

Air Force, Navy and Marine Corps Equipment & Systems Update





- **Vision:**
 - To be the preeminent provider of research, development, and engineering in support of the Navy, Marine Corps, and Air Force requirements for field food service equipment and kitchen/galley systems
- **Key Technologies:**
 - Galley/kitchen design
 - Refrigeration design
 - Field Sanitation and Scullery design
 - Electric and fuel-fired food service equipment design

- Purpose:
 - To develop and support best value, technology advanced field food service equipment and systems to enhance the performance and quality of life for the Navy, AF, and Marine Corps
- Products:
 - Prototypes of kitchens/galleys, refer systems, and sanitation systems
 - Electric/fuel-fired food equipment
 - Technical reports
 - Tech Data Packages
- ROI
 - Reduce O&S costs
 - Support Services' ability to meet feeding requirements
 - Reduce maintenance/manpower requirements



Service	Project Titles
Air Force	<ul style="list-style-type: none"> - Air Force Basic Expeditionary Airfield Resources Kitchen - Air Force Electric Single Pallet Expeditionary Kitchen
Marine Corps	<ul style="list-style-type: none"> - Marine Corps Expeditionary Field Kitchen <li style="padding-left: 20px;">- Field Feeding Equipment Efforts
Navy	<ul style="list-style-type: none"> - Future Navy Galleys - Automated Shipboard Dishwashing - Automated Shipboard Cleaning - Naval Refrigeration
Joint	<ul style="list-style-type: none"> - Joint Service Refrigerated Container System



BEAR (i) Kitchen System integrated into CAMSS20EX-24 Shelter (Tyndall AFB)

Schedule

Milestones	FY06	FY07	FY08	FY09	FY10
Identify and evaluate major items of food service equipment for the BEAR (i)	8	————— 9			
Provide CIDs for BEAR shelter system/flooring system and for equipment for BEAR (i) kitchen		—————			
Identify and evaluate major items of food service equipment for the BEAR (f)			8	————— 9	
Develop and complete TDP for AF approved BEAR equipment items					9

Purpose: Provide AF new electric food service equipment; and implementation plan to support BEAR field feeding systems

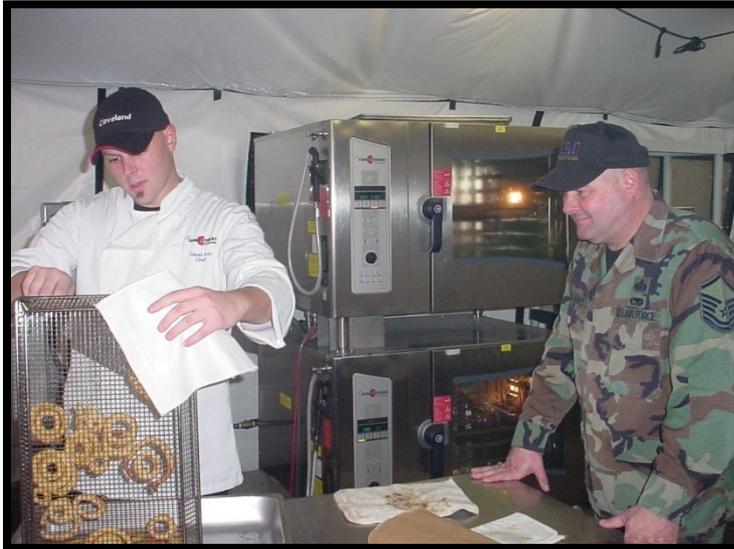
Results/Products:

- Provide AF an all electric BEAR system
- Modular system that builds on all initial equipment
- Tested BEAR-550 prototypes

ROI/Payoff:

- Reduced life cycle costs
- Improved field feeding efficiency
- Reduced logistical burden
- Transition Technical Data Package to support AF procurement contract in FY12

- Presently, the Air Force has four field kitchens. The capability of these kitchens are being redesigned and consolidated into one BEAR Kitchen System
 - Replaces Harvest Falcon, Harvest Eagle, 9-1, and 9-2 Kitchens
 - Provides new state of the art electric food equipment items
 - Prepares and serves 550-3300 Warfighters (UGR-A's)
 - Supports the Air Force's modernization and implementation efforts of BEAR Kitchens (initial and follow on)



BEAR (i) Kitchen Systems at Tyndall AFB and Dobbins ARB

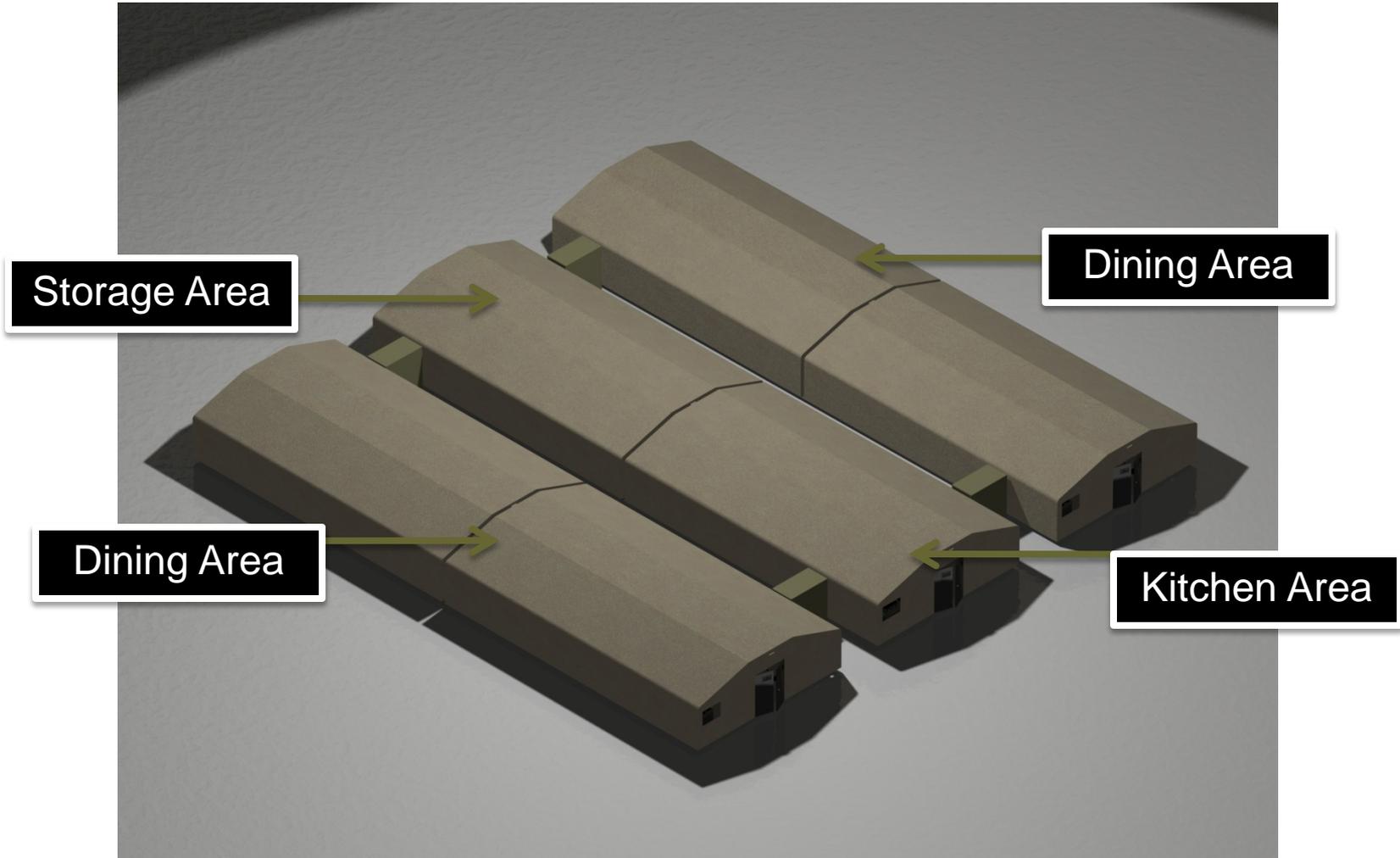


Illustration of BEAR (i) and BEAR (f) Kitchen Systems



ESPEK and CESPEK Photos

Schedule

Milestones	FY08	FY09	FY10
Procure and Test Equipment Suites	8		
Fabricate and Integrate the complete System			
Conduct In house, Ground & Air mobility testing & User Evaluations			
Develop TDP and Transition to AF			8

Purpose: To develop a compact, self contained, all electric, expeditionary kitchen to prepare and serve 550 UGR H&S™ meals and 275-550 UGR-A™ meals in austere locations

Results/Products:

- Tested prototype tent based kitchen (ESPEK) and container based kitchen (CESPEK)
- Design permits roll up into Basic Expeditionary Airfield Resources (BEAR) field kitchen system

ROI/Payoff:

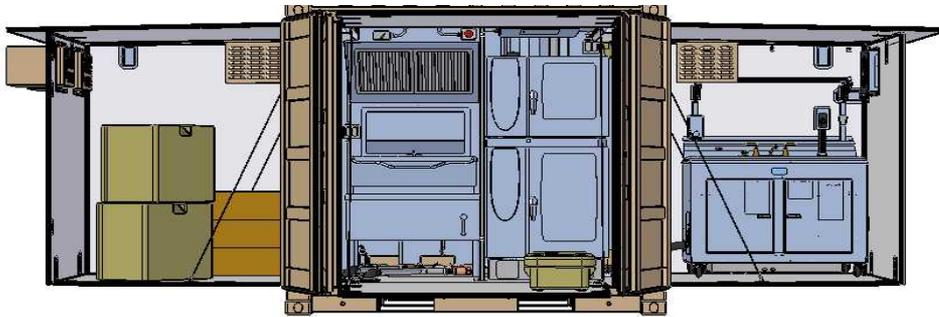
- Supports cook prepared UGR™ menus
- Supports Joint Service expeditionary requirements
- Increases morale for expeditionary Warfighters by providing initial hot meals
- Provide TDP's for both systems to support AF out year procurements

- Air Force wants to reduce the logistics burdens associated with legacy fuel fired field kitchens
 - Replaces legacy Fuel Fired Single Pallet Expeditionary Kitchens (SPEK's)
 - Phases out the current Containerized Deployment Kitchen (CDK)
 - Provides cook prepared group rations (UGR-H&S™ and UGR-A™)

Electric Single Pallet Expeditionary Kitchen (ESPEK)



Containerized Electric Single Pallet Expeditionary Kitchen (CESPEK)

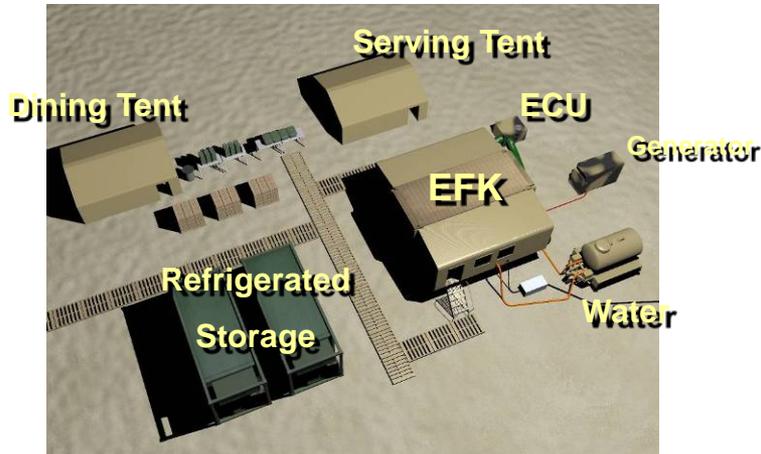


CESPEK 3D Design Models



CESPEK Photos

EFK at field site w/accessories



Schedule

Milestones	FY08	FY09	FY10	FY11
Prototype development		██████████		
Technical and Limited User Testing		██████████		
Approve System Spec			8	
Production Contract Award				8
Production Verification and/or FAT testing				██████████
Production of 6 EFK/month				██████████

Purpose:

Provide a tactical field kitchen capable of supporting >500 Marines with the full spectrum of DoD group prepared rations

Results/Products:

- Designed/modified new equipment to meet capacity and workspace requirements
- Developed, built, and tested two different kitchen designs.
- Recommend final design and build to support User testing.

ROI/Payoff:

- EFK to provide new capability that allows Marine Food Service Personnel to meet field feeding doctrine and capacity requirements

- The Marines require equipment that will enable them to provide freshly prepared, high quality foods to their forward fighting units
 - The Field Food Service System (3 container based electric kitchen) is not portable and is limited to large base camp operations
 - The tray ration heating system (fuel fired boiling water tank) is highly portable, but incapable of preparing the entire family of Unitized Group Rations
 - HQMC published a Statement of Need documenting the required capability, to prepare the full family of DoD supported field rations to include the UGR-A™ (DoD's fresh/frozen ration) and UGR-B™ (rehydrated ration) in tactical environments for a minimum of 500 Marines



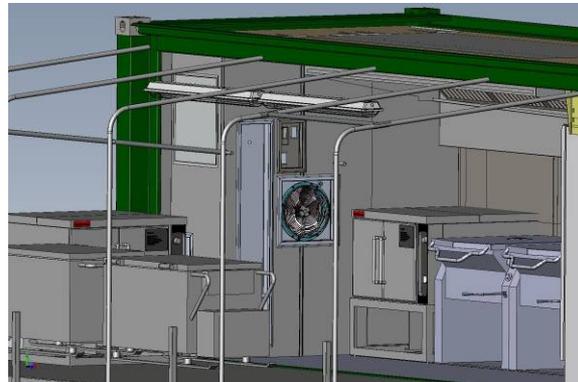
EFK at ATC for technical test



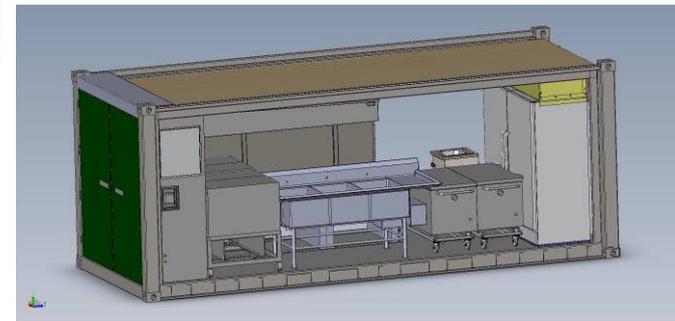
EFK at MCB LeJeune for user eval



Tray ration heater



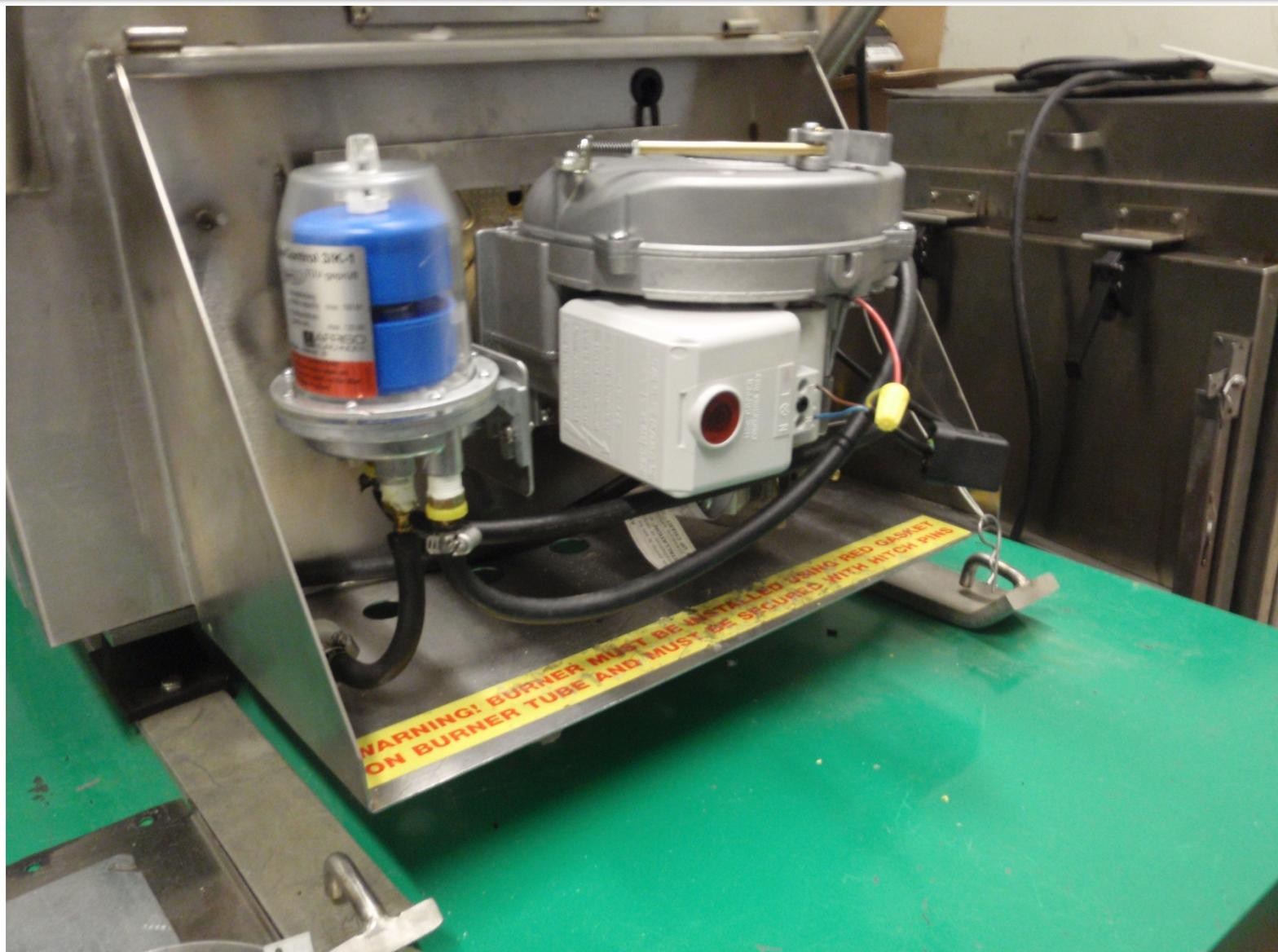
EFK III cook center



EFK III packed out



Final system configuration. The kitchen container rides on an MCC 20 trailer (supporting capacity 10 tons) and is towed by an MTVR Prime Mover (towing capacity - 11 tons). All of the components to cook, serve and clean are inside the 3:1 expandable container. The kitchen has limited (60 cubic foot) refrigeration capability. Fuel, water and a maximum of 10kW of power must be supplied for operation.







- The project focuses on consolidation, modularization, commonality, and automation technology of Navy food service equipment
 - Navy Transformation Plan optimizes total crew size including food service personnel
 - Use of legacy designs, inefficient equipment, and large galley footprints impede food service operations with Reduced Culinary Specialists

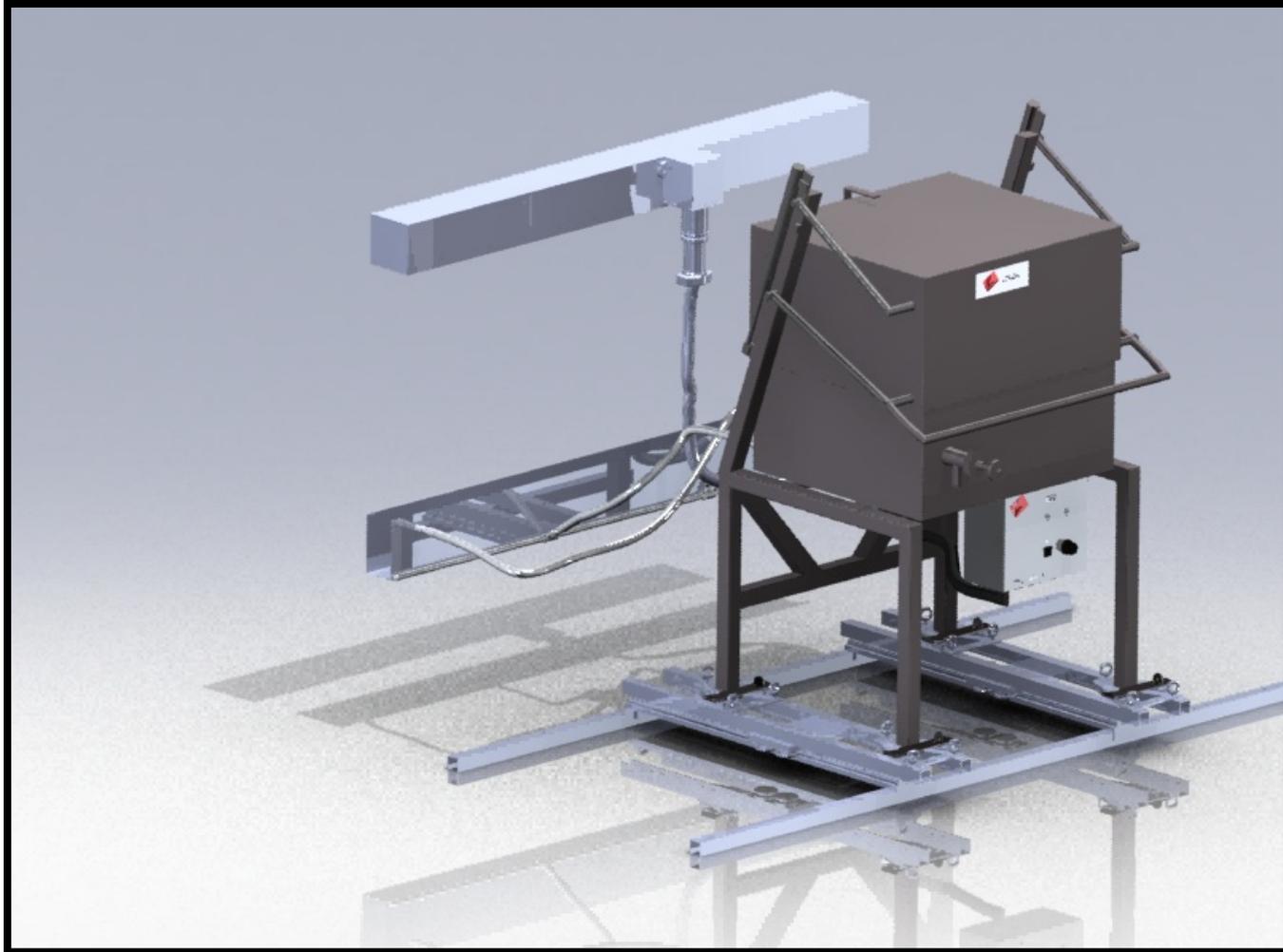


Modular Food Service System

Modular Food Service System



Modular Food Service System



Modular Food Service System

X-GREEN AUTOMATED VEGETABLE WASH/SANITIZING SINK



Modular Food Service System



Modular Food Service System Galley Concept



Automated Shipboard Dishwashing System (ASDS)



ASDS PROTOTYPE

Schedule

Milestones	FY08	FY09	FY10	FY11	FY12
Review SBIR proposals award, and administer Phase I effort	4				
Develop SOW, review, and award SBIR Phase II contract					
Monitor Phase II effort/build of ASDS prototype. Evaluate and test system.	5				
Develop shipboard prototype			6		
Test/evaluate ASDS prototype in-house					
Transition to PEO Carriers for integration of Carriers				8	

Purpose:

Develop ASDS technologies that will reduce labor and manning for Carrier Scullery operations

Results/Products:

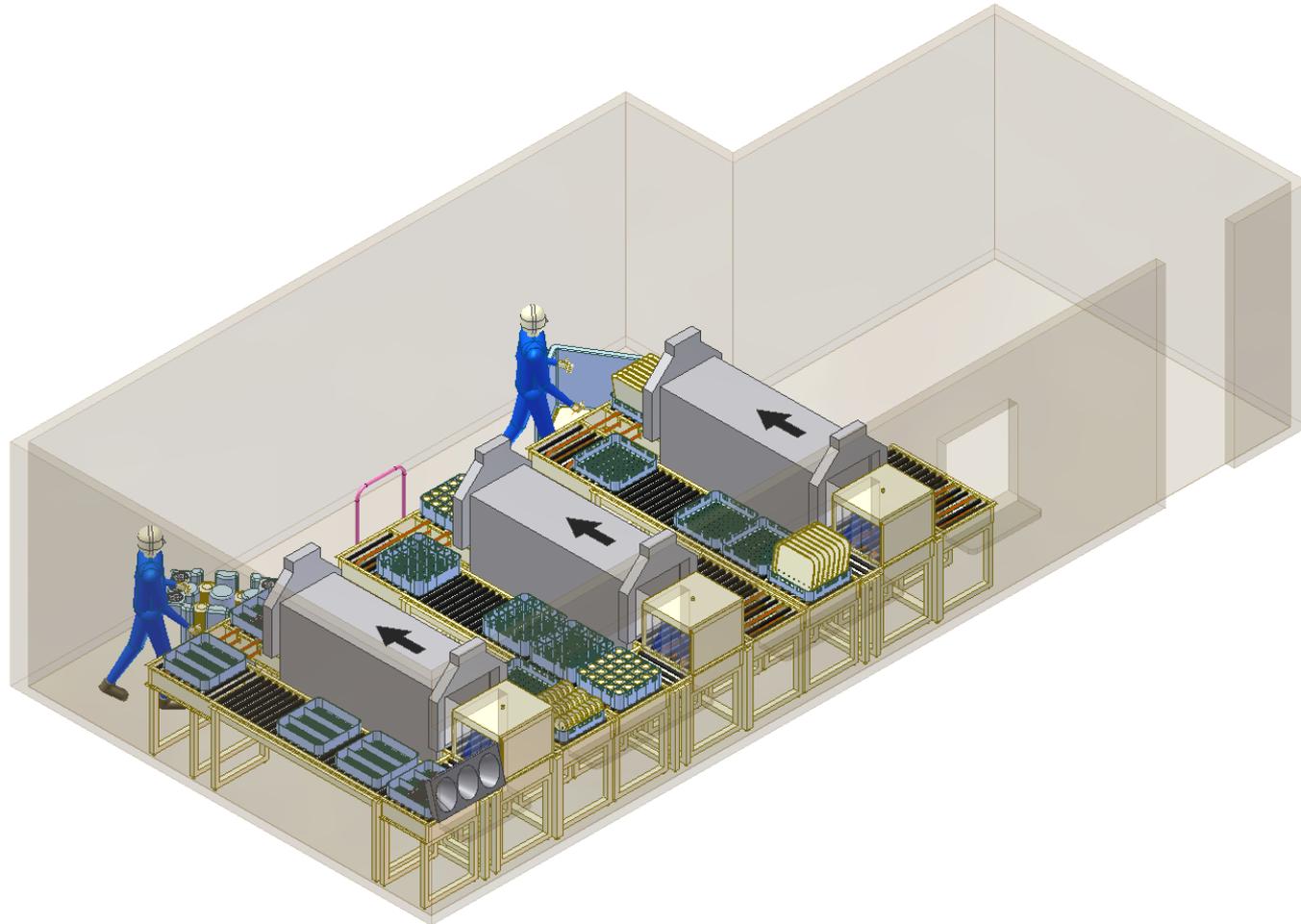
- Prepare Phase II SBIR Report
- Develop / evaluate land-based prototype
- Develop/ evaluate shipboard prototype
- Transition TDP to support Navy procurement

ROI/Payoff:

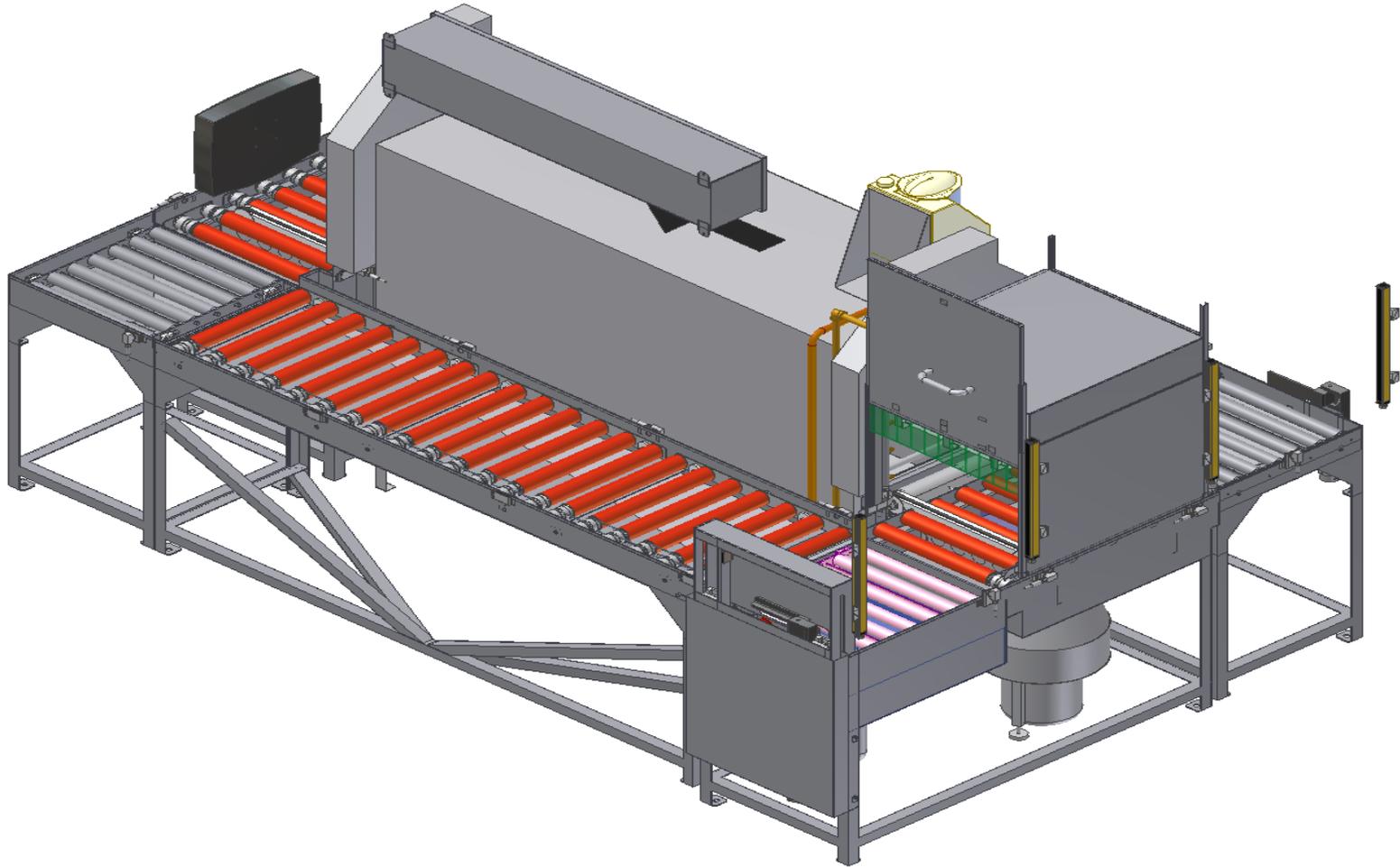
- Decrease Carrier Scullery Life-Cycle costs
- Improve efficiency of Scullery operations
- Reduce manpower requirement
- Improve morale of CS/FSA
- Transition to PEO Carriers – FY13

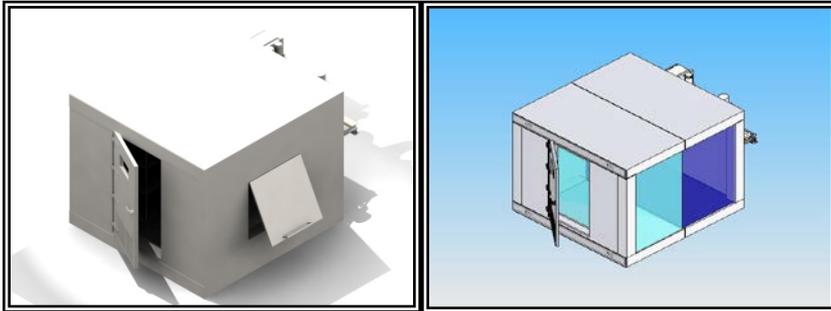
- The project is a PEO Carriers funded SBIR effort currently in a Phase II prototype development state
 - Technology focuses on automating the dishwashing process onboard naval platforms
 - Current process extremely labor intensive requiring numerous personnel
 - Technology insertion will reduce manning associated with shipboard dishwashing processes and improve quality of life for food service personnel

Scullery Three Dishwasher Modular System



Automated Shipboard Dishwashing System (ASDS)





Schedule & Cost

Milestones	FY09	FY10	FY11
Review and validate requirements	■		
Conduct Front End Analysis	■	◆ 6	
Develop design & prepare SOW		■	
Receive funding for RTOC REFR-I, conduct R&D and develop ECP		■	◆ 7
Award best value contract to build prototype NAVRP and conduct testing			■
Develop CID and APL for NAVRP			■ ◆ 8
CFREP 643747/610	50	100	141
CUSTOMER FUNDING (RTOC)	1,174		
TOTAL \$1.5 M			

Purpose:

- Develop modular, hatchable, re-configurable, dual temperature refrigerated and frozen space to supports endurance requirements for legacy/future ships and to support Navy increased ice consumption from 1.5 lbs/man/day to 2.5 lbs/man/day

Results/Products:

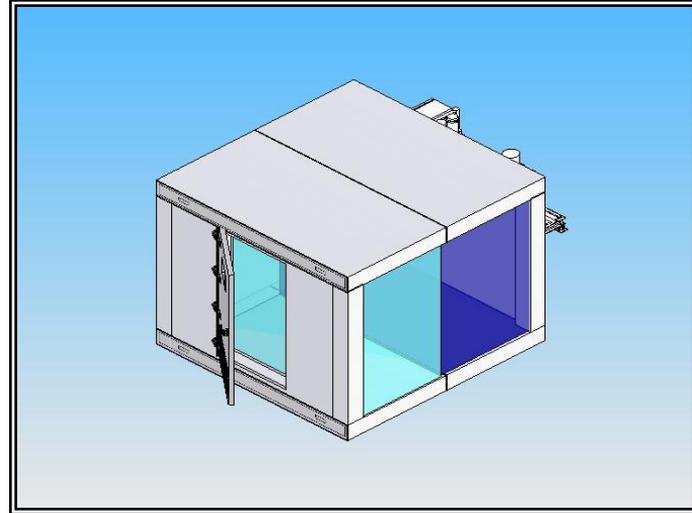
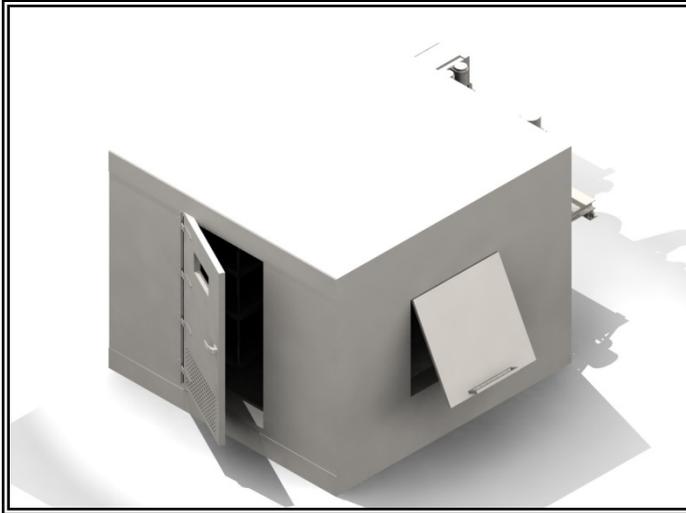
- Front End Analysis Report
- Trade off Analysis Report
- NAVRP/REFR-I prototypes

ROI/Payoff:

- Supports the Navy goal of optimizing crew size
- Decreases overall footprint in the galley
- Reduction in O & M costs

- Currently, most ships in the fleet have fixed refrigerated or freezer storage capacities that limit the use of advanced foods
- Currently fielded refrigeration assets in climates such as the Middle East, are exposed to excessive thermal loading resulting in frequent breakdowns and high O & M costs
- Technologies identified under the Reduction in Total Ownership Cost (RTOC)'s Refrigeration Improvements (REFR-I) program for Refrigerated Container Systems (RCS) shall be leveraged into the NAVRP

Modular Refrigerator / Freezer Systems





Example of an autonomous cleaning system

Schedule

Milestones	FY10	FY11	FY12	FY13	FY14
Award and administer Phase I effort	[Bar from start of FY10 to start of FY11, with diamond 4 at end]				
Evaluate proposals, award and administer Phase II effort	[Bar from start of FY11 to start of FY13, with diamond 6 at end]				
Upgrade SBIR prototype and coordinate shipboard testing	[Bar from start of FY13 to start of FY14, with diamond 7 at end]				
Complete design based on all evaluations	[Bar from start of FY14 to end of FY14]				
Transition to PEO Carriers for integration of Carriers	[Diamond 8 at end of FY14]				

Purpose:

Development of an Autonomous Shipboard Cleaning System that will support the PEO-Ships reduced manning requirements

Results/Products:

- Phase I SBIR Report
- Phase II SBIR Report
- Develop Land-based prototype
- Develop Ship-based prototype
- Transition TDP to the Navy

ROI/Payoff:

- Decrease total life-cycle costs
- Increased safety/sanitation
- Increased quality of life/morale
- Accommodates reduced CS manning requirements

- Sanitation in foodservice areas performed by Food Service Attendants (FSA)
 - Food Service Attendants come from various departments throughout the ship
 - Navy requirements state Food Service Attendants based on: 4% of the total enlisted crew; one for every 15 Chief Petty Officers; and 12% of the total officers
- Major component of Navy Transformation is an Optimized Crewing Plan

- Planned reduced crew sizes aboard all naval vessels would increase the workload for the food service personnel if labor saving systems are not implemented
 - The Cleaning & Sanitizing of Foodservice spaces is currently entirely performed manually





Concept of JSRCS in transport mode and deployed mode

Purpose: To develop a Joint Service Expandable Refrigerated Container System with advanced technologies to support group ration storage missions in expeditionary base camp environments.

Results/Products:

- Tested prototype JSRCS
- Increases usable volume
- Supports safe thawing
- Decreases fuel consumption

ROI/Payoff:

- Support Joint Service expeditionary temperature storage requirements
- Increases morale for expeditionary Warfighters
- Reduces resupply interval requirements
- Provide TDP's/MIL-PRF to the Joint Services
- Addresses WFOs: 30, 87, 102, 123

Schedule

Milestones	FY11	FY12	FY13	FY14
Develop Joint Service requirements and award an R&D contract	6			
Fabricate prototypes and conduct Contractor Testing		7		
Conduct Developmental Testing and User Evaluations			8	
Develop TDP, procurement documents and transition				9

- Joint Services are looking to increase their expeditionary base camp temperature sensitive storage capabilities without increasing the transportation footprint, power or cost
 - Rigid walled TriCon refrigerators have fixed storage volumes (~270 cu ft)
 - Current TriCon refrigerators have electric driven only capabilities
 - Current TriCon refrigerators have single temperature only capabilities



JSERCS concept in transportation mode (~270 cu. ft.)

Possible unique features/technologies:

- Highly Expandable
- Dual Temperature
- Stand alone powered
- Highly Insulated
- Thermally efficient
- Modular
- Integrated into the BEAR-550 Kitchen System
- Integrated into the Force Provider System
- Low Solar Absorptive/Insulative coatings



JSERCS concept in expanded mode (~900 cu. ft)