



US ARMY NATICK SOLDIER CENTER:  
The Science Behind the Warrior: Yesterday, Today and Tomorrow

# Combat Feeding Research & Engineering Program

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# Organization

## Office of the Director-Gerry Darsch

- Program Integrator, Kathy Evangelos
- Senior Advisor, Nutritional Biochemistry/Advanced Processing, Dr. Pat Dunne

## Basic & Applied Research/Technology Demonstration

- Performance Enhancement/Food Safety, Betty Davis
- Advanced Processes/Packaging, Jeanne Lucciarini
- Equipment and Energy Technology, Don Pickard

## Advanced Development/Engineering

- Individual Combat Rations, Steve Moody
- Group Rations, Bob Trotter
- Systems Equipment & Engineering, Bob Bernazzani
- Food Service Equipment Team (PM-FSS), Gregg Gildea

## Operations/Maintenance

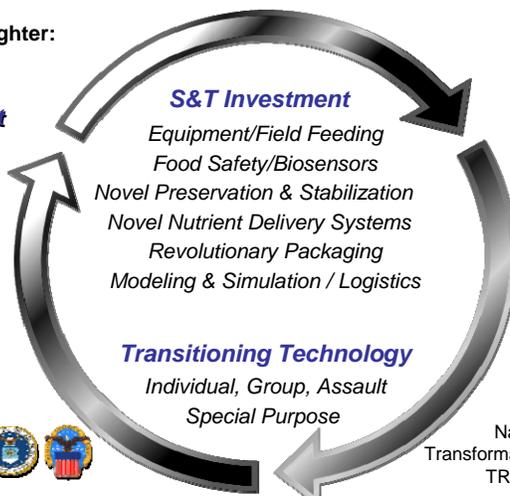
- Food Engineering Services Team, Ray Valvano

Biology  
 Nutrition  
 Physics  
 Microbiology  
 Biochemistry  
 Dairy Science  
 Bioengineering  
 Food Science  
 Food Packaging  
 Food Technology  
 Materials Science  
 Food Engineering  
 Inorganic Chemistry  
 Electrical Engineering  
 Chemical Engineering  
 Mechanical Engineering  
 Operations Research  
 Management



# Balancing Our Investment

Today's Warfighter:  
**Continuous  
 Product  
 Improvement**



Army Campaign Plan  
 MC Strategy 21  
 Sea Power 21  
 AF Vision 2020  
 Joint Vision 2020  
 National Defense Strategy  
 Transformation Planning Guidance  
 TRADOC Pamphlet 525-66



**Revolutionary Products and Capabilities**



## Program Oversight

<i>Chair</i>	<i>Voting Members</i>	<i>Joint Technical Staff</i>
Dr. Robert Foster Director, BioSystems, DDRE	Mr. John McNulty HQDA, DCS G-4	 vacant
	Maj Mike Weeks HQMC, LSF-4	 Capt Rick Kohler HQMC
	CDR James Watts NAVSUP	 Mr. Robert Winn NAVSUP
	Mr. George Miller USAFSVA	 TSgt Anne Taylor USAFSVA
	LTC Brad Hildabrand HQ DLA	 Mr. Jim LeCollier DSCP



## Combat Feeding Research & Engineering Program (CFREP)

- The CFREP is established under DoDD 3235.2E (21 May 2004)  
<http://www.dtic.mil/whs/directives/>
- Army is Executive Agent
- It provides a research, development, technology and engineering base for all combat feeding systems to include: **combat rations, field food service equipment & field feeding systems** for all of the Services and DLA
- DODD 3235.2E also establishes the Combat Feeding Research and Engineering Board (CFREB), which is chaired by Office of the Director, Defense Research and Engineering, and the DoD Nutrition Committee





## How does the CFREP Process work?

- The CFREP is a total life cycle program (6.1-6.5, OMA); Reliance 4
- The CFREP is executed by the DoD Combat Feeding Directorate at the US Army Natick RDEC, Natick, MA, an element of RDECOM, AMC
- Proposals or **Joint Statements of Need (JSNs)** are requested from the Services for new or enhanced capabilities for combat feeding systems
- JSNs are submitted to the CFD through members of the **Joint Technical Staff (JTS)** from each Service/DLA who represent the CFREB
- The JTS works with the CFD to review the existing program, **ensure Joint Service focus, integrate & prioritize efforts, & approve new starts**
- Proposals are integrated into the current program plan (10 year plan) for **final approval by CFREB/DDRE**
- The CFD maintains extensive partnerships within DoD, industry, and academia to carry out the mission of the CFREP



## Major CFREP Activities - 2007

- Feb 07 → Request for FY09-17 JSN Proposals
- Apr 07 → Mid-Year Review (on-going Projects)
- May 07 → JSN Review
- May/June 07 → Program (Ballot) Build
- June 07 → CFREB Exec Board Meeting
- June-Aug 07 → S&T Planning (6.2 JV 2020)
- 14-15 Nov 07 → CFREB Annual Meeting



# Program Build & Approval

## *JSN Presentations to JTS/PM (6.2-6.5):*

- Need/Capability
- Description
- ROI/Benefit to Warfighter
- Deliverables
- Technical Approach
- Transition

## *Program Build (JTS/PM):*

- FY09-17
- Incorporation of Approved JSN proposals
- Prioritization within each funding category
- Balance IAW President's Budget for next YOY

## *Program Approval:*

- CFREB Voting Members & Chair
- DDRE Approval



# Combat Feeding Platforms



**Individual**

**Group**

**Assault**

**Special Purpose**

- ✓ ***Warfighter Recommended***
- ✓ ***Warfighter Tested***
- ✓ ***Warfighter Approved™***

**...Meeting Today's Challenges...**

**Science and Technology**

Equipment & Energy: Thermal Fluid, Cogeneration, Thermoelectrics, Eutectics, Electrochemical Heating/Cooling, Flameless Combustion

Novel Nutrient Delivery: Glucose Modulation, Inclusion, Encapsulation, Transdermal/Buccal, Liposome Anchoring, Recovery Components

Preservation/Stabilization: Multiple Technology, Pulsed Electric Field, High Pressure, Microwave/Radio Frequency Sterilization

Food Safety/Quality: Biosensors, Rapid Assay, Electronic Nose, Volatile Organic Compounds, Peptide Arrays, DNA Polymerization

Revolutionary Packaging: Emulsion Stabilizers, Barrier Enhancement, Tamper Evidence, Nanotechnology, Coextrusion, Forward Osmosis Filtration

Modeling, Simulation & Logistics: Dynamic Nutrition Modeling, Decision Support Tools, Novel Packaging, Radio Frequency Identification, Advanced Sensors

**...Providing Tomorrow's Solutions...**

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**S&T Categories**  
**FY09-17 Topic Areas (6.2/6.3)**

- **Equipment/Energy Technology:** combustion, cogeneration, waste to energy conversion, heating/chilling for combat rations/beverages/water, refrigeration, sanitation, flameless combustion, self-powered equipment, alternative & solar energy, ethylene detection and central process control (diagnostics/prognostics), AIT/RFID technology, automated equipment, grey water recycling & reutilization, smart systems
- **Food Safety/Biosensors:** field portable biosensors, sampling, technology validation and optimization, pathogen detection (antibody, DNA, B-cell, peptides, VOC), array diagnostics, anti-microbial, probiotics
- **Novel Preservation & Stabilization:** encapsulation, micronutrient stabilization, non-thermal processing, novel thermal processing, enhanced varieties of combat ration components
- **Novel Nutrient Delivery Systems:** performance enhancement, micronutrients, nutraceuticals, buccal delivery, enhanced components, functional foods, nutrient bioavailability
- **Revolutionary Packaging:** combat ration packaging, advanced materials, plastics, polymers, nanotechnology, tamper detection, barrier enhancement, self-hydration systems, diagnostic packaging, smart packaging, primary and secondary packaging
- **Modeling & Simulation/Logistics:** RFID and sensor systems, logistics impacts on field feeding, decision support tools, optimized nutrient contents in rations

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