left unchecked, pay and benefits will continue to eat into readiness and modernization. That could result in a far less capable force that is well compensated but poorly trained and poorly equipped."

— Defense Secretary Chuck Hagel, speaking July 31 about sequestration's impact on the Defense Department's future decisions.

"I'm a firm believer that improvements to policies and processes must be driven by data and objective analysis rather than conjecture and opinion."

— Undersecretary of Defense for Acquisition, Technology and Logistics Frank Kendall on what's needed to make better decisions in improving the department's acquisitions processes.

"When I got there, we were demilitarizing 200,000 pounds of scrap at forward operating bases per week, then later a million. Since I left, they are up to scrapping about 5 million pounds of equipment a week. We want to make sure we get rid of items that our enemies can't later use against us."

— Navy Cmdr. William "Jack" May, talking about the demilitarization work he led as officer in charge of DLA Disposition Services Afghanistan from October 2012 to April 2013. May, a DLA reservist, was chosen as the Military Logistician of the Year in the 2012 Admiral Stan Arthur Award for Logistics Excellence.

BY THE NUMBERS

25 GALLONS:

The amount of fuel able to be produced per day by a prototype system DLA Energy is looking into that converts solid waste to liquid fuel, enough to power a 100kW generator for more than three hours.

13,000 KILOGRAMS:

The amount of pure germanium in the National Defense Stockpile, enough to create more than 400,000 germanium wafers used to collect and discharge solar power for satellites.

SEPT. 26, 1918:

The first day of the Battle of the Argonne, the last major battle of World War I.

57 PERCENT:

The proportion of DLA's 1,300-strong uniformed workforce who are reservists.

Riga Retrograde

Story by Amanda Neumann

For the Defense Logistics Agency and U.S. Transportation Command, Riga, Latvia has been a bustling hub of activity of late. Already a supply location for subsistence, Riga, a Baltic port, is now an important connection for air transportation to and from Afghanistan.

With long delays on the Northern Distribution Network, a series of rail and truck routes across Europe and Central Asian countries used to supply U.S. warfighters in Afghanistan, Riga's flights began out of necessity, said Tom Shively, the DLA liaison officer to U.S. Transportation Command.

"The flying operation kicked off because we needed to [quickly] get food into Afghanistan. Since our prime vendor food was already transiting through Riga, which has an airfield that can handle wide-bodied 747s, the decision was made to figure out what we needed and fly that in from Riga to Afghanistan."

There were numerous advantages to using Riga's location. However, in the beginning, the urgency of need resulted in higher prices than desired, and DLA and USTRANSCOM officials recognized the need to drive the costs down, Shively said.

"At that time, the rates were high for the inbound food shipments because we did not have outbound cargo," he said, explaining that flights would be going

"When you have to fly cargo in, you really need to fly cargo out to get an advantageous rate for the lift. So there was an opportunity to get stuff out of Afghanistan that needed to come out."

— Tom Shively

A member of the 8th Expeditionary Air Mobility Squadron secures a pallet of copper wire. Copper wire taken out of Afghanistan is routed through Riga, Latvia, for disposal by Defense Logistics Agency Disposition Services, preventing the material from falling into adversaries' hands.

— Photo by Air Force Staff Sgt. Nathanael Callon

Marine Staff Sgt. Theresa Seng

A member of a Defense Logistics Agency Disposition Services team operates a plasma cutter at Camp Leatherneck, Afghanistan. The cutters use electricity and current to cut metal into small parts, which are then sold as scrap metal to local vendors.

one way empty, which wastes resources and increases costs.

"When you have to fly cargo in, you really need to fly cargo out to get an advantageous rate for the lift. So there was an opportunity to get stuff out of Afghanistan that needed to come out," he said. "But although the Riga air operations started off quite expensive, as time went on, we figured out how to configure an outbound load along with an inbound load. And, most importantly, the DLA-USTRANSCOM team figured out how to do the bidding process better."

By creating competition between major air carriers, DLA and USTRANSCOM were able to significantly bring down the cost of flights, Shively said.

"When we got into a situation where the carriers were competing with each other for business, it really drove the price down dramatically," he said. "As a result, costs for airlift from Riga to Afghanistan are now comparable to surface costs in many cases, and cargo movement is far less complex."

Shively said one of the biggest challenges is identifying and weighing cargo for return flights because some customers had no ability to weigh goods needing shipment.

> With Riga already in use as a prime vendor food hub, using it for retrograde flights made good business sense.
>
> *— Steve Dubernas*

"We had to get scales out there so that they could really start providing a better estimate with some credibility to it. And we found out we were pretty far off. People thought they had a million pounds and it really turned out to be 125,000 [pounds]," he said. "So our folks have learned to pay attention to forecasts in and out when they're bidding on contracts by the pound."

With Riga already in use as a prime vendor food hub, using it for retrograde flights made good business sense, said Steve Dubernas, a logistics management specialist in the U.S. Transportation Command Support Division of DLA Logistics Operations.

"What we've been trying to do with Riga is tie two supply chains together," he said. "You've got the subsistence supply chain coming in -- consumable goods, and then you're bringing retrograde cargo out. Although you would naturally think there would be more outbound as we start to close, there is still a fighting season left in Afghanistan, so there is a hesitation to put too much on the retrograde return flights. So what we're trying to do is market the Riga solution to the warfighters that have non-consumable items to be taken out or [repair parts] that they need repositioned in Europe or the U.S."

For the retrograde flights out of Afghanistan, Riga is a "transload" location, meaning items come through and either terminate in Riga or move through from there to another military installation, such as Germany. For DLA Disposition, Riga is the termination site for copper, said Vickie Rodgers, planner for the Afghanistan area of responsibility in DLA Disposition Services.

"We get a lot of copper wire turned in," she said. "When you have a ton of copper, they make the best [improvised

explosive devices] and that's something you don't want. So we've always shipped the copper out to have it processed somewhere else, and [Shively's] team has helped us with that."

Don Phillips, chief of transformation strategy in DLA Disposition Services, spent six months as site chief at Afghanistan's Bagram Air Base. He said Shively and his team were essential in moving items like copper out of theater when needed.

"Copper wire eats up a lot of yard space so I worked closely with [Shively's] team to arrange for its removal," he said. "And they excelled at that. They had timely and effective scheduling of [commercial] air retro hauls of the copper wire. We would give them a projection, and within several days it would be scheduled for pickup. The contractor would show up, they would put it on pallets, prepare it for air movement and away it would go. They were essential in coordinating the processes behind that. The partnership between that team and DLA Disposition Services has allowed us to better meet the needs of the customer in an austere environment and keep pace with evolving needs."

Evolving needs for DLA Disposition Services included changing methods for removing "regulated waste" from Afghanistan. Regulated waste, items of a hazardous nature, requires strict controls to ensure the material gets disposed of properly, Rodgers said.

"Regulated means it needs to be watched from cradle to grave, and it needs to be done in a certain manner," she said. "You watch that it goes to the place that processes it, and you have certifications that it was done correctly, basically that someone didn't just dump them away somewhere. Although DLA doesn't actually do anything with the hazardous materials or waste, we oversee contracts to make sure it's all handled correctly."

With traditional ground-based exit routes challenging and inconsistent, DLA Disposition Services and the DLA-USTRANSCOM team, known as the DLA-T team, are working together to fly some regulated waste out of Afghanistan later this year, a first for the agency, Rodgers said.

"What we've always done in the past with regulated waste is ship it out through Pakistan," she said. "But with the borders of Pakistan being what they are and what they have been, it's shut us off tight. So the DLA-T team is assisting us by arranging for commercial transport using our contractor to fly it out."

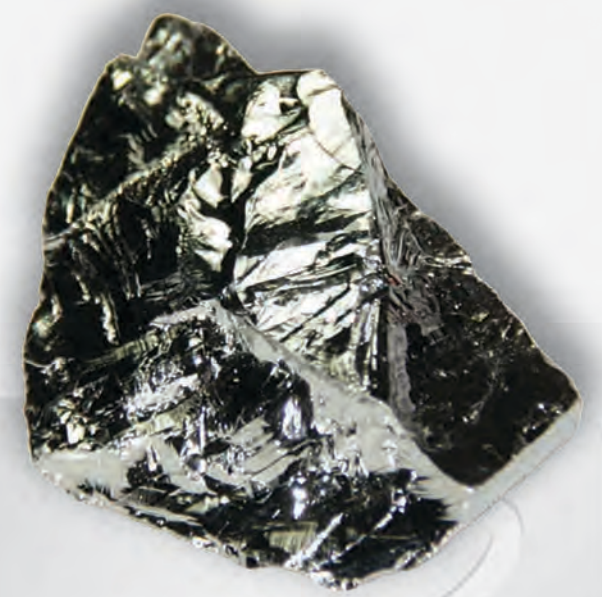
In addition, the DLA-T team is helping DLA Disposition Services bring in additional equipment to help with the ever-increasing disposal process in-country, Rodgers said.

"As the military pulls everything out, our business is increasing," she said. "After years of stockpiling and building up, here's all this stuff and you can only pull so much out. The rest has to be disposed of. So as everyone else is dialing down, we are dialing up trying to go through and demilitarize and mutilate all this equipment. So we need stuff coming in – shears, shredders, torch cutters, plasma cutters – and the DLA-T team is assisting us, not only with regulated waste coming out, but with the stuff coming in, the equipment that we need, so we can get that out to the forward sites."

Palletized cargo is ready for boarding onto outgoing flights at Riga, Latvia. Cargo from Afghanistan either terminates in Riga or continues onto other locations in Europe or the United States.

Tom Shively

Critical Metals



Story by Beth Reece

A growing need for metals critical to military space programs is leading to changes in how Defense Logistics Agency Strategic Materials manages inventories of materials in the National Defense Stockpile.

Until now, manufacturers that produce early warning and reconnaissance satellites have purchased space-certified germanium from a Belgian manufacturer that bought the only American company previously capable of converting germanium to the wafer form required by the U.S. military. The wafers resemble compact discs and are widely used in solar cells to collect and discharge electrical power required to sustain satellites for up to eight years of continuous operations.

A decline in the quality of metal being used by the manufacture, however, resulted in increased failure rates that prompted military officials to seek a new source of supply, said Gary Gulino, projects administrator for DLA Strategic Materials' Strategic Planning Directorate.

"If you don't use 99.999 percent pure germanium in the original crystal growth process, when you finally slice it and lay it under a microscope, all those imperfections are visible, and that affects its ability to generate power," he said.

The conversion process typically has a 40 percent fail rate, but over time that has increased to 85 percent.

In May 2011, DLA Strategic Materials agreed to upgrade 3,000 of the more than 16,000 kilograms of pure germanium in the National Defense Stockpile to germanium wafers for defense space applications. To do that, defense officials partnered with other national security space activities to award a contract to an American company to establish a domestic metals production process. With the domestic process in place, DLA Strategic Materials then awarded contracts to process 3,000 kilograms of germanium metal into wafers.

"We are converting part of the germanium stockpile to ensure that U.S. defense industries have access to the materials in the forms they require," Gulino said.

After World War II, Congress moved aggressively to build stockpiles of critical materials for national defense purposes. The premise was that as long as America had the resources, they could be processed by American companies.

"But in the 21st century, it's become apparent that the problem transcends the material," Gulino said, citing germanium as a good example of a material that can be mined domestically but not processed to a usable form in the United States.

Products such as this compact disc-like wafer are typically created using 99.999 percent pure germanium. DLA Strategic Materials is converting 3,000 kilograms of its germainium stockpile into wafers for use by U.S defense industries.

"It's actually cheaper to ship it in the ore form to foreign locations such as China for processing into a metal than it is to do it domestically. There are some people who are capable of processing it domestically, but they're not competitive," he said, adding that other locations offer lower labor and production costs.

An Air Force study on 20 of the service's most critical space platforms revealed that every single one relied on components produced in China, where there is little if any product liability, he added. The tsunami that hit Japan in 2011 further illustrated the risks inherent in relying on foreign sourcing.

"It's not so much the industries that got hit, but a lot of them had high reliance on regular supplies of pure electrical power. A lot of the space industry and the aerospace industry, especially with the advent of the drone, can't move without Japanese industrial capabilities to support it," he said.

Gulino stressed that the National Defense Stockpile was created so America wouldn't have to depend on foreign sources for critical materials during a conflict or national emergency. The 2011 Biennial Report to the Congress on National Defense Stockpile Requirements identified germanium as a critical material that will be stockpiled for the foreseeable future. ✪

Uniforms for Cadets

Story by Mikia Muhammad

Just in time for the back-to-school season, the Defense Logistics Agency Troop Support clothing and textiles supply chain supplied distinctive dress uniform items to Army Junior ROTC cadets.

To outfit more than 310,000 JROTC cadets, DLA Troop Support and the U.S. Army Cadet Command have been working together to ensure deliveries of new gray shirts and berets for the upcoming school year, Monique Williams, clothing and textiles supervisor of DLA Troop Support's Army recruit cell, said.

"[The Army service uniform] is a new uniform for the Army, so the JROTC is the last of the Army to get [their version of it]," Williams said. "We're doing the best we can to fully support the cadets. The whole uniform transition has been a learning experience for all of us."

About 24,000 requisitions have been placed in fiscal 2013 at a total value of $5.4 million, Williams said. A second wave of fielding for the new items is set to be completed in fiscal 2015.

James Kilgo, chief of logistics at Cadet Command, said the two organizations have remained in constant communication to reach their common goal of supporting the cadets.

"[Cadet Command] and DLA have a personal and professional working relationship that includes strategic planning, purchasing, ordering, contracting and processing shipments of Army clothing and equipment throughout the continental United States and overseas to approximately 275 universities' senior Army ROTC programs and more than 1,700 high schools' Army JROTC programs," Kilgo said.

Williams agreed there were a lot of moving pieces in the mission, including coordinating with manufacturers to fill uniform orders for cadets.

Cadet Command received $16 million in funding to procure the distinctive uniforms for cadets within eight brigades throughout the United States, Williams said.

The new gray uniform items differ from the regular Army and senior ROTC dress uniforms, which include white shirts and black berets.

Mikia Muhammad is a public affairs specialist with DLA Troop Support.

Photo courtesy DLA Troop Support

An Army Junior ROTC cadet receives an award at North Hardin High School in Radcliff, Ky. DLA Troop Support Clothing and Textiles has been working with the U.S. Army Cadet Command to ensure deliveries of new gray shirts and berets to more than 310,000 JROTC cadets for the upcoming school year.

I AM DLA

(and so is my dog)

My name is:
William Pagán

I am:
A tailored vendor logistics specialist with DLA Troop Support's subsistence supply chain. Oprah is a yellow Labrador and my service dog.

Describe your job in a sentence.
I work to identify and meet customers' order-fulfillment needs.

How long have you worked for DLA?
I started Aug. 6, 2007. I was on and off due to military training, a deployment to Iraq and recovering from injuries. Oprah has being working in DLA since Feb. 20, 2013.

What is your favorite thing about working for DLA?
The people I work for are always ready to make everything happen for the warfighter. There's nothing more rewarding to me than continuing to serve my country.

What is your best memory of working here?
My best memory has to be going through the intern program. There were excellent classes, a lot of knowledge, and people from very diverse backgrounds. Most of my classmates were military veterans, so I felt right at home. I miss them. And, of course, Oprah coming to work with me.

How do you make a difference?
Having served in the military and knowing what the warfighter goes through makes me not take my job and position for granted. It makes me push every day to be a better DLA employee.

William Pagán