

U.S. ARMY NATICK SOLDIER RESEARCH, DEVELOPMENT AND ENGINEERING CENTER

The director of the Combat Feeding Directorate (CFD) provides vision, leadership, technical management and program integration for the total combat feeding life-cycle program. The program executes research and engineering of combat rations, field food service equipment and combat feeding systems for the four services and the Defense Logistics Agency (DLA). In addition to program integration, planning and reporting, the office of the director is also responsible for outreach and education initiatives, to include all activities centered on promoting careers in Science, Technology, Engineering and Math.

HEADQUARTERS

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**DEPARTMENT OF DEFENSE
 COMBAT FEEDING
 DIRECTORATE (CFD)**

Office of the Director
 Stephen Moody
Director

Jeremy Whitsitt
*Deputy Director
 Chief, Operations Branch*

**SCIENCE AND TECHNOLOGY
 BRANCH
 BRANCH CHIEF: BETTY DAVIS**

**FOOD ENGINEERING AND
 ANALYSIS TEAM (FEAT):
 Team Leader, Lauren Oleksyk**

The FEAT researches and develops technologies that improve the nutritional quality, organoleptic properties, stability and shelf life of novel foods for individual and group rations. This multi-disciplinary team of food technologists, chemists and nutritionists develops improved, ready-to-eat prod-

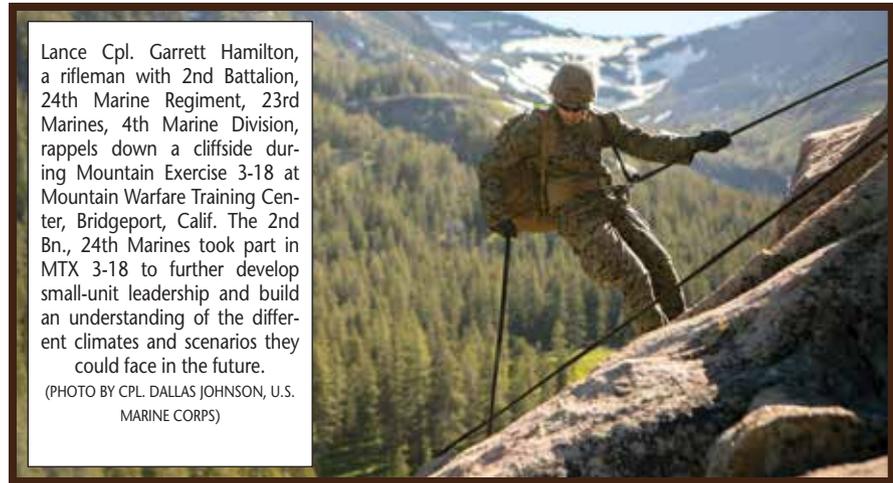
ucts through unique product formulation and employing advanced thermal and non-thermal novel processing and preservation technologies. The team also focuses on improving quality and stability of intermediate moisture foods using next-generation hurdle technologies to produce new shelf-stable sandwiches, breakfast and baked goods. Chemical, physical, nutrient and sensory analysis of foods is conducted to ensure safety and acceptance of shelf-stable rations and

retention of important nutrients. R&D projects contribute to the Combat Feeding Directorate's Science and Technology Thrust Areas of Reduction of Individual Combat Load and Class 1 Logistics Burden, and Innovation in Food Delivery Systems. In addition, FEAT supports the National Aeronautics and Space Administration (NASA) Stabilized Foods for Extended Spaceflight program, NASAs Irradiation Program, and multiple advanced food processing technology consortiums.

**FOOD PROTECTION AND
 INNOVATIVE PACKAGING
 TEAM (FPIPT):**

Team Leader, Josh Magnone

The FPIPT is the preeminent provider of advanced materials, polymer processing technologies and revolutionary packaging concepts that maintain, sustain and provide the warfighter with rations delivering the highest performance level, overall quality, nutrient retention and safety. FPIPT is also responsible for protecting warfighter health by the prevention, detection and elimination of food contaminants through development of procedures, validation of novel diagnostics, analysis of risk assessment tools and validation of novel pathogen reduction methodologies. Current packaging efforts include research and development of high-barrier non-foil polymeric structures, permeability modeling, advanced polymer-processing technologies, polymeric microspheres, polymer/clay nanocomposites, alternative materials for secondary packaging, high-barrier coatings, liquid-crystal polymers, and multi-functional polymers for ration packaging systems and lightweight and compostable packaging. Current food-protection efforts include research and development of two patented technologies for detection and recovery pathogens from food contact



Lance Cpl. Garrett Hamilton, a rifleman with 2nd Battalion, 24th Marine Regiment, 23rd Marines, 4th Marine Division, rappels down a cliffside during Mountain Exercise 3-18 at Mountain Warfare Training Center, Bridgeport, Calif. The 2nd Bn., 24th Marines took part in MTX 3-18 to further develop small-unit leadership and build an understanding of the different climates and scenarios they could face in the future.
 (PHOTO BY CPL. DALLAS JOHNSON, U.S. MARINE CORPS)

surfaces, evaluation of cold plasma for reducing pathogens on fresh fruits and vegetables, characterizing factors for survival and reduction of Salmonella in low-moisture foods, and development of a shelf-stable bacteriophage treatment system for FF&V. These efforts seek to stabilize and protect foods against microbial, chemical and physical contaminants, as well as deterioration under extreme environments in the military logistics systems, while increasing warfighter health. The team supports other teams in the CFD, and NSRDEC, as well as the Food Risk Evaluation Committee (FREC), FREC Laboratory Working Group (LWG), NASA food-packaging program and DoD's environmental programs. This team collaborates with academia, industry and other government organizations to transfer technology that will enhance food safety and protect the health of the deployed warfighter.

PERFORMANCE NUTRITION TEAM (PNT):

Team Leader, Ken Racicot

The PNT develops novel, nutrient-dense ration components for optimized warfighter performance. The team works closely with the U.S. Army Medical Research and Materiel Command's Research Institute for Environmental Medicine to assess the nutrient bioavailability and physiological status in developed components for all environmental extremes. The PNT also manages innovative science and technology projects, including in-vitro screening of nutraceuticals, synergistic compounds to enhance bioactive absorption, and functionality of encapsulated oils. Other team projects include the assessment of phytochemical stability, development of recovery components, investigation of muscle tissue overuse injury and repair, and the influence of nutrition on gut microbiome and performance. Team efforts focus on providing tomorrow's warfighter with increased physical and cognitive performance on the battlefield and conducting chemical, microbiological and sensory analysis of targeted ration components to ensure safety, bioavailability and ac-

ceptance of supplemented shelf-stable ration components.

ENGINEERING AND MANUFACTURING DEVELOPMENT BRANCH BRANCH CHIEF: BOB TROTTIER

COMBAT RATIONS ENGINEERING AND SUPPORT TEAM (CREST):

Team Leader, Mary Nash

The CREST demonstrates and validates the ability of transitioned technologies to ensure continuous improvement of the entire suite of operational rations while simultaneously enabling greater variety, increasing warfighter acceptance, optimizing nutrition, increasing shelf life and improving logistics via cost, weight and volume savings. Team members prepare, coordinate and approve procurement documents in compliance with DoD Acquisition Reform for transition to Defense Logistics Agency – Troop Support. The team provides pre- and post-award support to procurement throughout the entire life cycle, including technically accurate and timely responses to engineering support requests. Additionally, the CREST conducts sensory evaluation reviews of First Articles and Product Demonstration Models, used to procure military rations and components, to ensure that operational rations provide high-quality end items to the warfighter.

JOINT FOODSERVICE AND ENGI- NEERING TEAM (JFET):

Team Leader, Bob Bernazzani

The JFET designs, develops and supports best value, technologically advanced food service field-feeding equipment and systems to enhance quality of life and performance for the Navy, Air Force, and Marine Corps. The team participates in the support requirements and analyses of new military food service equipment in the design, development, fabrication, test and evaluation of concepts for Navy, Air Force and Marine Corps, and conducts engineering support and standardization for the Army, Defense Logistics Agency (DLA), Integrated Lo-

gistics Support Center (ILSC) and the U.S. General Services Administration for fielded food service equipment. The JFET also conducts food product development for the Air Force and Navy, consisting of development and production of Tube Foods for Air Force in-flight feeding and product evaluations for the Navy Standard Core Menu and Battle Messing Menus. JFET also executes projects supporting the Armed Forces Recipe Service, which involves development, testing, standardization and nutrition coding of new/current recipes used aboard ships and in shore-based dining facilities. Additionally, JFET supports/conducts research, development and engineering support in the areas of combat ration heating technologies, field kitchen appliances, alternative energy sources, burners for field kitchen appliances, cogeneration, refrigeration, sanitation and greywater recycling for all military services.

FOOD SERVICE EQUIPMENT TEAM - PRODUCT MANAGER FORCE SUSTAINMENT SYSTEMS FOOD SERVICE EQUIPMENT TEAM (PM FSS FSET):

Team Leader, Joe Jordan

In partnership with CFD, the FSET focuses on the engineering and manufacturing development, production, deployment and sustainment phases for food service equipment that consistently provide warfighters the capability to enjoy hot group meals in combat and/or training environments. Responsible for projects that field robust, efficient and proven equipment and systems for field feeding, ration storage, sanitation of field food service equipment and solid waste destruction, the team operates and categorizes its programs into four functional areas: prepare rations and food products; maintain, stabilize and distribute rations; heat-and-serve rations for remote feed; and sanitize field-feeding equipment and remediate waste.

The FSET works with CFD science and technology teams, DLA Troop Support, the Combined Arms Support Command, the JCCoE, and the Integrated Logistics Support Command.