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FOODSERVICE SYSTEMS FOR NAVY FORCES IN THE 1990's

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13. ABSTRACT (Maximum 200 words) This report provides the Navy Food Service Systems Office (NAVFSSO) with a strategy for enhancing foodservice operations through the 1990's. Areas investigated include Enlisted Dining Facility operations, logistic support, foodservice equipment, customer service, design and layout, and the foodservice worker. Analyses consist of an assessment of current foodservice operations both ashore and afloat (customer surveys, management interviews, etc.), and a series of industry trend evaluations. Recommendations include training foodservice managers to be more competitive/aggressive in pursuing customers (increasing headcounts); promoting increased emphasis on the sailor as a customer and improving customer service; identifying high potential Mess Management Specialists (MSs) for accelerated training; modifying annual performance standards to reflect an increased emphasis on foodservice management responsibilities; developing a program/strategy to improve pride in the MS rate; CONTINUED				
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designing Centralized Food Preparation (CPF) facilities wherever possible to reduce overall operating costs; and developing a Long-Range Systems Planning and Integration Division at NAVFSSO to better identify and coordinate future foodservice requirements with both Navy developers and commodity developers. Several recommendations are already being acted upon. Others, such as the development of new management strategies and improving the image of MSs, will require follow-on programs.

The overall conclusion: opportunities for new and innovative approaches and programs exist in all areas of Navy Food Service.

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PREFACE

Under the Department of Defense Food Research, Development, and Engineering Program the U.S. Army Natick RD&E Center's Advanced Systems Concepts Directorate (formerly the Operations Research/Systems Analysis Office) initiated work on Joint Service Requirement AMAFN 81-20 (IV) entitled "Food Service For Navy Forces In The 1990's". The purpose of the project was to identify new foodservice concepts to meet the needs of Navy forces ashore and afloat in the 1990's timeframe.

The sponsor of this effort has been the Navy Food Service Systems Office (NAVFSSO). The project was initiated under CAPT Morgan, then Commanding Officer of NAVFSSO in October 1982 and was completed under CAPT Whitman in September 1986. The funding was under Program Element 62786, Project AH99, Task AA, and Work Unit 130.

The project team represented the combined efforts of three Directorates at Natick: the Advanced Systems Concepts Directorate (ASCD), the Soldier Science Directorate (SSD), formerly the Science and Advanced Technology Directorate, and the Food Engineering Directorate (FED). Program management initiated with Mr. Robert Walsh and transitioned to Dr. D. Paul Leitch. Project Manager of the overall effort was Mr. Paul Short. Principal Natick participants include Mr. George Turk, Mr. Keith Schroeder, Mrs. Dianna McAllister, Mrs. Janice Rosado, Ms. Colleen Cathcart, and Mrs. Kathy-Lynn Evangelos of ASCD; Dr. Richard Popper, Mrs. Barbara Bell, Major Charles Salter, and Dr. Barbara Quigley of SSD; and Mrs. Virginia White, Mr. Tony Lee, and Mr. Harry Dostourian of FED. Mr. Philip Brandler and Mr. Richard Richardson, past Directors of ASCD, are credited for their support of this effort. Secretarial support was provided by Mrs. Diane Sears, Ms. Katrina Schuh, and Ms. Julie Matondi of ASCD. Final editing was accomplished by Ms. Marcia Lightbody, also from ASCD.

Additional project support was provided by Drs. J. Edward Sunderland and Kirby Hayes of the University of Massachusetts. Also contributing from the Graduate School were Mr. Lars Marshall and Mr. Vinod Maudgal. Mr. Robert Porter of the U.S. Army Construction Engineering and Research Laboratory is also acknowledged for his support.

LIST OF ACRONYMS AND TERMS

Ship Classifications

AFS	- Combat Store Ship
AO	- Oiler
AS	- Submarine Tender
CGN	- Guided Missile Cruiser (nuclear propulsion)
CV	- Aircraft Carrier
DD	- Destroyer
DDG	- Guided Missile Destroyer
FFG	- Guided Missile Frigate
LHA	- Amphibious Assault Ship
LPD	- Amphibious Transport Dock
LPH	- Amphibious Assault Ship (helicopter)
LST	- Tank Landing Ship
SSBN	- Ballistic Missile Submarine (nuclear propulsion)
TAF	- Fleet Stores Ship

Other Acro /m-

AC&R	- Air Conditioning and Refrigeration
AFQT	- Armed Forces Qualification Test
AFS	- Refrigerated Stores Ship
AI	- Artificial Intelligence
AM	- Amphibian
ANOVA	- Analysis of Variance
ASCD	- Advanced Systems Concepts Directorate
ATM	- Automatic Teller Machine
BAS	- Basic Allowance for Subsistence
BOQ/BEQ	- Unaccompanied Personnel Housing; Bachelor Officer/Enlisted Quarters

ACRONYMS AND TERMS

(Continued)

CAD	- Computer-Aided Design
CAP	- Controlled Atmosphere Packaging
CFP	- Centralized Food Preparation
CFPF	- Centralized Food Preparation Facility
CO	- Commanding Officer
CONFORM	- Concept Formulation Group
CONUS	- Continental United States
CPO	- Chief Petty Officer
EDF	- Enlisted Dining Facility
EM	- Electrician's Mate
ET	- Electronics Technician
FED	- Food Engineering Directorate
FSA	- Food Service Attendant
FSD	- Food Service Division
FSO	- Food Service Office
GEDUNK	- Snack Store
GQ	- General Quarters
MARCORPS	- Marine Corps
MDMAA	- Messdeck Master-at-Arms
MLSF	- Mobile Logistics Support Force
MM	- Machinists Mate
MS	- Mess Management Specialist
NAVFSSO	- Navy Food Service Systems Office
NAVPERS	- Naval Personnel
NAVSEA	- Naval Sea Systems Command

ACRONYMS AND TERMS

(Continued)

NAVSUP	- Naval Supply
NOB	- Naval Operating Base
NRA	- National Restaurant Association
OCONUS	- Outside Continental United States
OPTAR	- Operational Target Allowance
REFTRA	- Refresher Training
RIK	- Rations in Kind
RP	- Republic of the Phillipines
RTE	- Ready To Eat
S2	- Enlisted Food Service Division
S5	- Ward Room Food Service Division
SMI	- Supply Materiel Inspection Team
SNAP	- Ship Nontactical Automated Data Processing System
SRA	- Ship Restricted Availability
SSD	- Soldier Science Directorate
SUB	- Submarine
SUPSHIPS	- Superintendent Shipbuilding and Repair
UHT	- Ultrahigh Temperature
UMASS	- University of Massachusetts
UNREPS	- Underway Replenishment
USO	- United Service Organization
VERTREPS	- Over the Horizon Replenishment
XO	- Executive Officer

FOODSERVICE SYSTEMS FOR NAVY

FORCES IN THE 1990's

I. SUMMARY

The purpose of this report is to provide the Navy Food Service Systems Office (NAVFSSO) with a strategy for enhancing foodservice operations through the 1990's. To achieve this objective an in-depth assessment of the current foodservice system was conducted. At the same time a number of related industry surveys were also undertaken by Natick. Several of the areas investigated included Enlisted Dining Facility operations, logistic support, foodservice equipment, customer service, design and layout, and the foodservice worker. The overall conclusion is that there are opportunities in all areas of foodservice to develop new and innovative approaches and programs.

Several of the recommendations include training foodservice managers to be more competitive/aggressive in pursuing customers (increasing headcounts); promoting increased emphasis on the sailor as a customer and improving customer service; identifying high potential Mess Management Specialists (MSs) for accelerated training; modifying annual performance standards to reflect an increased emphasis on foodservice management responsibilities; developing a program/strategy to improve pride in the MS rate; designing centralized food preparation (CFP) facilities wherever possible to reduce overall operating costs; and developing a Long Range Systems Planning and Integration Division at NAVFSSO to better identify and coordinate future foodservice requirements with both Navy developers and commodity developers.

Several of these recommendations, such as a more intensive investigation of CFP, the shipboard bakery project, and the development of new equipment concepts are already being acted upon. Others, such as the development of new management strategies and improving the image of MSs will require follow-on programs. This report should not be viewed as the final, definitive plan for foodservice through the 1990's, but rather as the first step in a continuing planning process to better meet tomorrow's challenges.

II. INTRODUCTION

A. Objective

In broad terms, the objective of this investigation was to identify future (1990's) Navy requirements and develop alternative foodservice design concepts to meet these requirements. More specifically, the purpose was to identify foodservice requirements stemming from the future strategic and tactical roles of the major Naval commands and to develop a full range of alternative feeding concepts to address these requirements. This objective would take into account all aspects of foodservice both ashore and afloat from A Ration to battlestation feeding.

B. Approach

The comprehensive approach that developed to address this multifaceted project was divided into several segments. The first involved identifying the long-range operational plans and requirements of the major naval commands. Any significant differences between peacetime and wartime operations were of particular interest. Interface requirements between organizations such as the Marine Corps for amphibious assault operations, Navy participation in the Rapid Deployment Joint Task Force, and Military Sealift Command responsibilities would also be investigated. An understanding of the Navy's shipbuilding program, how requirements for new classes of ships and foodservice systems are generated, the overall length of the design cycle, ship design priorities, and lead-time requirements for foodservice design input would be developed to ensure that any new concept proposals were implementable within the scope (time frame) of this project.

Next, a cross-section evaluation of ships throughout the fleet was conducted with emphasis on foodservice system operations and deficiencies to provide a further source of information on which to base future recommendations.

Following these investigations a set of alternative foodservice system concepts would be developed. In the development of these alternative concepts, a number of subelements would be broken out and analyzed, including: new food items; improved operating concepts; new recipes; greater exploitation of computer-assisted job tasks including increased levels of food production automation; more lightweight, reliable, durable, and energy efficient equipment; novel means for reducing manpower requirements; new customer service concepts; and more efficient inventory/storage models. Subsistence replenishment requirements, both at sea and in port would also be analyzed for potential streamlining. The concepts developed were not to be specific to one class of ships or a unique situation, but rather generic in nature so as to make them as universally applicable throughout the Navy as possible. Concept designs were also not limited to current state-of-the-art technologies.

Alternative concept proposals selected by the Navy would then transition, where applicable, to Advanced/Engineering Development (6.3) for necessary system hardware development.

C. Project Planning

The initial project plan, as briefed to NAVFSSO in October 1983, identified six evolving areas of particular interest to the study team. The idea was to organize and consolidate the large number of individual areas of interest into a few categories that would make the study more comprehensible. It was felt that the following were the key driving influences that had the greatest potential to impact future Navy Food Service design concepts. These included:

- future Navy mission requirements (to include new ship designs)
- advanced/next generation foodservice technologies
- future MS personnel resources
- commercial trends
- automation technology
- nutritional trends/requirements

As the study evolved, it became evident that "Nutritional trends/requirements" was more closely aligned with "Commercial trends" than previously thought and so the two were consolidated. Additionally, some topics, such as automated data processing applications and submarine foodservice systems were being specifically addressed on other projects. It was not the intent of the project team to duplicate these efforts, only to maintain an awareness of ongoing work/results in these areas and the potential impact on future systems.

In the final analysis, these various subject matter investigations would be pulled together to identify a series of opportunities that management could embark on to enhance the future image of Navy Food Service. The extensive range of the Navy Food Service system, coupled with the dynamics of change, however, limited this study to addressing more near-term relevant issues. As such, all of the answers to the future of Navy Food Service will not be found in this report. Indeed, more questions may arise than answers. The report should not be viewed as an end to the planning process but rather as a beginning.

III. DATA COLLECTION METHODOLOGY

Data collection was divided into three principal phases. The first, major command level data collection, was directed at identifying both ongoing, emerging, and future trends that would tend to have a broad impact on major areas within the Navy. What should the study team be aware of in future foodservice and planning endeavors as a result of the ship construction program or future operations plans? The second phase involved data collection at the individual command level and sought to assess the general status of foodservice within the Navy today. The intent was to derive a better understanding of Navy Food Service on the front line to observe the day-to-day routines, and the successes and problems that go along with feeding people in this unique environment. In other words, where should the study team focus its project resources to achieve the maximum payback for the Navy? The third phase focused on identifying commercial trends in the areas of food equipment, products, service styles, etc.

A. Major Naval Commands

Interviews were conducted on a face-to-face basis with various military and civilian personnel who were responsible in specific areas that were of interest. Some contacts were known to us through previous Navy projects, some were identified with the help of the Navy Joint Technical Staff Representative at Natick, and others were the result of numerous phone calls to commands explaining the project and the kind of information being sought. In a number of cases Natick personnel made return visits to gather additional information. While focusing in different subject areas, these interviews were similar in that the interviewers all sought to

- gain a better understanding of how things exist/operate in the Navy;
- identify Navy planning documents that would likely result in significant future changes, and
- encourage the interviewees to express what changes (in their area) they would like to see in the future.

Interviews were conducted with representatives at the following commands:

NAVAL SEA SYSTEMS ENGINEERING COMMAND

- Naval Sea Systems Command/Naval Supply (NAVSEA/NAVSUP) Liaison Officer
- Concept Formulation Group (CONFORM)
- Habitability Project Manager

NAVAL SUPPLY SYSTEMS COMMAND

- Logistics Plans and Controls
- Fleet Liaison Branch
- Ship Non-Tactical Automated Data Processing System (SNAP)
Project Manager
- NAVFSSO Staff

NAVAL SURFACE FORCES ATLANTIC FLEET

- Mobile Logistics Support Force (MLSF)
- Habitability Project Manager

NAVAL AIR FORCES ATLANTIC FLEET

- Force Supply Office
- Supply Materiel Inspection (SMI) Team

NAVAL SURFACE FORCES PACIFIC FLEET

- Force Supply Office

NAVAL SUBMARINE FORCES ATLANTIC FLEET

- Squadron Supply Office

B. Individual Naval Commands

The investigating team set out to identify the types of ships that would be most appropriate to visit and, from these, to select the latest class of each. In this instance, the term "most appropriate" meant ship types that existed in large enough numbers to affect a significant portion of the afloat population and whose mission (function), in all likelihood, would continue well into the future. Viewing the latest "class" of ships was important, too, in that the study team wanted to see the very latest in applied design/equipment technologies.

Ships were generally selected for some representative feature the study team wanted to observe, such as the athwartship serving line on the McKee, the all electric state-of-the-art galley on the Nicholas,

the Monongahela with its Central Food Preparation Facility designed by NAVFSSO, the Jackson with its subsistence storage pods, and the Kincaid and the Nicholas as examples of the "minimally manned" ship concept.

The data collection plan called for visiting comparable ships on the East and West coast in order to observe any operational differences that arose as a result of stationing. Additionally, the study team wished to survey several ashore Enlisted Dining Facilities, speak with members from Food Management Teams on both coasts, and to survey MSs operating both an Unaccompanied Officer Personnel Housing Unit and an Unaccompanied Enlisted Personnel Housing Unit.

The data collection visitation that evolved is in Table 1.

Table 1. Navy Facilities Visited for Data Collection

West coast	East coast
<u>Afloat facilities</u>	
USS Constellation (CV-64)*	USS Independence (CV-62)
USS Bainbridge (CGN-25)	USS Mississippi (CGN-40)
USS Kincaid (DD-965)	USS Kidd (DDG-993)
--**	USS Nicholas (FFG-47)
--**	USS Nassau (LHA-4)*
--**	USS Guam (LPH-9)*
--**	USS Trenton (LPD-14)*
--**	USS Manitowac (LST-1180)*
USS McKee (AS-41)	--**
--**	USS Monongahela (AO-178)
--**	USNS Rigel (TAF-58)
--**	USS San Diego (AFS-6)
--**	USS Jackson (SSBN-619)
<u>Ashore facilities</u>	
32 ST EDF, San Diego	NOB Norfolk (EDF, BOQ)
FMT, San Diego	FMT Norfolk
--**	NAS Norfolk (EDF, BEQ)
--**	NAS Oceana (EDF)

*

underway data collection with embarked Marine Detachments

**

no comparable vessel visited

As can be imagined in scheduling visits with active duty commands, what is initially planned is not necessarily what happens. First, there always was and always will be problems with getting data collection personnel aboard ships while underway. A data collection team of greater than two individuals can create accommodations problems even on an aircraft carrier. In projects of this nature where the type and amount of data to be collected is extensive and the team has only one opportunity to get the information, an undermanned team becomes a serious handicap. Compounding the problem was the restriction on females aboard combatants at sea. These factors caused us to face an early decision either to limit the scope of the underway data collection or forgo altogether the opportunity to observe the full dynamics of foodservice operations while underway.

As can be seen from the list of ships visited, a compromise of sorts was struck in that "at sea" data were collected on a more limited basis on an aircraft carrier with the Air Wing embarked and on four amphibians with embarked marine detachments. Other ships were visited in port with the entire project team participating (including females) so that all team members would have a basic and similar understanding of shipboard foodservice operations.

A second problem focused on the age of the ships we visited. Although our stated preference was to visit newer vessels, for instance, Ticonderoga-class cruisers, if all that was available was a Bainbridge-class cruiser, then the choice was simple.

Data collection customarily took three working days at each command, including introduction and exiting interviews. The data collection team typically consisted of the project manager, one or two operations research analysts, one equipment specialist, one dietician, one behavioral psychologist and one government contract individual. The data collection plan was broken down into four main areas as follows:

- command operations and maintenance
- foodservice operations
- foodservice equipment
- human factor issues (crew and MS surveys).

Interviews were generally conducted with the following personnel: the Supply Officer, Medical Officer, Engineering Officer, Food Service Officer, Leading MS, galley supervisors and personnel, breakout personnel, and bakery personnel. Written surveys were administered to Enlisted Dining Facility (EDF) customers and MS personnel.

The objective of the surveys was to determine, from the opinions of current Navy foodservice customers and workers, areas for improving Navy foodservice in the approaching decade. To meet this objective, 899 questionnaires were administered to enlisted customers that included ship's company, air wing, and Marine Corps personnel; and to 237 officers on board several classes of ships. Also surveyed were 215 afloat Mess Management Specialists, 64 ashore EDF MSs and 55 MSs assigned to Unaccompanied Personnel Housing (Bachelor Officer/Enlisted Quarters (BOQ/BEQ)).

Although the data collection plan is lengthy, it may be of some value to the reader to scan an outline of the plan to get a feel for the extensive amount of information that was solicited. See Appendix A.

C. Trends

This phase of the data collection effort centered on evaluating all aspects of the foodservice industry, including equipment, customers and food service workers. Data were collected pertaining to the evaluation (assessment) of advanced foodservice technologies, including virtually every aspect of food service such as food products, packaging, equipment, storage/distribution layout and design, etc. The University of Massachusetts' (UMASS') School of Food Science and Nutrition and Natick's Food Engineering Directorate (FED), and Advanced Systems Concepts Directorate (ASCD) participated in the investigation of new food products, ingredients, prepared items, processing and packaging trends. In another segment of the investigation the UMASS School of Engineering, in cooperation with FED and ASCD, investigated both military and commercial trends in foodservice equipment and facility design. Many types of equipment were addressed including food production equipment, customer service equipment, waste disposal equipment, environmental systems, and storage/distribution systems.

Population

Further investigations conducted by the Soldier Science Directorate (SSD) at Natick focused on the future labor force the Navy would be drawing upon to fill MS billets. What would the future MS be like? What would be the availability of this resource, competition from the private sector, demographic characteristics, sex, age, marital status, ethnicity, education etc. Given that the MS rate is the second largest in the Navy, i.e., heavily man dependent, it seemed appropriate that some attention be focused on this area.

Industry

Lastly, an analysis of customer trends focused on current patterns in the commercial sector and the identification of emerging and future ideas. Most important was what would survive into the future to affect Navy Food Service? The analysis included, among other things, eating styles, patterns, types of foods and lifestyles changes, such as nutritional awareness.

IV. SURVEY FINDINGS

A. Major Naval Commands

In identifying future Navy requirements Natick was particularly interested in such factors as new ship designs, fleet organization, operations, location, readiness, and endurance requirements. The customary approach in initiating a comprehensive investigation such as this would be to first review a long-range planning document similar to Airland Battle 2000, Army/21 or Marine Corps (MARCORPS) 2000. The analogous Navy document, however, was under revision at the time and was unavailable.

While Natick had general knowledge of fleet makeup and operations as it existed in 1983, the objective was to learn more about future Navy plans and the potential impact on system designs and operations. From the "new ship design" perspective what we learned was a firm condition: given the long service life of the typical ship, the ongoing Service Life Extension Program (SLEP) for aircraft carriers, and the build-up to a 600-ship Navy using current designs, the course that would take the Navy well into the next decade had essentially been set.

Having to rely primarily on anecdotal data from interviews, we concluded that, with few exceptions, there were no major ship design or operational modifications planned that would have a significant effect on foodservice system designs throughout the 1990's time frame. Further, in discussions with the Concept Formulation Group (CONFORM) at NAVSEA in regard to future ship designs, we were informed that the full cycle from conceptualization to commissioning could take anywhere from 20 - 25 years. The point being, that any revolutionary ship designs being considered (even if we were aware of them) were beyond the time frame of this effort.

In the course of conversations with the various commands, a number of points, listed below, surfaced of initial interest to the study group.

Planning

- The resources to effectively address long-range planning were limited.

Habitability

- Habitability lacked influence to compete successfully in the overall ship design process;
- The revised habitability standards of 1979 are still considered good.

- Habitability upgrades were more frequently left to the individual commands on a self-help basis.

Ship Design

- A prototype NAVSEA computer-aided design (CAD) model does exist for the design of berthing spaces but not foodservice.
- A drive is apparent towards the development of standardized ship modules (including foodservice) that would fit together depending on the mission of the ship undergoing construction/modification.
- A significant concern aboard ships is weight, but subsistence represents only a negligible contribution.

Food/Foodservice

- Importance is given to the traditional separation of the officer and enlisted foodservice facilities.
- A long-term implementation plan exists for Shipboard Nontactical Automated Processing (SNAP) I and II where foodservice operations hold a low priority.
- Type II packaging requirements and the potential cost burden to the Navy are concerns.
- Ration densification and increased sustainability, particularly in the Mediterranean Sea and Indian Ocean, are being emphasized.
- Over-the-horizon replenishments (VERTREPS) appear as a future possibility.

Food Equipment/Galley

- The need to design shipboard foodservice equipment primarily for ease of maintenance is increasing.
- Maintenance procedures should be more user friendly; too many items are apparently being discarded because ships cannot make repairs on their own.
- Galley steam requirements on gas-turbine-driven ships present a problem.
- Food equipment manufacturers' compliance with 440-volt equipment is improving.
- The future may see refrigerated stores ships (AFSSs) shift from Surface Forces Command to Military Sealift Command (MSC) control.

- Wartime MLSF supply scenarios appear little different than peacetime operations.

While all of the above were issues that the team would consider either directly or indirectly in the overall study, four areas, in particular, stood out as having greater potential to affect future foodservice design initiatives on all classes of ships. The four future trends/thrust areas that were of primary interest to the study group had broadbase application:

- reduce manpower requirements (minimal manning concept)
- conserve/minimize utility usage
- minimize total foodservice space requirements
- maximize endurance requirements (subsistence storage)

The potential implications of reducing manning levels aboard ship extend well beyond having fewer people to feed. There will also be fewer MSs with which to feed the people as well as fewer foodservice support personnel, i.e., messcooks, equipment repair and maintenance personnel, and working parties for loading stores.

Relative to utilities, the advent of gas turbines has resulted in the Navy's near-complete reliance on electrically powered foodservice equipment and a need for auxiliary boilers. The availability and usage of fresh water is a constantly recurring issue.

Finally, overall design and space limitations on future class ships will push designers to come up with more novel and efficient solutions to crew feeding. Experiences with resupply in the Indian Ocean and elsewhere stand as reminders of the need to strive for a maximum endurance capability that does not compromise customer satisfaction with the end products.

B. Individual Naval Commands

This section consists of the verbal command interviews, customer satisfaction surveys, Mess Management Specialist (MS) surveys, and the MS image surveys.

Command Interview results were compiled into a broad overview of the current systems to identify areas with the greatest potential for improvement. Comments that are worded in the negative should not be viewed in the sense of a criticism, but rather as an opportunity to make the overall system better. Points of interest that arose out of these subjective interviews and observations are listed below as findings in five major areas.

Findings: General Operations/Management

1. Command level support/interest in foodservice appeared to be a good performance indicator. This was most evident when command support/interest was judged to be poor.

2. The majority of ships visited provided poor weight control programs for problem customers. Overall, the team felt strongly that this stemmed more from a lack of understanding of the problem and potential solutions (MSs and medical personnel) than from a lack of caring. The whole area is admittedly a complex one, but proactive approaches to the problem did not appear widespread.

3. Pest control management appeared excellent aboard most ships visited. Outbreaks were quickly and aggressively handled.

4. For various reasons nearly half of the ships visited were not offering fast foodservice. One reason given was that the "cooks had to work too hard to do it" so management didn't offer it.

5. Rather than subdividing the problem of waste management into a number of categories i.e., disposal equipment, containment areas, etc. the issue will be stated here collectively as a foodservice "operations problem" of significant proportion for many ships.

6. The availability of effective, quality cleaning gear through the normal supply system was rated poor.

7. Vertical resupply was, by far, the preferred method of underway replenishment.

8. In an unfortunate number of instances Food Service Officers were quite blunt in stating that within the Supply Department foodservice was considered the worst assignment of all. MSs were viewed (within the Supply ratings) to be the most troublesome of all to manage.

9. Overall, sanitation throughout the commands we visited was good.

10. Battlestation feeding concepts, in nearly all cases, appeared to be ill conceived and geared only to "drill/refresher training (REFTRA)" scenarios.

11. The "Open Galley" sandwich concept observed on submarines is highly commendable and should be expanded (in a modified version) throughout the fleet.

12. Food was consistently being prepared too far in advance for several reasons including a lack of proper food-holding equipment; concern for unscheduled interruptions such as utility outages, General Quarters, and man overboard drills; and at times, merely for the convenience of the cooks. Most management personnel we spoke with were fully aware of "progressive cooking" and many Food Preparation Worksheets (1090's) cited proper batch sequencing, but in reality - few commands did it. The pervading overall attitude was aptly articulated by one Master Chief - "better the meal is overcooked than not on time".

13. In virtually all cases there was a noticeable absence from the galley of the FSO, particularly at meal time. Similarly, there was a lack of onsite management by the more senior MSs in the majority of foodservice operations observed.

14. A good deal of frustration with the menu review board process was sensed. The team felt that in large measure the problems arose from a "them vs. us" mentality between S2 (the Food Service Division) and the ship's company. MSs assume a defensive posture feeling the crew doesn't understand why many things cannot be done and the crew representatives get tired of listening to excuses as to why things cannot be changed.

15. Ships with Central Food Preparation appeared pleased with the system. Officers generally shared this enthusiasm. Concerns were expressed by S2 relative to a lack of portion control in Wardroom and the CPO Mess. Private messes did indicate a desire to be able to digress from the EDF menu.

16. Probably one of the more consistently observed problems (and one that the study team found particularly distressing) was the lack of serving line supervision/management during meal periods. Long product resupply delays, runouts, dirty serving lines, poor control over foodservice attendants, poor attitudes on the part of the customer service team, desserts being put on the line in sheet pans and pie pans as self-serve items, and lower than average serving line speeds that resulted in long waiting lines were all too frequently observed. In some cases this same lack of attention carried over into the salad/beverage bar area. The bottom line was that no one was in control with the necessary authority to keep this segment of the operation running smoothly and professionally.

17. Some foodservice operations were providing only one entree at meal times.

Findings: Foodservice

1. One Foodservice Management Team member commented that certain types of customized/convenience foods should be more aggressively exploited to allow MSs more time in such areas as entree preparation. The study team not only agrees with this philosophy, but would like to see it further expanded.

2. A number of ships surveyed that had been involved in the Lebanon crisis, or in such areas as the Indian Ocean, cited a noticeable decrease in the level of support provided by AFS's and the like.

3. Where offered, fast foodservice operations were responsible for higher than average customer participation rates.

4. Many commands were using plastic messgear that foodservice managers rated as adequate. One command switched to china during in-port periods. In only one case was the physical condition of the plastic messgear deemed unacceptable for crew use by the study team. This is not an approval of plasticware and/or the serviceware system as a whole. Unacceptable conditions frequently found were wet trays, cold trays, messy tray areas, inadequate quantities of glasses, hot cups used for cold beverages, and no teaspoons.

5. Relative to the use of freeze-dried, compressed products, the majority of ships used them although most felt the quality was only adequate and many felt the cost was too high. Two ships would not use them.

6. There was virtually universal agreement on the need for improved variety, quality, and shelf-life of fresh fruits and vegetables.

7. Product comments: packaging of liquid shortening and ultra-high temperature (UHT) milk was poor; frozen eggs--all types--were good (an interesting fact since shell eggs were being used nearly exclusively aboard all ships); coffee creamer was poor; the prebreaded chicken very good; fish squares, roast beef, and pepperoni were all poor; and individual servings of ready-to-eat cereal were considered too bulky to carry all that was required during deployments.

8. Most, but not all, ships took advantage of at least some convenience bakery items.

9. The cycle menu in use on most ships appeared to be a perpetual document that never changed.

10. One large ship mentioned that it realized how popular lasagna was, but that it just couldn't produce the quantities needed to serve the crew.

11. A number of ships stated that they would like to use more convenience foods, but that they were bulky and storage space was limited.

Findings: Foodservice Equipment

1. Many on a number of ships cited a lack of repair dollars with which to fix/maintain foodservice equipment.

2. Foodservice personnel on larger ships, amphibians in particular, cited a critical need for trash compactors. Problems with grinders were scattered throughout the survey.

3. With the exception of one or possibly two ships - none of the foodservice operations we visited had any hot food holding units.

4. Some commands were effectively using Engineering-rated messcooks for food equipment repair.

5. Scullery systems appeared to be a problem in most operations. No spare parts and the frequency of repairs were cited most often.

6. Conveyor broilers were considered too hard to clean - some that were in place were never used.

7. Excess delays in receiving standard stock-ordered equipment, i.e., one year for a soft serve unit, 11 months for a milk dispenser, and one year for a mixer and freezer.

8. A few commands felt that they could do without coffee urns due to

low consumption demand.

9. Messdeck furniture (chairs) was rated poor by foodservice personnel.

10. Subsistence conveyors were down too often.

11. Numerous problems were cited with pressure steamers, i.e., operations, cleaning, gaskets, etc.

12. Oven door and calibration problems were frequently mentioned.

13. Inability to repair electric kettles (underway) was a problem.

14. Deep fat fryers were too small (undersized units were initially installed). Temperature recovery rates were poor, a condition seldom realized or understood by many managers.

15. The Engineering Department, in a number of cases, felt their people needed better training on foodservice equipment diagnostic/repair procedures. Few Engineering Officers felt that a proliferation of solid state foodservice equipment would present any repair problems for them.

16. Microwave ovens and steamers had not been installed on all ships visited.

17. Infrared heating lamps were observed to significantly detract from the appearance of the food on the serving line.

18. Carbonated beverage dispensers were frequently cited for a variety of problems. Ice makers received a share of complaints too.

19. Problems with the vent/grease extraction system were mentioned on the majority of ships surveyed.

20. A few commands cited excellent support from the Engineering Dept., but the majority of foodservice managers were not pleased with the repair support they received.

21. When asked to rank order the types of repairs most frequently needed, electrical problems were number one, followed by mechanical problems, and lastly air conditioning and refrigeration (AC&R) problems. The consistency of this response was surprisingly strong. Not surprising was that electrical problems accounted for 50-70% of all needed repairs.

22. Lack of standardization of equipment and repair parts was cited. Poor availability of repair parts was noted while deployed (particularly in the Mediterranean).

23. Repair access on equipment was also mentioned as a frequent problem.

24. The majority of commands did not have any calibration kits onboard, particularly for beverage dispensers and Frispo(R) units.

25. In two instances Frispo units were installed in remote areas of the galley away from deep fat fryers. In two other cases the units did not work and the ships did not have the calibration/repair kit and/or were experiencing difficulty with the local vendor in repairing the units.

Findings: Personnel and Training

1. Most of the foodservice officers felt that the Supply Corps School foodservice training curriculum was poor and did not adequately prepare them for managing foodservice operations.

2. No foodservice industry publications were available on any ship we visited. Also, no personnel (management or otherwise) were ever sent to a regional or national industry trade show.

3. While in port, foodservice personnel (particularly senior enlisted management) should be exempt from or not placed on watchstanding bills during foodservice hours. With typically only a few of these key personnel per ship, the team feels they should be onsite managing foodservice operations. While actual customer counts may vary, the overall intensity of foodservice operations, unlike many other areas throughout the ship, remains high whether in port or underway.

4. Nearly half the commands felt that available training aids were poor and would like to see more and newer material made available. One command was trying to get the Johnson & Wales course presented onboard. Another, who had the course, spoke highly of it.

5. Nuclear ratings were exempt from messcooking on a number of mid-to smaller-sized ships. One command did not assign any Food Service Attendants (FSAs) to the galley. One provided no Messdeck Master-at-Arms (MDMAAs) and one had no S2 Training Petty Officer.

Findings: Facility Design and Layout

1. Accommodating a distinct fast foodservice line is particularly difficult on smaller, single-serving-line ships. On amphibious ships - fast foodservice lines are typically abandoned in favor of A Ration lines when Marine detachments come aboard. This is ironic because, if anything, the larger the customer population the more benefits can be derived from fast foodservice.

2. As the team observed, "problem identification" can be a problem in and of itself. On one large ship foodservice management blamed long waiting lines on an inadequate number of seats in the main dining area. After some detailed data collection and analysis the study team was able to show management that slower than normal serving line rates and inadequate coordination between MDMAAs was the problem and not a lack of seating.

3. Undercounter space in galleys was poorly utilized.

4. Serving line design was particularly poor on at least two ships.

5. Straight-line design (serving line) on smaller ships made serving either Marine detachments or fast foodservice very difficult or impossible.

6. Messdeck sanitation was difficult due to main passageway traffic.

7. Numerous ships voiced concern over dry subsistence storerooms that were not adequately ventilated and got too hot, particularly in the Red Sea and Indian Ocean.

8. Only two ship designs for subsistence loading were considered good, the remainder were judged adequate to poor.

9. The majority of foodservice operators felt that they had inadequate bulk storage, particularly for frozen food. Ship design has not kept pace with industry trends in this area. Larger ships felt storage facilities were too dispersed. Only one ship had the bulk freezers and refrigerators conveniently located adjacent to the galley.

10. At least three galley/main dining area layouts were considered good. Two were felt to be poor and the remainder adequate.

11. One new ship with an all-electric galley expressed concern because not enough power was available to operate all of the necessary equipment at peak production times.

12. On one class of ship that is continuing to come on line, no obvious consideration has been given to providing fast foodservice, or any other modified foodservice system. The study team was particularly distressed with the entire galley design concept considering that the ship is brand new and that others are scheduled to follow.

Use of Findings

Having reviewed these findings, we cannot emphasize enough the importance and use of these data as planning tools for identifying the most potentially productive areas for further investigation and improvement. A number of these issues will be addressed in upcoming sections of the report and several will be discussed in the Conclusions and Recommendations section of the report.

C. Customer Satisfaction Survey

Surveys of customers were also conducted during the individual command visits. The study team was interested in how satisfied customers were with their particular foodservice facility. The surveys were not administered to ashore customers. Since approximately 80% of the Enlisted Dining Facilities (EDFs) are afloat and involve captive audience feeding for the most part, the study team chose to focus on the majority population with the more critical need. Continuing this section are the results from the Customer Survey, which appears in Appendix B.

Demographics

The background data of the enlisted customers (n = 899) indicate an average age of 23.6 years and an average length of military service of 4.3 years. As seen in Table 2, 70% had been in the Navy less than 5 years, and 67% had reenlisted at least once. Of those reporting, 66% were in pay grades E-4 to E-6, 34% were grades E-1 to E-3. Of the total surveyed, 63% had been assigned to their ship for one year or less.

Table 2. - Time in Navy

<u>Years</u>	<u>Percent Reporting</u>
Less than 1	1
1-2	32
3-4	37
5-6	12
7-8	8
9-10	4
More than 10	6

Forty-eight percent of the enlisted respondents were surveyed while their ship was actually underway. In addition, 95% had experience with their ship while afloat and were familiar with situations which might be unique to the ship while at sea.

The 237 Officers had a median age of 31.7 years, had been in the Navy for an average of 9.5 years and had been assigned to their present ship for an average of 11 months. The Wardroom Survey appears as Appendix C.

Customer Opinions Of Current System

Historically, a starting point in determining specific opinions of various aspects of the current food service system has been to determine how the respondents feel about the military in general. The rationale for this is that it is quite possible that general overall feelings for the military might well be reflected in the ratings of more specific aspects of life in the military environment. These respondents rated their general feelings on a 7-point scale from 1 - Dislike very much through 4 - Neither like nor dislike to 7 - Like very much.

Generally, a mean rating less than "4" (Neutral) reflects dissatisfaction. The Neutral category is the cut-off: dissatisfaction is defined as a rating less than 4 and satisfaction as a rating above 4 (5 and up). Any aspect not rated positive by 50% of the respondents is a candidate for improvement.

As shown in Table 3, slightly less than half (46%) of the enlisted respondents indicated positive (like) feelings, while only 31% expressed negative (dislike) feelings for the military. The remaining 23% were neutral.

Table 3. - Customers' Feelings for the Military

<u>Hedonic Ratings</u>	<u>Feelings</u>	<u>Percentages</u>
5 - 7	Positive	46
4	Neutral	23
1 - 3	Negative	31

Keeping in mind the respondents' overall feelings about the military, we investigated their feelings regarding several more specific aspects of Navy life (see question #11, Appendix B). Of the ten aspects respondents were asked to rate, only one, "friends", was rated positive (5.5). Travel, the job, benefits, and training were all rated between neutral (4.0) and slightly satisfied (5.0) while work hours, pay, discipline, berthing and food all rated between neutral (4.0) and slightly dissatisfied (3.0).

The officers also rated their satisfaction with Navy life and indicated all 10 aspects were satisfactory with ratings above neutral.

The enlisted customers' responses were also plotted by ship type to observe any trends. These results are seen in Figure 1 on the page that follows.

Enlisted Customers

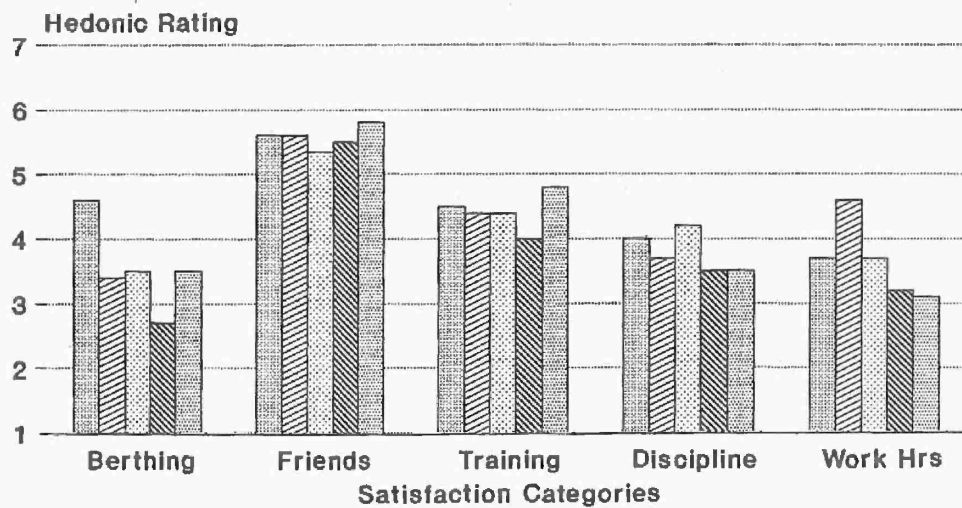
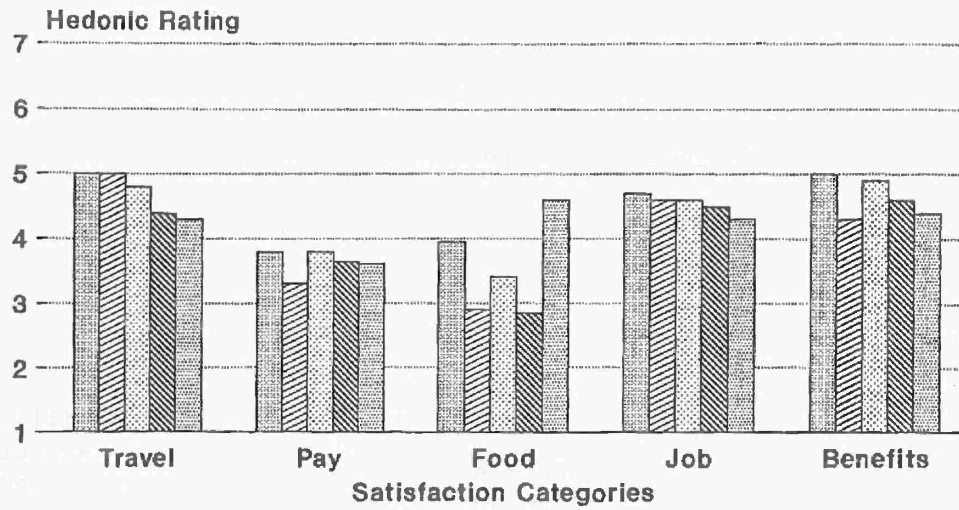


Figure 1
Enlisted Customers' Life Satisfaction by Ship Type

As is seen, high overall levels of satisfaction were reported by DD, AFS customers. The ship types reporting the least satisfaction in several categories were the Amphibians (AM). The "food" aspect of Navy life was most positive for Submarines (Sub) and most negative for Amphibian and Cruiser (CGs) customers.

The enlisted customers were asked to rate how respected each of the jobs shown in Table 4 is within the Navy.

Table 4. - Respect for Specific Navy Jobs

Corpsman	2.5
Electronics Technician	2.2
Fire Control Technician	2.1
Data Processor	2.0
Machinist Mate	2.0
Hull Technician	2.0
Sonar Technician	1.9
Quartermaster	1.8
Storekeeper	1.6
Signalman	1.6
Mess Management Specialist	1.5

Scale: 0=Not Respected, 1=Somewhat Respected, 2=Moderately Respected, 3=Very Respected, 4=Extremely Respected

These results point out that among the 11 jobs listed, the job of Corpsman is perceived as the most respected while Mess Management Specialist is respected the least.

Customer Satisfaction With Dining Facility

Much of the emphasis of the customer's survey was placed on overall satisfaction with their ship's mess. These customers, however, were also asked to rate their ship's mess compared to messes on other ships at which they had eaten. When making this comparison, as indicated in Table 5, the Submarine customers rated their mess significantly higher than did the Destroyer, Carrier, Cruiser, and Amphibian customers.

Table 5. Customer Ratings Of Their Mess Compared To Other Messes

	Overall	By Ship
04-Submarines	5.8***	
Ohio		5.9
LaJolla		5.6
05-Destroyer	4.7**	
Monongahela*		5.3
Kidd		4.8
Kincaid		4.0
03-Carriers	3.6	
Independence		3.6
Constellation		3.5
02-CGs	3.4	
Mississippi		3.5
Bainbridge		3.4
01-Amphibians	2.9	
Manitowac		4.3
Trenton		3.3
Nassau		3.3
Guam		2.3

***Significantly higher than Types 05,03,02,01; $p < 0.05$

**Significantly higher than Types 03,02,01; $p < 0.05$

*An Auxillary Oiler was included in the analyses with Destroyers; $p < 0.05$

Scale: 1 - Much Worse

4 - Neutral

7 - Much Better

Similarly, a higher mean rating was given by those on Destroyers than by those on the remaining three ship types.

Results of the question which asked about satisfaction with specific aspects of the dining facility while underway are shown in Table 6. As is shown here, some specific aspects of the mess were rated higher than the mess overall. Thirty two percent of the enlisted customers expressed satisfaction with the mess overall while 64% were dissatisfied. The chance to sit with friends (47%), cleanliness of the dining area (45%) and the hours of operation (44%) were rated as the most satisfying features of the mess. It should be noted, however, that this satisfaction level is barely above the neutral category. Perceptions of Navy food (specifically appearance, quantity, quality, service and variety) as reported by the majority of the enlisted customers in Table 6 are below neutral or negative.

Table 6. - Customer Satisfaction with Different Aspects of Dining Facility

Aspects	Percentage of Enlisted Rating Satisfied	Mean Response	
		Enlisted	Officers
The mess overall	32	3.8	5.3
Chance to sit with friends	47	4.1	-
Cleanliness of dining area	45	4.2	5.4
Hours of operation	44	4.2	5.5
Appearance of food on serving line	28	3.7	-
Quantity of food	25	3.5	5.9
Quality of food	25	3.5	5.1
Service by MS personnel	23	3.6	5.3
Variety of food	21	3.3	4.6
Speed of lines	20	2.9	5.0
Boredom of same facility	12	3.4	4.6

Scale: 1-Very Bad, 2-Moderately Bad, 3-Somewhat Bad, 4-Neutral, 5-Somewhat Good, 6-Moderately Good, 7-Very Good

Food quality and quantity received mean ratings of 3.5, between "somewhat bad" and "neutral", and were rated as satisfactory by only 25% of the enlisted customers. This low rating indicates that this detail of the current dining facility should receive attention. Further indications of low perceptions of dining facility satisfaction by these respondents are with the aspects of service, variety, line speed, and monotony of the dining facility.

The Officers appear to be substantially more satisfied with the listed aspects of the dining facility (wardroom). Their ratings of "somewhat good" or above distinguish their opinions of their dining experience from the enlisted customer's perception, which is neutral or lower for the same aspects.

As Figure 2 shows, again by ship types, that Submarine customers were more satisfied overall with aspects of the ship's dining facility than were the customers on the remaining types. Customers on Amphibians were the least satisfied with aspects of their dining facility. Boredom of the dining facility was perceived on all types as being a somewhat negative aspect of the dining experience while underway.

Global Ratings

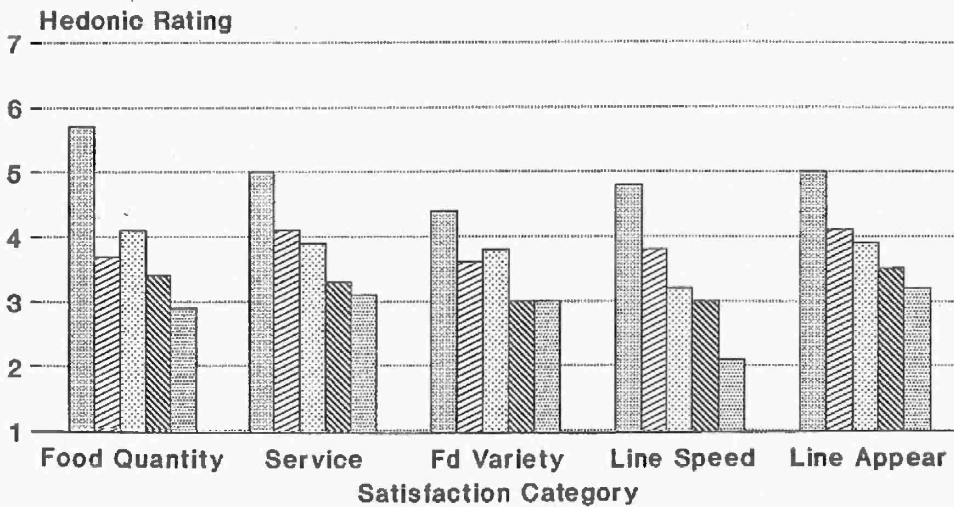
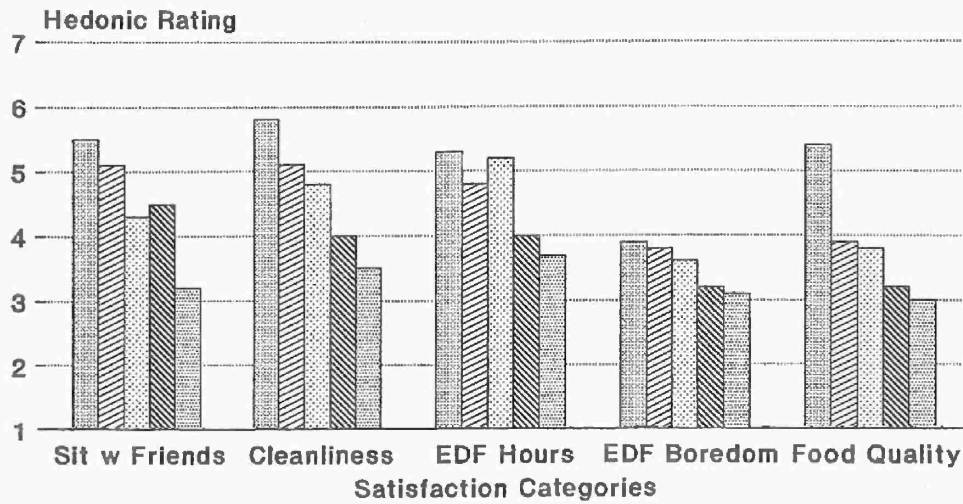


Figure 2
Global Ratings of Enlisted Dining Facility (Underway) by Customers

Food Quality

Five aspects of quality were rated by the enlisted respondents for their perceived importance when selecting what to eat at a meal: taste, appearance, nutrition, the filling quality of the food, and the familiarity of the food to the respondent.

The perception of what is being served is often an underlying factor in determining food quality. How the food tastes rated "very important" to 98% of these respondents. Food presentation and nutrition play equally important roles in their eating decisions. The feeling of fullness and familiarity with the food item are somewhat less important. Of the five aspects, none was rated unimportant. Taste was most important followed closely by appearance and healthfulness. How filling the food is and how familiar the respondent is with it were the least important aspects.

Supporting the importance of the aspect of food presentation in the perception of overall quality, the enlisted customers were asked to rate how the food was prepared in the mess. The majority of customers are in agreement that, when the food is presented to them, it is often greasy, tasteless, tough, and cold.

Another specific example of enlisted customer dissatisfaction with food quality is exhibited in Table 7. When the respondents were asked to compare the quality of fast food received in their mess to the quality available at civilian restaurants, their responses were as follows:

Table 7. - Customers' Comparison of Military and Civilian Fast Foods

<u>The Fast Food in Our Mess Is:</u>	<u>% Responses</u>
Better compared to civilian restaurants	3
Worse compared to civilian restaurants	81
About the same as civilian restaurants	12

Very few (3%) perceived the quality of Navy fast foods to be better than (3%) or equal to (12%) that found in the civilian sector.

Food Quantity

Food quantity is another source of dissatisfaction with these respondents, as was seen in Table 6. Here again, only 25% of the overall ships' enlisted customers were satisfied with this aspect of the Navy.

Traditionally, the meat/entree portion of the meal is perceived as being somewhat too small. The responses of customers asked to rate the amount given in one serving are seen in Table 8.

Table 8. - Portion Sizes in Enlisted Dining Facility

	Mean Response	% Reporting too Small
Meat	2.7	79
Vegetables	3.7	29
Dessert	3.7	29
Starches	4.3	19

Scale: 1 - Much Too Small, 4 - Just Right, 7 - Much Too Large

Given that a rating of 2 is defined as "moderately too small" and 3 as "somewhat too small," the meat portion (2.7) of the meal is perceived as being somewhat inadequate.

Using a four point scale (1 - Almost Never, 2 - Sometimes, 3 - Often, 4 - Almost Always) 26% of these customers responded that they Sometimes (2.1) want seconds from the serving line. Of these wanting seconds, 71% then went on to indicate some degree of difficulty getting seconds while underway and 46% experienced difficulty in port.

The enlisted respondents were asked whether or not they were on a diet. Twenty-nine percent indicated that they were on a diet to lose or maintain their present weight. Thus, to a specific question which asked of everyone whether they left the mess hungry, excluding the times when they are dieting, the majority (75%) of these customers responded that they leave the mess hungry from "sometimes" to "almost always" as is seen in Table 9:

Table 9. - Customers Who Leave Mess Hungry

	Percent Responding
Almost Always	6
Often	19
Sometimes	50
Never	25

For the 29% on a diet it is a toss-up between whether it is more or less difficult to diet while underway than in port. Forty percent report that dieting is more difficult while underway while 39% report that it is less difficult underway than in port. Of those remaining, 18% find dieting equally difficult at either location while 3% have not dieted underway.

As shown in Table 10, menu run-outs are perceived as problems while underway. For example, run-outs of menu and salad bar items and condiments were highlighted by at least 46% of the customers. "No milk" was problematic for 44% of the respondents, and a lack of hot drinks, other than coffee, was a frequent problem. Likewise, as will be seen in a later question (Table 22), insuring "no run-outs" on the serving line is important to improving the current system.

Table 10.- Menu Run-Out Items When Underway

	Mean Rating	Percent Responding:	
		Often to Always	Sometimes to Never
No ice	2.7	40	60
No milk	2.5	44	56
Salad Bar run outs	2.5	48	52
Not enough condiments	2.5	51	49
No other hot drinks	2.4	46	54
Menu run outs	2.4	46	54
Missing silverware	2.3	42	58
Napkins missing	2.2	34	66
Not enough dishes	2.2	35	65
Not enough trays	2.2	37	63
No other cold drinks	2.1	30	70
No coffee	1.6	16	84

Scale: 1 - Almost Never, 2 - Sometimes, 3 - Often, 4 - Almost Always

Food Variety

Food variety, rated as "somewhat bad" (3.3), is clearly another cause of dissatisfaction with the current dining facility among the enlisted respondents, as was seen in Table 6. Variety was satisfactory to only 21% of the customers.

It is the opinion of the customers that there are insufficient menu choices at an average meal as well as over the course of a typical menu cycle, as seen in Table 11. Shown in this table are the mean response ratings and percentages of individuals wanting "more choice" when responding to the questions asking them to rate the variety at an average

meal and over several weeks. It is not surprising that they want entree (meats), beverages and short-order choices increased; historically these items are perceived as lacking in satisfactory variety. Salads and desserts are likewise desired to be increased, but by fewer respondents.

Table 11.- Customers Wanting More Choice at Average Meal and Over Several Weeks (Rank/(Percentage))

	At an Average Meal		Over Several Weeks	
Meats	5.1	(71)	5.1	(71)
Beverages	5.1	(62)	5.1	(62)
Short Order	4.9	(62)	4.9	(62)
Salads	4.8	(52)	4.9	(56)
Desserts	4.8	(53)	4.8	(53)
Vegetables	4.6	(48)	4.7	(49)
Starches	4.1	(28)	4.3	(37)

Scale: 1 = Want Much Less Choice, 4 = Choice Now Enough, 7 = Want Much More Choice

In addition, a mean rating of 1.9 (between almost never and sometimes) indicates that a choice of low-calorie foods is offered infrequently according to the 29% who are dieting. The addition of this option would expand the menu variety somewhat.

The enlisted respondents were given a list from which to choose items desired more frequently. Table 12 shows percentages of customers choosing these foods.

Table 12.- Food Items Customers Desired Served More Often

	Percent Responding
Sandwiches (Subs)	61
Deep Fried Foods	48
Ethnic Foods	46
Grilled Sandwiches	46
Burgers	46
Pizza	44
Hot Dogs/Chili Dogs	31
Stews/Casseroles	29

Conversely, the items listed in Table 13 were suggested by the customers in response to an open-ended request for menu additions/deletions.

Table 13.- Menu Suggestions by Enlisted Customers (N = 718)

	Percent Responding
A. <u>Add Or Serve More Frequently</u>	
Fresh Fruit	46
Soda	32
Fish/Seafood	23
Corn	17
Fruit Juice	13
Milk/Choc Milk/Milkshake	13
B. <u>Drop Or Serve Less Frequently</u>	
Roast Beef/Pot Roast	26
Rice	22
"Bug Juice"	19
Pork (Pork Adobo)	12
Unripe/Damaged/Spoiled Fruit	8

Environment

The environment in which one is required to eat is another important contributor to customer satisfaction. In addition to the dining preferences of the customers, several questions were designed to address their opinions of the dining facility environment. Examination of the answers to eating environment questions reveals that 37% of those enlisted customers surveyed had not eaten in dining facilities on other ships, 52% felt that theirs was, to some degree, worse than others; 28% felt that their mess was better than others; and 20% were neutral.

On the general customer satisfaction responses (Table 6), boredom of the same facility was rated as "somewhat bad" (3.4) in the overall rating of the mess. This rating represents 88% of the respondents who are dissatisfied with the atmosphere or environment of their mess. This could be an indication that the perception of the lack of a pleasant eating environment might well be a problem resulting in dissatisfaction for this group of respondents.

Since interest focused on an individual's experience on the ship while it was underway, those who had never been underway on that specific ship were not required to respond to question #29 in Appendix B. The general condition of the mess was described by those responding with regards to several physical aspects. On a bipolar scale, five conditions (lighting, appearance, noise, crowding and comfortable seating) were rated as shown in Table 14. Lighting was perceived by 54% to be satisfactory. The remaining conditions were acceptable to less than half of the customers, with noise the least satisfactory condition of the mess.

Table 14. - Customer Satisfaction with Physical Conditions of Mess/Underway

	<u>Percent Satisfied</u>
Lighting	54
Crowdedness	47
Appearance	39
Comfortable Seating	34
Noise	26

It is not surprising, as shown in Table 15, that the majority of the customers (66%) perceive loud people on the mess deck as being a frequently recurring problem:

Table 15.- Nonfood Problems Seen in the Mess Underway

	<u>Percent Reporting:</u>		
	<u>Mean</u>	<u>Often/Almost Always</u>	<u>Sometimes/Almost Never</u>
Bomb Handling (CVs only)	1.5	17	83
Bugs	1.7	21	79
Dirty Service Counters	2.1	32	68
Dirty Tables	2.4	45	55
Dirty Trays	2.5	48	52
Dirty Silverware	2.6	51	49
Dirty Dishes	2.6	52	48
Loud People on Mess Deck	3.0	66	34

Scale: 1 - Almost Never, 2 - Sometimes, 3 - Often, 4 - Almost Always

Although the enlisted customers tend to be satisfied with the overall aspect of cleanliness in the dining area (Table 6), 51% and 52% of the customers often observed problems with dirty silverware and dishes, respectively. Forty-eight percent observed dirty trays and 45% found dirty tables to be a problem "often" or "almost always" when underway.

Another query on the dining environment asked customers their type of dinnerware preferences from four choices. The respondents were asked to rank each in order of preference. Table 16 indicates the types and the rankings of dinnerware:

Table 16. - Preferred Type of Dinnerware

Dinnerware	Percent Ranking:			
	Most preferred	Second Choice	Third Choice	Fourth Choice
China	70.3	9.4	12.4	7.9
Plasticware	29.1	50.1	17.2	2.8
Metal tray	4.9	25.6	41.5	27.9
Paper	2.7	12.4	27.5	57.4

By a wide margin, china dishes are the preferred dinnerware by these shipboard respondents. A plastic compartmentalized tray is their second choice, followed by compartmentalized metal trays and, lastly, paper dishes.

Other perceptions of the mess can be seen in Table 17. That it is "sometimes" stuffy and too warm rated as minor complaints. The other possibilities were not seen as complaints.

Table 17. - The Mess Environment Underway

	Mean
Stuffy	2.1
Too warm	1.9
Too cold	1.6
Full of unpleasant food odors	1.6
Full of fuel smells	1.3
Smoky	1.2
Full of steam	1.2

Scale: 1 - Almost Never, 2 - Sometimes,
3 - Often, 4 - Almost Always

In responding to whether there should be more or less military atmosphere in the dining facility, the customers' mean response was that "somewhat less" of a military atmosphere should prevail. As seen in Table 18, 61% wanted less military atmosphere, while only 7% wanted more. The remaining wanted no change.

Table 18. - Mess Military Atmosphere Change Wanted

<u>Atmosphere</u>	<u>Percent Respondents</u>
Less	61
Same	32
More	7

In Table 19, of those wanting less military atmosphere, 49% responded that they would have the mess look more like a civilian cafeteria. Nonenforcement of a dress code was chosen by 40% of those who desire less military atmosphere. However, only 19% wanted the Master-At-Arms removed, while 17% did not want a change at all.

Table 19.- Change to Less Military Atmosphere: Options

	<u>Percent Responding</u>
Make look like civilian cafeteria	48.5
Do not enforce dress code	40
Remove Master-at-Arms	19
Install video games	10
Do not change	17

Another traditional problem pointed out by these customers was "speed of lines." As shown in Table 6, this factor received an overall enlisted crew rating of 2.9 (1 being very bad and 7 being very good). It is perceived as a big problem with the current facility.

It might be concluded that these customers desire their facility to resemble a civilian facility, a facility in which they can dress casually and sit with their friends in pleasant, attractive surroundings. Minimizing the noise and crowding plus improving the perception of openness and airiness would lead to increased satisfaction with the mess. It is interesting that customers also want the order afforded by the presence of the master-at-arms.

The officers were asked to indicate the amount of formality they preferred at each meal in their wardroom dining. As is seen in Table 20, the amount of formality which exists is "fine as is" for the most part, for breakfast and lunch. However, there appears to be less agreement on the amount of formality at the dinner meal. A considerably larger percentage of these officers (15.9%) want more formality at dinner. In comparison to breakfast and lunch, fewer perceive the formality at dinner as being "fine as is".

Table 20.- Amount of Formality Desired in Wardroom

<u>Amount of Formality</u>	<u>Percent Responding</u>		
	<u>Breakfast</u>	<u>Lunch</u>	<u>Dinner</u>
More	3.0	4.0	15.9
Less	6.5	10.0	12.4
Fine as is	90.5	86.0	76.6

The survey also inquired of the Officer customers their preference for serving styles. They were required to indicate for each meal their most preferred style with a "1" and the style they least preferred was indicated with a "4". Table 21 shows the average ranks of preferred serving styles:

Table 21. - Preferred Serving Style in Mess (average rank)

<u>Type of Service</u>	<u>Breakfast</u>	<u>Lunch</u>	<u>Dinner</u>
Cafeteria	2.9	3.0	3.4
Buffet	2.2	<u>2.1</u>	2.6
Family	2.5	2.2	2.0
Table	<u>2.0</u>	2.3	<u>1.7</u>

Scale: 1 - Most Preferred 4 - Least Preferred

Table service, a style in which waiters serve at the tables, was the most preferred style for breakfast and dinner. Buffet style, which is a serving line featuring self-service, was their first choice for lunch. Family style, which consists of large platters placed on the table from which individuals serve themselves, was a second choice for dinner and lunch. Cafeteria style, which is characterized by a serving line with a server, was the least preferred style for each meal.

Dining Facility Personnel

Another area of interest while underway was addressed by the enlisted respondents being asked to rate the service by the dining facility personnel. Overall, this service was rated as between, "somewhat bad" and "neutral" (3.6). Submarine customers rated service significantly higher than the customers of Destroyers, Carriers, Cruisers and Amphibians (This

can be seen in Figure 2). Likewise, the Destroyer and Carrier customers rated service higher than the Cruiser and Amphibian customers.

The respondents were then asked to describe the MSs and the Foodservice Attendants. The responses were generally neutral when describing both the MSs and FSAs. On the positive side, MSs were rated as "somewhat" clean, well trained, and hard working. On the negative side they were rated as somewhat unpleasant and exhibiting a poor attitude. The FSAs were also positively rated as "somewhat" clean and hard working. On the negative side they were rated as "somewhat" poorly trained, unpleasant, and exhibiting a poor attitude.

Foodservice Improvements

When the enlisted customers were asked to rate the importance of items from a list of potential changes that to improve foodservice on board the ship, the results in Table 22 were obtained:

Table 22.- Importance of Changes in Improving Foodservice

	Mean Rating	% Responding Important
Make sure serving line doesn't run out of food	2.6	88
Open a high-quality fast food speed line	2.0	71
Have vending machines with sandwiches	1.7	56
Put more tables in the dining area	1.4	47
Stay open longer hours	1.4	47
High-quality/low calorie food lines	1.3	43
Take-out items	1.1	39
New food outlets in other parts of ship	1.1	35

Scale: Important: 0 - Not, 1 - Somewhat, 2 - Moderately, 3 - Very

Several improvements in foodservice onboard ship, according to the customers, are ensuring that the serving line does not run out of food (88%), and establishing a speed line to serve high-quality fast-food items (71%). An improvement which is, interestingly, highlighted by over half the respondents is the availability of vending machines (56%) with sandwiches, etc. This could conceivably be an acceptable alternative for increasing variety, quantity and speed of lines. More tables in the dining area (47%) and staying

open for longer hours (47%) would likewise be perceived as "somewhat important" changes in the present foodservice system.

Generally, two-thirds of the enlisted customers were satisfied with the current hours of operation of their respective mess. It was suggested by approximately one-fourth of the respondents that the mess might stay open longer for the three main meals. Opening earlier was not a preferred alternative.

The midday meal is the most frequently eaten meal in the mess both while the ship is in port and while it is underway. Evening and breakfast meals are attended less frequently in port than while underway. Midrats are not offered in port (Table 23):

Table 23.- Customer Attendance Patterns at Meals

	<u>Underway</u>	<u>In Port</u>
Midday Meal	3.2	2.9
Evening Meal	3.1	2.0
Breakfast	2.4	1.9
Midrats	1.9	---

Scale: 1 - Almost Never, 2 - Sometimes,
3 - Often, 4 - Almost Always

Additionally, respondents' work schedules are rarely (between 1 "almost never" and 2 "sometimes") a reason for missing a meal at the mess.

Other questions on the survey were concerned with awareness of the meal choices for the day. When asked if the day's menu was usually posted throughout the ship or just at the dining facility, the enlisted respondents answered as in Table 24:

Table 24. - Availability of the Day's Menu by Posting

	<u>Percent Responding</u>
Menu at dining facility only	77
Menu at dining facility and elsewhere	17
Menu not posted anywhere	7

The accuracy of the menu's listings received a generally favorable rating.

Also asked was: "How often are the choices offered on the serving line identified by labels?" Sixty-five percent responded "sometimes" to "almost never".

Open-ended comments or write-ins not solicited or suggested by the questionnaire are often quite revealing of the "true" opinions of the respondents. The most frequently offered comments are listed in Table 25 below:

Table 25. - Opinions By Enlisted Customers Regarding The Mess and Food - An Open-Ended Query (n=718)

	<u>Percent Responding</u>
Poor attitude among cooks	14
Want more variety in food	11
Generally negative comments on food	11
Food run-outs	11
Lack of cleanliness	9
Poor mess deck environment	8

When asked about their plans to reenlist, the responses in Table 26 were received from these customers:

Table 26.- Do You Plan To Reenlist?

<u>Response</u>	<u>Number</u>	<u>Percent Responding</u>
Definitely yes	113]	32
	]	
Probably yes	171]	
Don't know	221	25
Probably no	132]	44
	]	
Definitely no	259]	

Less than a third (32%) of these surveyed Navy customers who averaged about 24 years in age and about four years in military service were planning reenlistment. These results, coupled with the projections of a declining labor pool (due in part to population shifts) in the 1990's, suggest that some manpower concerns are warranted. There will be fewer young people from which to choose in the 17 to 21 age group. Some method of interesting the current Navy population in continuing military service and attracting "outsiders" should be devised.

Summary: Customer Satisfaction

"Join the Navy and see the world" may no longer be enough inducement to obtain the numbers required to maintain an adequate level of manpower in the Navy over the next 20 years. Indeed changes in several areas are indicated.

That there is some need for improvements in the foodservice area is evident by the results of the survey. It is quite clear that food is not perceived as a satisfying aspect of Navy life by the enlisted customers. The quality, quantity and variety of the food which rated below neutral were observed as problems by this group of respondents.

More variety of menu selections, including high-quality fast foods, would improve the perception of afloat dining. Increasing the speed of lines and ensuring no runouts would also be seen as a change for the better.

Especially for the afloat customers, improvement of the dining experience itself would likewise be perceived as increasing the satisfaction level. A less military atmosphere with less crowding, more comfortable seating and better noise control, in surroundings comparable to civilian facilities would be seen as positive attractions.

Cleanliness to the Navy customer is as important a factor as it is to the civilian consumer. It is worth noting that the enlisted customers were dissatisfied with the attitudes of the workers, whose job they perceived as being the least respected among Navy jobs. Thus, good service and attitudes from clean, pleasant workers are important to enlisted men.

The officers, overall, had a substantially higher level of satisfaction with the foodservice than did the enlisted customers.

D. Mess Management Specialist Survey

Introduction

To discover the workers' perspective on the current state of Navy foodservice and to give them a voice in any system improvements, we surveyed Mess Management Specialists (MSs) assigned to both afloat and ashore dining facilities and Unaccompanied Personnel Housing (BOQ/BEQ). The surveys (Appendices D and E) duplicate questions to compare responses of the groups. The MSs assigned to afloat and ashore enlisted dining facilities (EDFs) were also given a Job Description Index (JDI). The JDI is a standard instrument which measures job satisfaction in five areas: the actual work, the supervision, fellow workers on the job, the opportunity for promotion, and the pay. Each area is evaluated by responses to a list of adjectives and descriptive phrases.

Survey Findings

Mess Management Specialist Demographics

The three MS groups are described in Table 27:

Table 27. - Description of Mess Management Specialists

	Afloat	Ashore	BOQ/BEQ
Sample Size	216	64	55
Mean Age	26.1	29.5	31.8
Sex: Male (Female)	216 (0)	57(7)	46(9)
Pay Grade (%):			
E 1-3	40%	23%	23%
E 4-6	60%	72%	66%
Over E-6	0	5%	11%
Highest grade of school*			
9th	2%	0	-
10th	5%	14%	-
11th	8%	5%	-
12th/Graduated	85%	81%	-
Years in Navy Food Service (Mean)	5.4	8.1	10.5
Work experience as an MS**:			
Afloat			
Yes	-	85%	81%
No	-	15	19
Ashore			
Yes	-	-	69%
No	-	-	31
BOQ/BEQ			
Yes	-	48%	-
No	-	52	-

*Asked only of Afloat and Ashore MSs **Asked only of Ashore and BOQ/BEQ MSs

The majority are high school graduates. With a mean age of 32 years, the age of those assigned to BOQ/BEQ facilities is slightly higher than for assignees to ashore (29.5 years) or afloat (26.1 years) facilities. The BOQ/BEQ MSs have more years in food service (10.5 years) than those assigned to afloat (5.4 years) or those assigned to ashore (8.1 years) facilities. They also appear to have higher pay grade levels with 11% over the level of E-6, compared to 5% for ashore MSs. It appears that the younger and newer enlistees are assigned to shipboard or ashore dining facilities. Appendix F is the survey for MSs in BOQ/BEQ housing.

The MSs were asked to indicate on a 7-point hedonic scale (1-Dislike very much, to 7-Like very much) their feelings about military service. Table 28 shows a higher percentage of satisfaction with military service for the ashore MSs than for their afloat counterparts. This pattern will be seen often throughout this survey as the ashore MSs tend to be generally more positive about other aspects of the Navy than are those afloat.

Table 28. - MS Satisfaction with Military Service (Mean/%)

	Mean Response	Percentage
Ashore	5.0	64
Afloat	4.3	53

Scale: 1-Dislike very much, 4-Neutral, 7-Like very much

MS Evaluation of the Current System

In order to provide a context for MSs evaluations, we sought to determine the level of satisfaction with various aspects of the Navy for both the afloat and ashore MSs. Their mean responses and the percentage responding "satisfied" (5, 6, or 7) are shown in Table 29. Friends, food and benefits were among the top satisfiers for both groups. Job and training ranked in the middle and, in decreasing order, pay, work hours, discipline and berthing ranked as the least satisfying aspects of Navy life. The ashore MSs rated all aspects higher than the afloat respondents, with the exception of travel, which was a bigger satisfier among afloat respondents.

Table 29. - MS Mean Responses and Rank Order of Satisfaction
with Aspects of Military

	Afloat (N=216)			Ashore (N=64)		
	Mean	Rank	Percent Responding*	Mean	Rank	Percent Responding*
a. Travel	4.8	3	63	4.6	7	59
b. Pay	3.8	8	40	4.7	6	59
c. Food	4.9	2	64	5.3	3	72
d. Job	4.6	5	55	5.3	4	75
e. Benefits	4.8	4	63	5.6	1	81
f. Berthing	3.3	10	27	4.2	10	47
g. Friends	5.4	1	77	5.6	2	79
h. Training	4.3	6	47	5.2	5	73
i. Discipline	3.8	9	39	4.5	8	52
j. Work hours	3.9	7	40	4.2	9	42

Scale: 1 - Very dissatisfied, 4 - Neutral, 7 - Very satisfied

*Percent Responding "Satisfied" (5, 6, or 7)

To focus on areas where improvements are possible, the following topics will be discussed: training, job satisfaction, motivation, work environment, management/leadership and reenlistment.

In the instances where descriptive statistics are reported, some percentages may show a total which exceeds or is less than 100%, because: a) responses less than 5% are not reported, b) some questions were combined into one table, or c) some respondents leave questions blank.

Training

Table 30 shows the foodservice training history of the MSs prior to joining the Navy.

Table 30. - MS Numbers Receiving Foodservice Training
BEFORE Joining the Navy

Training	Afloat		Ashore	
	N	%	N	%
High School	54	29	15	23
Vocational/Tech School	23	12	10	15
College Courses	15	8	3	5
Junior College Courses	12	6	2	3
Food Service Institute				
Courses	10	5	4	6
Correspondence Courses	7	4	4	6
No Training	101	55	40	62

Forty-five percent of the afloat MSs reported some previous foodservice training, while only 38% of ashore MSs received foodservice training before entering the Navy. After high school, most of this training was obtained at vocational/technical schools (12%, afloat; 15%, ashore). Fourteen percent of the afloat MSs and 8% of those ashore reported that their pre-Navy training was at the college level. In addition to this training, the majority of those afloat (59%) and those ashore (53%) had some civilian foodservice work experience (McDonald's, cafeterias, etc). Of those with this experience, 72% afloat and 39% ashore reported that their experience had been gained as a cook.

After joining the Navy and before becoming an MS, the respondents' training consisted of the following:

Table 31. - MSs Completing Navy Foodservice Training

Training	Afloat		Ashore		BOQ/BEQ	
	N	%	N	%	N	%
A- School	173	94	51	88	49	89
B- School	-	-	-	-	4	7
C- School-Food Management	18	10	11	19	4	7
C- School-Food Production	12	7	3	5	7	13
C- School-BOQ/BEQ Management	-	-	-	-	4	7

Neither the afloat nor ashore MSs reported receiving B School or BOQ/BEQ training. It is suspected that B School training, which is no longer available, had been eliminated by the time the younger afloat and ashore MSs had come into the Navy.

Since becoming an MS, the types of training received and the number of respondents (percentages in parentheses) are as shown in Table 32.

Table 32. - Training Since Becoming an MS

	Afloat (N=216)		Ashore (N=64)	
	N	%	N	%
Navy Food Service Correspondence Courses	51	(24)	17	(27)
Civilian Foodservice Correspondence Courses	12	(6)	6	(10)
Foodservice Courses at College/Technical	15	(7)	10	(17)
School or Foodservice Institute				
Foodservice Trade Shows	19	(9)	5	(9)

Recall from Table 29 that the level of satisfaction with the current training system was slightly different for the afloat and ashore groups. The afloat MSs reported that they were "neither satisfied nor dissatisfied" with the aspect of training (4.3), while the ashore MSs were somewhat more satisfied with training (5.2). Less than half (47%) of the MSs afloat versus almost three quarters (73%) of the ashore MSs rated this aspect positive. A higher percentage of the ashore respondents indicated that they had received training since becoming an MS than did the afloat respondents. Approximately one quarter of the MSs had received some training via Navy Food Service correspondence courses (Table 32). Nine percent of both groups had obtained training from foodservice trade shows. This is interesting since the Individual Command Interviews concluded that no one ever attended these shows.

As can be seen in Table 47, "on-the-job training" (afloat, rank 6th out of 10, ashore rank 8th out of 12) is "somewhat good". However, a need for more on-the-job training was reflected in ratings of between "moderately" and "very" important (afloat 2.5, ashore 2.5), as a change which would improve the current operation of the respective facilities (see Table 33). For both groups, this improvement follows a "pat on the back," better equipment, and more FSAs as an important change.

Table 33. - MSs' Views on Changes to Improve Operation

	Mean Ratings For:	
	Afloat	Ashore
More recognition for good job	3.2	3.3
More or better equipment	3.1	3.6
More FSAs	2.6	--
More on-the-job training	2.5	2.5
More MSs	2.5	2.3
Stricter watch--civilian contract work & FSAs	2.4	(2.0)
Better supervision by Watch Captains	2.1	1.9
More convenience foods	2.1	1.9
Better supervision by Senior Chief	1.8	2.1

Scale: 0-Not needed, 2- Moderately important, 4-Extremely Important

An effective method of obtaining state-of-the art information is through trade journals. Thus, these respondents were asked how often in the past 12 months they had read foodservice trade journals. Table 34 reports the frequency with which these respondents read journals.

Table 34. - MSs' Frequency of Reading Trade Journals

	Afloat		Ashore	
	N	%	N	%
Never, not interested	50	27	16	25
Never, journals not available	53	29	17	27
Once or twice	44	24	23	37
Three to five times	14	7	3	5
More than five times	24	13	4	6

Approximately one quarter of the respondents expressed a lack of interest in journals. Others reported that they never read trade literature because it was not available to them. The remainder had read some journals from once or twice to more than five times in the past year. Again, this is interesting since no ship that was visited had any trade journal publications onboard.

Job Satisfaction

In order to assess job satisfaction, the JDI was used. Based on a large number of respondents who were asked to describe the best and worst possible jobs for themselves, developers of the JDI determined which responses should be scored as satisfied for each item. With the JDI, each of five areas is evaluated by response to a list of adjectives and descriptive phrases. Eighteen phrases are used for work, supervision and coworkers, nine each for pay and promotion (see Appendix G).

The scoring for responses is: "Y" - Satisfied and is scored with 3 points; "N" - Dissatisfied and is scored with a 0 (zero); a "?" indicates that the respondent does not understand or cannot decide. (The higher the score, the more satisfaction.) The results are shown in Table 35:

Table 35. - MS Mean Response to Five Scales of the Job Description Index

	Afloat	Ashore
Supervision	33.63	36.71
People (Coworkers)	31.04	33.60
Promotion	25.90	29.00
Work	25.02	29.25
Pay	16.22	22.23

0 - Lowest job satisfaction, 54 - Highest job satisfaction

Supervision and coworkers are perceived as high job satisfiers, while pay is perceived as a low satisfier by these MSs. The difference between the ashore and afloat scores is related to the overall higher degree of satisfaction expressed by the ashore respondents, and is seen throughout.

Job satisfaction is contingent upon many factors. One such factor may be the personal choice of selecting that particular job. Only the ashore MSs were asked to indicate why they had been assigned to the MS rate. According to Table 36, one-third of those responding had chosen the MS rate over other choices available to them. For the remaining two-thirds, the MS rate was not their first choice, and in many cases, was their only alternative.

Table 36. - MSs' Reasons for Choosing MS Rate (Ashore Only)

	Percent
MS was my first choice among all rates	33
Preferred a different rate, MS was one of several open to me	34
MS was only rate open to me	33

Another factor which might impact significantly on job satisfaction is one's perception of how one sees himself and how appreciated he or she is by others for the job performed. To determine how MSs view the importance of their jobs, the two MS groups were asked to rate, on a 5-point scale, how respected they perceive selected Navy jobs (theirs included) to be. The resulting perceptions are shown in Table 37.

Table 37. - Ratings for Respect of Selected Navy Jobs
(Rank in Parentheses)

	Afloat	Ashore
Corpsman	2.9 (1)	3.0 (1)
Fire Control Technician	2.4 (2)	2.6 (4)
Data Processor	2.4 (3)	2.6 (5)
Electronics Technician	2.4 (4)	2.8 (2)
Sonar Technician	2.3 (5)	2.6 (3)
Hull Technician	2.2 (6)	2.3 (9)
Machinists Mate	2.2 (7)	2.4 (6)
Quartermaster	2.1 (8)	2.4 (8)
Signalman	2.1 (9)	2.2 (11)
Storekeeper	2.1 (10)	2.4 (7)
Mess Management Specialist	1.9 (11)	2.2 (10)

Scale: 0 - Not respected, 1 - Somewhat respected, 2 - Moderately respected, 3 - Very respected, 4 - Extremely respected

Both groups perceive their job as a Mess Management Specialist to be moderately respected. Still, the MSs job was, in the opinion of the afloat group, the least respected job among 11 jobs listed, while the ashore MSs rated only the job of Signalman lower than their own.

It is interesting, from Table 38, that if given a choice, 48% of the respondents preferred remaining in the MS rate, while 16% expressed a preference for converting to another rate.

Table 38. - MS Rating Preference if Given a Choice

	Percent
Staying in MS rate	48
Converting to another rate	16

Ship to shore rotation was perceived by the afloat MSs to be the least satisfying (4.0) aspect of their job, as shown in Table 39. Likewise, the MSs ashore expressed neutral satisfaction with the schedule of rotation among dining facilities aboard ship (4.1). Positive satisfaction was expressed for the work itself, the schedule and the number of hours worked in port. The number of hours the afloat MSs are required to work while underway was the least satisfying of these specific job aspects.

When asked whether they had a preference between continued work at their present facility and being rotated to another facility aboard the ship, 117 versus 56 of the afloat MSs indicated that they preferred their present facility.

Table 39. - MS Satisfaction with Specific Job Aspects

	Mean Response	
	Afloat	Ashore
The work you actually do aboard ship/at this EDF	5.4	4.9
The schedule of weekly work hours/while IN PORT	4.7	4.8
The number of hours you work a day/while IN PORT	4.8	4.6
The schedule of ashore-afloat rotation/ rotation among dining facilities aboard ship	4.0 -	- 4.1
The schedule of weekly hours worked while UNDERWAY	3.9	-
The number of hours you work a day while UNDERWAY	3.8	-

Scale 1 - Very dissatisfied, 4 - Neutral, 7 - Very satisfied

Several other questions relating to job satisfaction were asked. The MSs responses are shown in Appendix H.

The two MS groups reported that they were moderately to strongly involved in their job; thus, about one-quarter of their workday dragged. Both afloat and ashore workers reported that they worked a little harder than others and performed extra work several times a week.

To find out preferences for MS assignments, two of the MS groups (BOQ/BEQ and Ashore EDF) were asked to indicate the facility assignment they preferred. MSs assigned to a BOQ/BEQ were asked to rate their preference on a 7-point scale. The ashore MSs were asked to choose one of the three choices. As might be expected, each responding MS group showed a preference for their present assignment. Of the 50 BOQ/BEQ MSs who rated the scale ($\bar{X} = 5.5$), 76% gave a positive rating to their current assignment. Seventy-six percent ($N = 33$) gave a positive rating to an ashore assignment ($\bar{X} = 5.1$). Lastly, the least preferred choice of this group afloat EDF ($\bar{X} = 4.1$) was rated positive by only 43% ($N = 42$) of these MSs. Of the ashore group, 41 chose an ashore assignment as their first choice. A BOQ/BEQ assignment was chosen by 15 ashore MSs, while only 7 indicated that they preferred an afloat EDF.

Thus, if given a choice, few of these MSs would choose to be assigned to sea duty. Table 40 shows working at a facility afloat was the least preferred assignment by both groups.

Table 40. - Percent MSs Showing Work Preference

	<u>BOQ/BEQ*</u>		<u>Ashore EDF**</u>
	<u>X</u>	<u>N</u>	<u>N</u>
At a BOQ/BEQ	50	5.5	15
At an Ashore EDF	33	5.1	41
Afloat	42	4.1	7

*Rated on a 7-point scale

**Were asked to choose one of the three choices

Motivation

In addition to training (Salter, et al., 1985), job satisfaction and efficient job performance depend a great deal upon good motivation. The MSs were asked to determine from a list what factors they perceived as effective motivators for good job performance. The complete list of motivators is shown in Appendix I. Table 41 contains the leading motivators cited by the MS groups:

Table 41.- MS Ratings of Effective Motivational Factors

	<u>Afloat</u>	<u>Ashore</u>
Opportunity to take civilian courses toward a Foodservice Degree	82%	82%
Opportunity to obtain foodservice certification	81	74
Senior MS taking good suggestions seriously	77	80
Positive customer feedback	65	72

Support from their managers, which includes taking suggestions seriously and recognition, is included in the list of effective motivators. Likewise, feedback from customers that the MSs' service is appreciated was cited as an effective motivational factor for these workers. The results of an earlier study (Richardson, et al., 1980) also support the overall importance of these factors to workers in general and more specifically for these MSs.

For the Navy to provide both time and payment for courses toward a foodservice degree in a college or community college program was perceived as the most effective motivator for good job performance by both groups. The opportunity to obtain a foodservice certification was also an effective job motivator. A degree would be beneficial in helping them continue working in the foodservice area after they leave the Navy, and 46% of these MSs were considering a foodservice career. Only 25% were not interested in working in the foodservice area and the remaining 29% were undecided about their future career plans, as will be seen later (Table 50).

The tendency of the afloat MSs to report slightly more negative opinions than the ashore MSs is continued in comparing their Navy job with a similar job in the civilian sector. As is shown in Table 42, over half the afloat respondents (52%) as opposed to just over one fourth of the ashore respondents felt that their job was less respected.

Table 42. - MSs' Comparison of Navy Job to Civilian Job

	Percent Responding	
	Afloat	Ashore
My job in the Navy is		
More respected	15	24
Equally respected	33	49
Less respected	52	27

Work Environment

Satisfaction with the present facility is indicated by the mean responses in Table 43. The MSs rated the dining facility in which they are presently working below:

Table 43. - MS Mean Responses to Factors in Present Dining Facility

	Afloat	Ashore
The dining facility overall	5.0	4.8
Customer satisfaction	4.7	4.8
The menu	4.6	5.0
Effectiveness of Messdeck Master-at-arms	4.4	-
The condition (repair) of equipment/utensils	4.3	3.6

Scale: 1 - Very bad, 4 - Neutral, 7 - Very good

In general, these MSs were positive about the dining facility. The mean rating of 5.0 and 4.8 for the afloat and ashore MSs, respectively,

reflects some degree of satisfaction with the location of their present duties. For the afloat respondents, this may account, in part, for their preference for remaining in their present facility rather than rotating to another one on the ship. It is not unusual to learn that poor equipment is a common complaint among the MS population.

Temperature and noise are the lowest rated aspects of the place where both responding groups now work, as is shown in Table 44. They were asked to "please rate the place where you work" in terms of the following factors:

Table 44. - MS Mean Response About Place of Work Factors

Factor	Mean Response	
	Afloat	Ashore
Cleanliness of work area	5.5	5.7
Lighting	5.2	5.6
How easy to get supplies	4.9	5.0
Size and layout of workspace	4.8	5.6
Ventilation	4.6	5.1
Bumping into others	4.6	5.3
Temperature	4.2	4.9
Noise	4.2	4.9

Scale: 1 - Very bad, 4 - Neutral, 7 - Very good

The afloat respondents' opinions of their dining facility, whether underway or in port, did not vary much. Table 45 shows their opinions. Food quality and quantity and sanitation were favorable. Variety and the general environment received slightly lower ratings. Overall, the ashore ratings were slightly higher than the afloat ratings. In all cases the MSs rated these factors higher than did their customers.

Table 45. - MS Opinion of Ship's Dining Facility
While In Port/Underway

	<u>In Port</u>	<u>Underway</u>
Quality of food	5.4	5.4
Quantity of food	5.4	5.3
Sanitation in dining area	5.3	5.2
General eating environment	5.0	4.6
Variety of food	4.9	5.0

Scale: 1 - Very bad, 4 - Neutral, 7 - Very good

Those surveyed also compared their facility to other ships' facilities on a 7-point hedonic scale (1= Much worse 7= Much better) as being between "neutral" and "slightly better" (4.6). The ashore MSs compared their current facility as "somewhat worse" (2.4) than others with which they were familiar.

"Who do you think should be operating ashore EDFs?" was asked of the 64 ashore MSs only. The three choices they were given and the resulting responses are shown in Table 46. As noted in the table, the MSs chose their present form of operation with both Navy and civilian personnel over the alternatives of an all-Navy or an all-civilian operation.

Table 46. - MSs' Opinion: Who Should Operate the Ashore EDF?

	<u>Percent Responding</u>
Navy Personnel	26
Civilian Personnel	3
Both Navy and Civilian Personnel	71

Management/Leadership

To further investigate the MSs' perceptions of the current food service system, the survey asked MSs to rate the present operation. The results are shown in Table 47:

Table 47. - MS Mean Rating of Present Foodservice
Operation (Rank in Parentheses)

	Afloat	Ashore
The food preparation skills of Navy MSs	5.1 (2)	5.1 (7)
Food preparation skills of civilian cooks	*	4.4 (12)
Leadership from Watch Captain	4.8 (4)	5.2 (6)
Leadership from Galley Supervisor	4.8 (5)	*
Leadership from senior MS	5.0 (3)	5.5 (2)
Leadership from Chief Petty Officers other than senior MS	*	5.4 (3)
Support and cooperation among Navy MSs	4.6 (7)	4.8 (9.5)
Support and cooperation between Navy and civilian cooks	*	4.8 (9.5)
Interest and support of Food Service Officer	4.4 (9)	5.7 (1)
Interest and support of the Supply Officer	4.5 (8)	5.2 (5)
Interest and support of Commanding Officer	5.2 (1)	5.4 (4)
The On-the-Job training program	4.8 (6)	5.0 (8)
The job performance of the civilian contract workers	*	4.7 (11)
The job performance of the foodservice attendants	4.4 (10)	*

Scale: 1 - Very bad, 4 - Neutral, 7 - Very Good

*Question not asked

Present operations were ranked high on "interest and support of the Commanding Officer" and the "MS's food preparation skills" by the afloat respondents. The ashore MSs ranked "interest and support of the Food Service Officer" first and "leadership from the senior MS" second.

When looking at their perceptions of the current leadership, the MSs indicated (see Table 47) that there was some degree of satisfaction with the present system. Here again, the ashore respondents were more positive about their management than the afloat MSs. Nevertheless, as shown in the table, interest and support of the Commanding Officer was rated high (5.2 and 5.4) for both groups, ranking first and fourth by the afloat and ashore respondents, respectively. Likewise, satisfaction with more immediate supervision (senior MS and Chief Petty Officers) was not a complaint for either group. Other areas less positive for those afloat are with the Supply Officer (8th) and Food Service Officer (9th).

Those in ashore EDFs are generally satisfied with the leadership. As was seen in Table 33, better supervision by watch captain (afloat, 1.8, ashore, 2.1) was a "moderately" important change needed to improve the present operation. It is uncertain whether or not these respondents perceived a difference between leadership and supervision. Another plausible explanation might be that even though supervision is perceived as satisfactory, as with anything else, there is always room for improvement. Likewise, the JDI indicated that supervision was quite satisfactory to both afloat and ashore MSs.

Retention

The area of MS retention/reenlistment was given some attention in this survey. The afloat and ashore MSs were asked whether or not they planned to reenlist in foodservice when their present enlistment ends. As is shown in Table 48, of the surveyed MSs, approximately one third (32%) of those afloat and one fourth (24%) of those ashore were undecided as to whether or not they would reenlist. Thirty-three percent of the afloat and 49% of the ashore MSs were considering foodservice reenlistment.

Table 48. - MS Reenlistment Plans

	Afloat	Ashore
Yes	33%	49%
No	35 (29)*	27 (16)*
Undecided	32	24

* Of the "No's", 35% afloat and 27% ashore, 6% and 11%, respectively, planned to retire.

Directing recruiting efforts toward those MSs who are undecided about reenlisting could improve the "Yes" category percentage.

All of the MSs were asked if they planned to continue working in the foodservice area when they leave the Navy. Their responses are shown in Table 49.

Table 49. - MS Plans to Continue in Foodservice Work

	<u>Afloat</u>	<u>Ashore</u>	<u>BOQ/BEQ</u>
Yes	49%	46%	32%
No	23	25	19
Undecided	28	29	49

In all cases, the majority of those who had decided were planning foodservice careers after the Navy.

The MSs assigned to BOQ/BEQ were asked to agree, remain neutral or disagree with some implications relating to their opinions on foodservice. The percentage of responses are shown in Table 50.

Table 50. - MS at BOQ/BEQ: Views on Foodservice

<u>MS OPINIONS</u>	<u>Percent</u>
A. MOST STRONGLY AGREE	
Working at a BOQ/BEQ is good management experience	85
Job at BOQ/BEQ is good preparation for a civilian job in Hotel/Motel Management	76
I prefer working in a BOQ/BEQ rather than in foodservice	48
When I leave the Navy, I plan to get a job in Hotel/Motel Management	43
B. MOST STRONGLY DISAGREE	
MSs should not be assigned to jobs at BOQ/BEQ	61
During a tour of duty at a BOQ/BEQ, MSs forget some of their foodservice skills	44
C. UNDECIDED	
When I leave the Navy, I plan to get a job in foodservice	49

The BOQ/BEQ MSs were undecided or neutral on getting a job in foodservice after leaving the Navy. Forty-three percent thought of a career in management rather than foodservice. The BOQ/BEQ MSs agree that they are receiving good management experience by working in the BOQ/BEQ. Again focusing on their career in foodservice, those MSs ashore and in Unaccompanied Personnel Housing (BOQ/BEQ) were asked to describe an "ideal" MS career path. This description included the number of years they thought should be spent working afloat, at an ashore EDF or at a BOQ/BEQ. As can be seen in Appendix J, their responses quite closely mirror their actual path. The first four years should be spent afloat according to 76% of the BOQ/BEQ MSs and 83% of the ashore respondents. The last four years should be spent at a BOQ/BEQ (61%), according to BOQ/BEQ MSs. The ashore MSs (64%) thought that the last four years should be spent at an ashore facility.

A previous study (Salter, et al., 1984) found that the MSs planning to reenlist agree more with positive statements regarding the Navy and the MS job and disagree more on negative statements than the MSs who are not planning to reenlist. These results support the previous study, that these MSs tend to reenlist based on job factors. For example, a larger percentage of the ashore MSs planned to reenlist since they, as a group, were more satisfied with most aspects of their job than were those MSs afloat.

Summary: Mess Management Specialist Survey

The MSs were more positive, in general, about military life than were the customers, and the ashore MSs were more satisfied than were the afloat MSs. The MSs consider that their job receives little respect within the Navy. Practically as many MSs were undecided about reenlisting as were positive that they would not. To improve these enlistment figures, efforts should be directed toward those items cited as motivators: More training, having senior MSs seriously consider suggestions, as well as receiving positive feedback from the customers.

E. Mess Management Specialist (MS) Image Survey

Introduction

This survey focuses upon a perceived Mess Management Specialist (MS) "image problem." On an earlier survey, MS and non-MS rated how much they respected various rates. The MS rate was viewed as least respected of the 11 rates listed by both the MS and non-MS crew members alike. This subsequent effort was designed to follow-up on this finding. Specifically, does this difference in respect for MSs stem from a work environment problem (e.g., MSs perceiving their jobs as low status) or from negative personality traits intrinsic in MSs. If the former case is correct, does this perception of their job as one of low status result in MSs feeling dissatisfied with their work and "feeling negative" about their own self-image? As such, the relationship between the work environment and negative personality traits in the MSs was investigated.

James and Jones (1974) suggested that researchers interested in an individual's perceptions of the work environment devise descriptive measures that address task, social and interpersonal attributes. Following this suggestion, the present study explored the perceived work environment of the MS and non-MS personnel with various situational and individual measures, e.g., overall job satisfaction, performance ratings, and social and personal job importance.

Although it is not generally possible to predict job performance from job satisfaction, some data suggest that individual self-esteem may mediate this relationship. The general notion is that high self-esteem persons are motivated to perform well on tasks in order to maintain a self-image of competence. Low self-esteem persons are not motivated to perform well on tasks since poor task performance is consistent with a self-image of low competence. Additionally, in high self-esteem persons, the better their performance on a task the greater the performance balances with their self-concept of themselves as competent, and the more satisfied they are with the task. Because success on a task and competence are not central to a low self-esteem person's self-concept, their task performance should not have an important impact on their satisfaction. Some research (Greenhaus & Badin, 1974) indicates that performance does predict satisfaction for those with high self-esteem but not for those with low self-esteem, presumably because of incongruities aroused by the belief that "I'm a good worker" versus "I'm doing a poor job."

Another possibility for the difficulty in predicting job performance from job satisfaction may involve an individual's internal locus of control (Rotter, 1954). Individuals may be high in internal locus control, believing that the major outcomes in their lives are under their own control, or individuals may be high on the more negative external locus of control believing their outcomes are due to either change or powerful others (Berzins & Ross, 1973). Conceivably a relationship between job satisfaction and job performance should hold for those with an internal locus of control (i.e., who take credit for work) but not for individuals with an external locus of control (i.e., who see performance as due to luck or the influence of others).

We know the MSs are different from other Navy rates in terms of prestige, what we need to know is are they different from other Navy personnel in other respects (such as personality) as well. As such, several personality traits believed to affect self-esteem were investigated: locus of control, anxiety, depression and interpersonal sensitivity. Anxiety reflects a general restlessness and nervousness; depression occurs when an individual possesses feelings and cognitions of hopelessness and futility; whereas interpersonal sensitivity may lead to feelings of personal inadequacy and inferiority, particularly in comparison with other individuals.

Subjects

Subjects were volunteer crew members of the U.S.S. Saratoga. Each volunteer completed a seven-page, four-part questionnaire entitled "Survey on Job and Life Satisfaction". Data were collected afloat from the crew.

Characteristics of the Sample

Table 51 describes characteristics of the sample. The sample consists of men from (supply) MS (n=43), medical (n=15) and operations (n=33). The three groups were chosen primarily because of known differences in perceived prestige.

Table 51. - Demographic Characteristics of Sample

<u>Department</u>	<u>Grade</u>	<u>N</u>	<u>Respondents</u>
Supply (MS)	-----	<u>43</u>	<u>47.3%</u>
	E01-E03	21	48.8
	E04	9	20.9
	E05	9	20.9
	E06	2	4.7
	E07-E09	2	4.7
Medical	-----	<u>15</u>	<u>16.4%</u>
	E01-E03	2	13.3
	E04	6	40.0
	E05	1	6.7
	E06	4	26.7
	E07-E09	2	13.3
Operations	-----	<u>33</u>	<u>36.3%</u>
	E01-E03	8	24.2
	E04	8	24.2
	E05	11	33.3
	E06	4	12.1
	E7-E9	2	6.1

Materials

The questionnaire consisted of four parts: 1) sample characteristics (rate, rank, department, division), 2) anxiety, depression and interpersonal sensitivity scales from the SCL-90 (Derogatis, Lipman, & Covi, 1973), 3) locus of control scales (Rotter, 1954), 4) work environment items assessing individuals' perceptions of their job importance (e.g., "My job makes a meaningful contribution"), their professional and work group esprit de corps (e.g., "Outside the Navy, this is a high status job" and "I am proud of my division", respectively), job satisfaction (e.g., "I like my work"), and job prestige (e.g., "My job is less respected than most other Navy jobs"). Job evaluation ratings were solicited from the senior MS for MSs.

Statistical Results

ANOVAs performed on the personality variables: depression, interpersonal sensitivity, internal locus of control, external locus of control, control by powerful others, and anxiety were nonsignificant, indicating the self-esteem problem was not related to personality factors, but was in fact, due to some extrinsic or job-related factor.

Mess Management Specialists vs. Non-Mess Management Specialists

Findings: Work Environment

Medical and operations were combined and compared to the MSs on the work environment items. One-way analyses of variance revealed significant effects on items:

#3 "My job is less respected than other Navy jobs."

#6 "In general, the quality of work in my division is worse than that of same division on other Navy ships."

#9 "There are poor opportunities for advancement in the Navy for people with my ratings."

#10 "This is a low status job in the Navy."

#14 "My job requires a great deal of technical knowledge."

As noted in Table 52, on the page that follows, MSs perceive their jobs as less respected, believe that there are fewer opportunities for advancement, they are in a low-status position, they require less technical knowledge, and their work quality is inferior to the same divisions on other ships. These results further support the hypothesis that the MS "image problem" is job related.

Table 52. - Mean Responses to Work Environment Questionnaire by MS and Non-MS

	<u>Item Number</u>					
	<u>3</u>	<u>6</u>	<u>9</u>	<u>10</u>	<u>14*</u>	<u>15,16</u>
MS						
(n=42)	3.59	3.43	4.93	3.88	4.14	2.00
Non-MS						
(n=48)	2.73	2.26	3.28	2.04	6.00	1.65

Scale ranged from disagree strongly (1) to agree strongly (7). Hence the higher the score the greater the agreement with the item.

*High scores are more positive on this item.

Findings: Self-Ratings on Performance

A performance scale was created by combining individual responses to the items:

#15 "How well do you believe you perform your job?"

#16 "Given all the jobs you've held in your life, how do you rate your work performance overall?"

A one-way ANOVA revealed a significant effect on this scale. As can be seen in Table 52, MSs report they perform their jobs less well than do non-MSs.

Findings: Self-Esteem

In support of the survey findings which led to this research, a marginally significant effect occurred on the self-esteem item "Feeling inferior to others" with MSs indicating more discomfort (Mean = .47) than non-MSs (Mean = .29) on this item. Scale: 0 (no discomfort) to 4 (extreme discomfort).

To further examine this self-esteem finding, individuals indicating any discomfort due to feeling inferior were compared to individuals indicating no discomfort due to feeling inferior. ANOVAs were then performed on all work environment items as a function of high and low "self-esteem". One-way ANOVAs revealed significant effects on items:

#11 "I like my work."

#16 "Given all the jobs you've held in your life, how do you rate your work performance overall?"

As indicated in Table 53, subjects in the sample indicate they like their work (Grand Mean = 5.90 on 7-point scale); however, those who felt no discomfort based on feeling inferior to others indicate they like their work less but are more positive in their ratings of their work performance

overall than individuals who indicate some discomfort based on feeling inferior to others. Conceivably, high self-esteem MSs caught in a low prestige position may dislike the position somewhat as it is not in keeping with their self-concept of themselves as competent individuals. However, objectively perceiving the task as low prestige and liking their work less than low self-esteem MSs is distinctly different from their perceptions of their work performance. Apparently, for high self-esteem MSs, competent task performance can be recognized as such even though the task is not in balance with their self-concept of themselves as competent.

Table 53 - MS Mean Response to Work Environment Questionnaire
as a Function of Self-Ratings of Feeling Inferior

	<u>Item Number</u>	
	11	16
Feeling inferior to others		
No discomfort	5.69	1.68
Some discomfort	6.00	2.13

Scale for item 11 ranged from disagree strongly (1) to agree strongly (7), hence the higher the mean the greater the agreement with the item. Scale for item 16 ranged from exceptionally well (1) to very poorly (7); hence, the lower the mean the more positive the rating.

Mess Management Specialists

Findings: Self-Ratings of Performance

The above performance scale was utilized to investigate MSs self-ratings of performance. MSs scoring high on this combined scale were compared to those scoring low on the scale by arbitrarily dividing the population in the middle so that half the MSs were above this scale point and half below. Analyses were performed on task evaluations, liking for their job, depression, anxiety and interpersonal sensitivity to determine whether differences exist between MSs who rate themselves high and low on these items.

The ANOVAS performed on task evaluations, liking for their job, and interpersonal sensitivity were nonsignificant. As noted in Table 54, two significant effects on the performance measure occurred. MSs who rate themselves high on the performance measure rate themselves as less depressed and anxious than MSs who rate themselves low on the performance measure. It would appear that believing you are performing well is associated with low anxiety, possibly about performance ratings, and lack of depression. On the other hand, believing you are not performing well can create anxiety, perhaps related to evaluations, and depression.

Table 54 - MS Mean Response on Depression and Anxiety as a Function of Self-Ratings of Performance

Self-Ratings of Performance	Depression	Anxiety
High	.68	.31
Low	1.23	.81

Scale: 0 (no discomfort) to 4 (extreme discomfort).

The lower the mean score, the lower the rated depression and anxiety.

To examine whether this depression was specifically associated with the work environment, MSs rating high on depression were compared to individuals rating low on depression by arbitrarily dividing the population of MSs in the middle so that half the MSs were above this scale point and half were below it. ANOVAs were then performed on all work environment items. One-way ANOVAs revealed significant effects on items:

#1 "The ship's crew consider my job important."

#5 "My job makes a meaningful contribution."

As noted in Table 55, MSs who rate themselves as more depressed perceive the ship's crew perception of their jobs at odds with their own perception of it. While the more depressed MSs believe their job makes a meaningful contribution, they perceive others as viewing their work as unimportant.

Table 55 - MS Mean Responses on Work Environment Questions as a Function of Rated Depression

	Item Number	
	1	5
Depression		
Low	5.83	2.91
High	4.79	3.57

Higher mean scores indicate more agreement with items 1 and 5.

Findings: Self-Esteem.

MSs indicating any discomfort due to feeling inferior were compared to MSs indicating no discomfort due to feeling inferior. ANOVAs were then performed on all work environment items as well as performance evaluations, locus of control scales, interpersonal sensitivity, anxiety and depression as a function of high and low "self-esteem." One-way

ANOVAs revealed significant effects on anxiety, ascribing outcomes to chance, and on the work environment items:

#1 "The ship's crew consider my work to be important."

#5 "My job makes a meaningful contribution."

#11 "I like my work."

As noted in Table 56, MSs who reported high self-esteem (no discomfort) are more likely to perceive others considering their work important, are less anxious, and they like their work more than low-self-esteem (some discomfort) MSs. However, high-self-esteem MSs perceive their work making less of a contribution and believe their outcomes are more a function of chance than low-self-esteem MSs.

Table 56. - MS Mean Ratings of Work Environment and Personality as a Function of Self-Esteem

	<u>Item Number</u>				
	1	5	11	Anxiety*	Chance*
Self-Esteem					
High	5.70	3.00	1.90	.34	1.79
Low	4.50	3.56	.93	1.05	1.74

Scores: these items range from (1) strongly disagree to (7) strongly agree.

High mean ratings indicate greater agreement with items 1, 5 and 11.

*Low mean scores indicate lower anxiety and lower perceptions that outcomes are due to chance.

Findings: Locus of control

MSs scoring high on the locus of control scale were compared to those scoring low on the scale by arbitrarily dividing the population at the median for chance, powerful other and internal scales so that half the MSs were above these scale points and half below. Analyses were conducted to determine if differences existed within individuals who rated themselves high or low on these scales.

ANOVAs were performed on the job performance evaluations as well as liking for the job, anxiety, interpersonal sensitivity, and depression ratings.

A main effect of job evaluations, interpersonal sensitivity and anxiety on chance occurred. Results indicated that MSs who rated their outcomes as more a result of chance had lower evaluations, and indicated

greater anxiety and sensitivity than individuals who rated their outcomes as less determined by chance. A main effect of anxiety on powerful others occurred, that is, MSs who believed their outcomes were controlled by powerful others were more anxious ($M = .68$) than those who rated their outcomes as less controlled by powerful others ($M = .40$).

One-way ANOVAs for powerful others, chance and internal locus of control conducted on the work environment items revealed a main effect of powerful others on:

#9 "There are poor opportunities for advancement in the Navy for people with my ratings,"

indicating greater agreement with this statement by individuals who perceived their outcomes were controlled by powerful others ($M = 5.63$) than by individuals who rated their outcomes as less controlled by powerful others ($M = 4.35$).

Table 57. - MS Mean Evaluation Response for Interpersonal Sensitivity and Anxiety as a Function of Ascribing Outcomes to Chance

	Evaluations	Interpersonal Sensitivity	Anxiety
Chance			
High	4.43	.94	.70
Low	5.55	.48	.40

High scores on evaluation are more positive. Higher scores on anxiety and interpersonal sensitivity are more negative.

Summary: Mess Management Image Survey

Rarely, do all members of a group have equal status. There usually exists a hierarchy on which a member can be ordered from the most to the least valued, according to their perceived prestige, importance or utility to the group. The MSs perceive their job as being near the bottom of the Navy job/rate hierarchy. This perception emerges not so much from personality factors, but from extrinsic, job-related factors associated with the MS rating.

Feelings of inequity (Herbert, 1981) usually begin when an individual makes a personal input/output comparison, often in reference to others. In self-rating their performance, the MSs see themselves performing their jobs less well than non-MSs. Some of these MSs who felt their jobs were important, also felt that others "looked down on them" which diminished

somewhat the positive feelings they themselves got from doing their job well. If other aspects of the job are unsatisfactory (e.g., negative customer feedback, poor working conditions), they can discourage the most enthusiastic job performance.

The MS survey indicated that two-thirds of the MSs were not in the MS rate as their first choice, but as the result of a lack of other available options. To some degree, these MSs arrive in the MS rate already rejected with a poor self-image. Then, if the MSs believe there is little relationship between effort or performance and available reward, this poor self-image is lowered even further. An important aspect of any job is in the answer to "What's in it for me?" Thus, any job has to make achievement possible to maintain an above-average level of performance and to foster a positive self-image. The MSs here feel that there is less opportunity for advancement in their rate.

The Navy is changing rapidly. Thus, the level of knowledge and skills required of the MSs is also changing. As we enter the 1990's, the Navy is seeking more from those coming into the service. So, too, will those coming to the Navy be demanding that the Navy meet their increasingly diverse needs.

Focus must be placed on the traditional MS rate to improve its status among Navy rates. Special attention must be given to attracting applicants, maximizing performance, and minimizing dissatisfaction and stress in order to retain valued employees. Drucker (1974) provides some direction in this effort in the areas listed below.

Personnel Selection

Special emphasis should be placed on attracting the right people for the job, for example, those who intend to pursue a foodservice/management career or at least have had some food service training before coming into the Navy:

1. Technical/Vocational high school
2. Culinary Arts institution
3. Food service institute courses

After the selection process, it is important that persons be placed in jobs where their strengths can become productive and they can obtain satisfaction from what they do best.

Job Enrichment

Job enrichment is a process designed to deal with problems when job content has been identified as the root cause. A job enrichment program allows those MSs already in the job the opportunity to have a say in ways the job can be altered to maximize their benefits, thus making the job more attractive, interesting and satisfying. Herbert (1981) agrees that job enrichment can lead to appreciable increases in MS motivation, performance and satisfaction.

People who have favorable attitudes toward their jobs will be more highly motivated to remain in and perform their jobs (Jackson and Schuler, 1990). Two job-related attitudes are job satisfaction (affect associated with one's job) and job involvement (how important the job is to the incumbent).

MS Training

The decade of the 1990s promises increased mechanization and technology and the MS rating must be able to keep in step. To be properly applied, this mechanization and technology must extend the sphere of human capacity. It must always add to one's capacity to achieve. Goldstein and Gilliam (1990) discuss the influences of these technologies on training systems. There will be more expectations that training programs will serve as a positive hope to maximize the potential of each person. MSs must be assured of acquiring the training and education they need to perform their jobs more capably and to insure future employment if they so desire.

Manager Training

Future managers will need to be very skilled individuals. They will have to provide on-the-job training to integrate those new to the MS rate, while also working with incumbents who have been around a while. Training programs insuring good leadership qualities and abilities for management and supervisory personnel in areas such as interpersonal skills are important in the future Navy workplace (Goldstein and Gilliam, 1990). Effective management also requires good communication skills. The traditional downward communication is not the best approach in today's society.

The 1990's managers should be concerned with motivation also, because motivating employees is one of the most consistent challenges any manager faces. Managers should be provided guidance in dealing with this challenge. Increased performance, the end result of motivation, means having employees who are reasonably satisfied.

Feedback

Feedback or knowledge of a job well done is considered by Drucker (1974) to have strong reinforcing properties. An opinion highlighted in the MS survey responses was that more recognition for a job well done was important to adding satisfaction to the job. Positive feedback from customers and superiors is important to the MSs.

F. Trends: Population

Introduction:

There were two main objectives of this emerging/future trend analysis. The first was to compile and analyze data on US population and Navy manpower trends to develop a profile of the future MS rate in the 1990's and beyond. Understanding manning levels and the quality of future personnel are necessary planning tools in the development of any future planning strategy. The second objective was to examine trends in the (food) service area itself. Where was the industry going, what were the driving technologies, and what would be required to attract the customer of tomorrow? Information, in part, was gathered from an industry review that was conducted by the School of Food Science and Nutrition at the University of Massachusetts for this project. Their complete report is available upon request.

Population Trend Analysis

Trends in demographics of both the civilian population and of Navy enlisted personnel were examined. For Navy personnel, demographic variables of interest were age, gender, marital status, race/ethnic background, home of record, education, aptitude, and pay grade. The implications of these trends are discussed.

Population Pool

Age changes in the civilian population are easily projected and are well documented. The estimated size of the 17-21 year old population--based on births 17-21 years previously--for the years 1960-2000 is shown in Figure 3. This population is the principal source

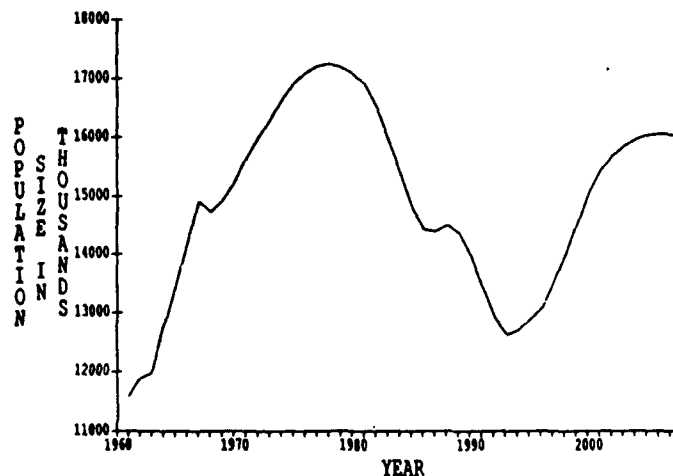


Figure 3
Estimated Size of 17-21 Year-Old Population, 1960-2000

of nonprior-service recruits for the armed services. The year 1978 was a peak population year with the pool of possible recruits almost two times that of 1960. From 1978, through approximately 1993, the pool steadily decreases. While, during the lean years in the early 1990s, there will still be almost as many 17-21 year olds as existed in 1966 force, requirements have been increased over the 1966 requirements because the Navy is expanding from a 558 to a 600 ship Navy, and ships will be manned above the wartime minimums. Also, basic recruitment has changed drastically since the 1960s with the ending of the draft and the concomitant increase in hiring of the 15-21 year-old population by civilian organizations. Thus, these population figures understate potential recruitment problems.

Depending upon circumstances which exist in the 1990s and beyond, the small pool of youth may be problematic, so that young women, who comprise 49% of the 17-21 year old population, may be called upon to increase numbers in the nonprior-service recruit pool more so than they have in the past. By 1990, the Pentagon estimates 1 out of every 34 eligible men and women will need to be recruited for military service as compared to 1 out of every 38 today (1987).

Using women to increase a diminishing recruitment pool may be a limited alternative given current Navy policy. Since the number of afloat billets is restricted for women, increasing their numbers would only help fill ashore billets. This would be at the expense of the men who would then not be able to rotate as easily from ship to shore duty. Perhaps an alternative would be to permit women in afloat billets in American coastal waters, the 2nd and 3rd fleet. This could help alleviate the population crunch without creating problems with men pulling additional sea duty.

Figure 4 compares the 17-21 year-old male population to the 17-21 year old female population for 1980, 1990, and 2000. At age 17-21, males comprise approximately 51% of the total population, therefore the potential shortfall is more pronounced than readily apparent from Figure 3 alone.

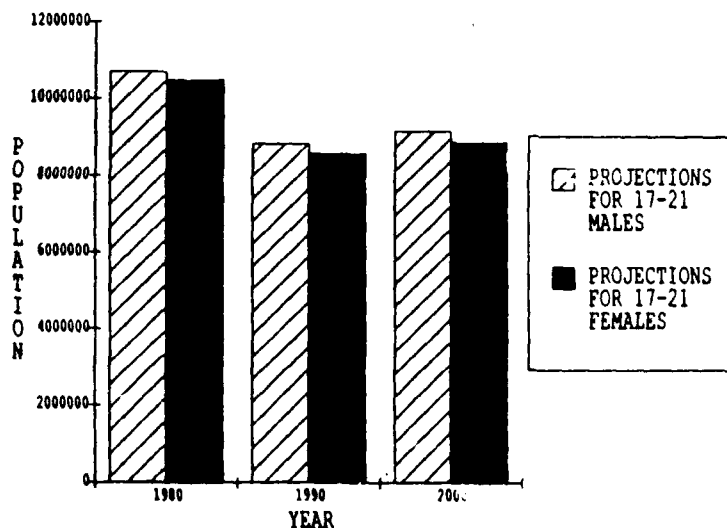


Figure 4
Population of 17-21 Year Olds

Age Trends

As can be seen, Table 58 illustrates a steady decline in the 17-21 year old Navy enlistees with a concomitant increase in 22-35 and 36-55 year olds. According to Table 58, the Navy's age trend is to an older population. This trend suggests, among other things, that a higher proportion of enlistees could become more discriminating in their food consumption requirements as experience tends to produce sophisticated tastes.

Table 58. Age Trends for Navy Enlistees for the Period 1975-1985 (%)

Year	Age		
	17-21	22-35	36-55
1975	41.4	48.6	9.9
1976	41.7	48.6	9.6
1977	41.7	48.7	9.5
1978	41.1	49.5	9.4
1979	38.8	50.5	9.6
1980	39.5	51.1	9.4
1981	38.6	52.0	9.3
1982	35.3	52.4	9.5
1983	32.6	57.5	9.8
1984	30.8	59.0	10.1
1985	30.1	59.5	10.3

NOTE: The source for Tables 58 to 71 is Defense Manpower Data Center, Monterey, CA 93940

Table 59 illustrates age trends for MS and non-MS Navy personnel. The following trends are shown in both Table 59 and Figure 5: non-MSs are

Table 59. Trends for MS and Other Navy Ratings
as a Function of Age (%)

Year	Mess Management Specialists			Other		
	17-21	2-35	36-35	17-21	22-35	36-55
1975	20.9	41.9	37.1	42.2	48.3	9.4
1976	18.5	48.0	24.1	42.4	48.5	9.0
1977	23.3	49.9	26.7	42.4	48.7	8.8
1978	23.2	50.0	26.7	41.8	49.5	8.7
1979	23.2	50.1	26.7	40.4	50.5	8.8
1980	24.4	50.7	24.8	40.0	51.1	8.8
1981	25.2	50.4	23.2	39.1	52.1	8.8
1982	23.6	52.4	24.0	35.8	55.2	9.0
1983	21.4	53.3	25.2	33.0	57.7	9.2
1984	20.1	54.6	25.2	31.2	59.2	9.5
1985	19.1	55.3	25.5	30.5	59.7	9.7

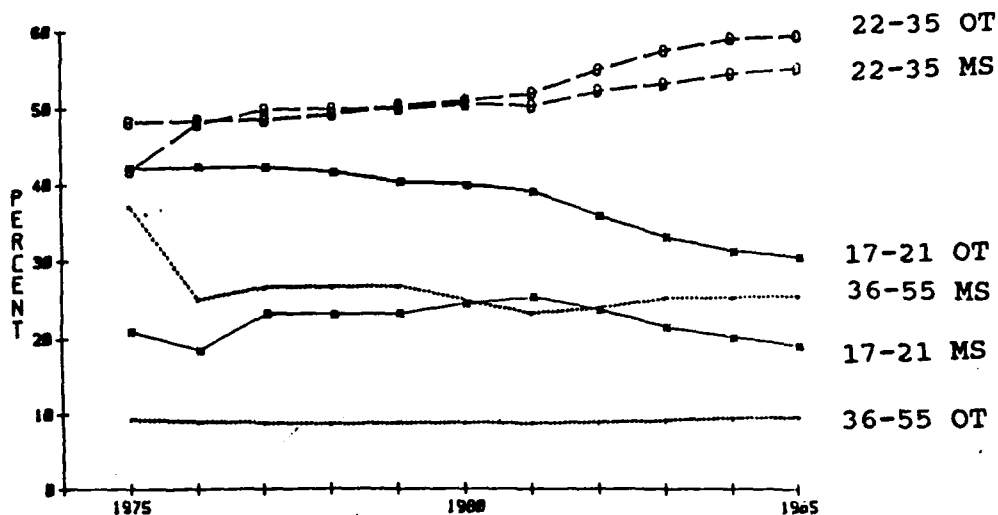


Figure 5
Trends for MS and Other (OT) Ratings as a Function of Age

more likely to be over 22 than between the ages of 17 and 21; the proportion of over 22 and over 36 year old non-MSs is increasing over time; while the proportion of under 22 year olds is decreasing. The same trends occur in the MS rating; the MSs, however, are older than the non-MSs. To the extent that age is associated with grade, this fact suggests promotion opportunities within the MS rating are less likely.

Gender Factors

Table 60 reveals the number of women in the Navy has steadily risen from a low of less than 3.7% in 1975 to a high of 9% in 1985. During the next 5 to 15 years, the percentage of females may rise slightly but should still remain at approximately 10% of the total Navy enlisted population. As females are currently restricted to noncombat positions, a strong recruiting effort is not expected. Assuming the present policy will continue over the next 15 years, the ratio of males to females will remain close to its present level.

Table 60. Males and Females in the Enlisted
Population: 1975-1985 (No./%)

Year	<u>Males</u>		<u>Females</u>	
	Number	Percent	Number	Percent
1975	112033	96.3	4296	3.7
1976	440423	95.8	19284	4.2
1977	442361	95.8	19210	4.2
1978	441339	95.5	20937	4.5
1979	431749	94.6	24751	5.4
1980	428647	93.5	29806	6.5
1981	434741	92.7	34348	7.3
1982	442655	92.3	37024	7.7
1983	443652	91.8	39873	8.2
1984	448288	91.5	41579	8.5
1985	451109	91.0	44492	9.0

Table 61 shows the relationship between males and females in the Navy broken down into MS and non-MS ratings. When this Table is compared to Table 60, year-by-year, the number of women within the MS rating is somewhat less than would be expected by the percentage of women within the Navy population.

Table 61. Males and Females with MS and Non-MS Ratings (%)

Year	<u>Mess Management Specialist</u>		<u>Other</u>	
	Males	Females	Males	Females
1975	99.1	.9	96.2	3.8
1976	98.6	1.4	95.7	4.3
1977	98.0	2.0	95.8	4.2
1978	97.4	2.6	95.4	4.6
1979	95.6	4.4	94.5	5.5
1980	94.2	5.8	93.5	6.5
1981	93.3	6.7	92.6	7.4
1982	92.9	7.1	92.3	7.7
1983	92.4	7.6	91.7	8.3
1984	91.7	8.2	91.5	8.5
1985	92.0	8.0	91.0	9.0

Table 62 reveals an increase in women serving in the MS rating from a low of 1% in 1975 to approximately 3.6% in 1985, an apparent upper level as this percentage is only slightly less than the 3.9% for males.

Table 62. Male and Female Enlisted Population in MS and Non-MS Ratings (%)

Year	<u>Mess Management Specialist</u>		<u>Other</u>	
	Males	Females	Males	Females
1975	4.1	1.0	95.9	99.0
1976	3.8	1.3	96.2	98.7
1977	3.7	1.8	96.3	98.3
1978	3.7	2.0	96.3	98.0
1979	3.7	2.9	96.3	97.1
1980	3.7	3.3	96.3	96.7
1981	3.8	3.4	96.2	96.6
1982	3.8	3.5	96.2	96.5
1983	3.9	3.6	96.1	96.4
1984	3.8	3.7	96.2	96.3
1985	3.9	3.6	96.1	96.4

Single Versus Married Trends

In 1975, 39.6% of the enlisted Navy personnel were married. By 1985 that percentage increased 6.1% to 45.7% married, representing a net increase of 43,024 individuals. Table 63 shows this increase in married personnel from 1975 to 1985 with a concurrent decrease in single personnel for both MS and other ratings. Over the three periods illustrated, Mess Management Specialist (MSs) were more likely to be married than non-MS personnel.

Table 63. Percent of Married and Single Navy Personnel in MS and Other Ratings for Years 1975, 1980, 1985 (%)

Year	<u>Mess Management Specialists</u>		<u>Other</u>	
	Single	Married	Single	Married
1975	45.1	54.9	61.0	39.0
1980	41.3	58.7	59.9	40.1
1985	40.7	59.3	59.3	45.2

Race Trends

From 1975 to 1980, the percentage of blacks and Hispanics in the Navy, in general, was less than one would expect from their known representation in the U.S. population. Figures for the U.S. population are available for 1980 and can be compared to the Navy population. This comparison indicates blacks comprised 11.7% of the U.S. population and 11.0% of the Navy population, compared to 6.5% of the U.S. population and

3.1% for the Navy population for Hispanics and 0.3% of the U.S. population and 4% of the Navy population for Filipino/Malaysians. Figures in Table 64 appear to indicate an increase in black recruitment into the Navy for years 1981-1985. Whether this is above their representation in the U.S. population for these years is not known; population projections of 12.18% for blacks suggest this is so.

Table 64. Minorities within MS and Non-MS Ratings (%)

Year	<u>Mess Management Specialists</u>			<u>Other</u>		
	Blacks	Hispanics	F/M	Blacks	Hispanics	F/M
1975	7.2	1.6	32.3	8.0	3.0	2.4
1976	7.1	1.9	38.6	8.2	2.9	3.1
1977	7.6	1.9	38.4	8.7	3.0	3.2
1978	9.3	2.1	33.7	10.7	3.1	3.3
1979	8.3	2.0	35.9	9.4	3.1	3.3
1980	10.5	2.5	30.1	11.5	2.9	3.3
1981	12.4	2.5	27.6	11.9	3.1	3.3
1982	14.0	2.7	25.8	12.4	3.2	3.2
1983	15.5	3.0	24.4	12.7	3.4	3.2
1984	16.5	3.2	23.4	13.0	3.6	3.2
1985	17.2	3.6	22.9	13.3	3.8	3.2

Tables 64 and 65 show the percentage of black, Hispanic, and Filipino/Malaysian personnel in MS and Non-MS ratings. The percentage of black and Hispanic Navy personnel has risen from a low of 8% and 3%, respectively, in 1975 to a high of 13% and 4%, respectively, in 1985. Comparisons of minorities within ratings for 1980, Table 64, show the MS rating has 43.14% minority members (blacks, Hispanics, and Filipino/Malaysians) whereas the non-MS ratings have 17.68% minority

Table 65. Minorities Across MS and Non-MS Ratings (%)

Year	<u>Mess Management Specialists</u>			<u>Other</u>		
	Blacks	Hispanics	F/M	Blacks	Hispanics	F/M
1975	3.4	2.2	34.8	96.6	97.8	62.2
1976	3.2	2.4	32.4	96.8	97.6	67.6
1977	3.2	2.3	30.2	96.8	97.7	69.3
1978	3.2	2.4	29.1	96.8	97.6	70.9
1979	3.2	2.5	27.8	96.8	97.5	72.2
1980	3.4	3.1	26.0	96.6	96.9	74.0
1981	3.9	3.1	24.9	96.1	96.9	75.1
1982	4.3	3.3	24.0	95.7	96.7	76.0
1983	4.6	3.4	23.1	95.4	96.6	76.9
1984	4.8	3.4	22.4	95.2	96.6	77.6
1985	4.6	3.4	21.0	95.4	96.6	79.1

members. Eliminating the Filipino/Malaysian figures as special case, reveals 13.01% minority members in the MS rating compared to 14.42% minority members in the non-MS ratings and 18.14% in the U.S. population.

Examination of Table 65 shows the percentage of minority members across ratings. Over the 11-year period illustrated, approximately 96% of black and Hispanic Navy personnel are in ratings other than MS while 4% are MSs. During the same 11-year period, the percentage of Filipino/Malaysian personnel in the MS ratings has decreased from a high of approximately 32% in 1975 to a low of 23% in 1985. As the percentage of Filipino/Malaysian Navy personnel has remained steady while their representation in the MS rating has decreased, it would seem that Filipino/Malaysians are slowly exiting from this rating by choosing ratings with more prestige. Given the low percentages of Hispanics found in the Navy, it appears Hispanics are not choosing Navy careers.

Home of Record Trends

Data for 1975, 1980, and 1985 obtained from the Defense Manpower Data Center indicate the pattern of Navy Homes of Record closely resembles the United States population patterns.

During the period 1975-1985, the Mid-Atlantic, East North Central, South Atlantic, and Pacific regions have been most prominently represented. These regions account for approximately 60% of the total Navy enlisted population. California, New York, and Texas are the states most often listed as Navy homes of record accounting for 22% of the enlisted population. The 1980 U.S. Census figures (Table 66) shows approximately 62% of the U.S. population resides in these four regions with California, New York, and Texas accounting for approximately 25% of the population. As the Navy enlisted homes of record are not inconsistent with the U.S. population and this trend has existed for an 11-year period, it should continue in the future. However, the Mid-Atlantic, East North Central, and West South Central regions are underrepresented as homes of record compared with Bureau of Census figures. Heightened recruitment efforts in these areas may prove profitable.

Table 66. U.S. Population by Region, 1980 U.S. Census (%)

<u>Region</u>	<u>Percent</u>
New England	5.4
Mid-Atlantic	16.2
South Atlantic	16.3
East North Central	18.4
West North Central	7.6
East South Central	6.5
West South Central	10.5
Mountain	5.0
Pacific	14.0

Education Trends

From 1975 to 1985, an average of 82% of recruits were high school diploma graduates. Table 67 indicates the total percentage of educated

MS and non-MS (either high school graduates, or some college education (including graduation)) has increased steadily over the 11-year period illustrated. Several additional points are obvious from the table: non-MSs are more likely to be high school graduates than MSs; and a steady increase in the percentage of high school graduate recruits from the low in 1982 has occurred. During 1982, a sharp increase in the number of college-educated recruits also occurred.

Table 67. Education: MS Versus Other Navy Ratings (%)

Year	<u>Mess Management School</u>			<u>Other</u>		
	High School	College	Total	High School	College	Total
1975	76.0	3.7	79.7	78.9	6.5	85.3
1976	80.0	.7	80.7	83.9	2.8	86.7
1977	81.4	.9	82.3	84.0	2.9	86.9
1978*						
1979	81.2	1.2	82.4	84.6	3.0	87.6
1980	80.4	1.4	81.7	84.7	2.9	87.6
1981	82.2	1.5	83.7	85.6	2.9	88.5
1982	78.6	6.5	85.1	78.4	11.2	89.6
1983	80.0	7.3	87.3	79.9	11.7	91.6
1984	81.6	8.2	89.8	80.8	12.3	93.1
1985	82.3	8.6	91.0	81.2	12.5	93.7

*Data unavailable

Summary: It seems likely, given the pending population crunch which will affect the total number of recruits, that Navy recruiters will fill critical rates first. This should impact on the MS rating in a number of ways. First, the education level of the MS rating will decline. Second, total numbers within the MS rating will decline. Third, there is currently an inverted age pyramid with the MS rating. This will continue and become more imbalanced. Fourth, due to a lack of E1-E3s within the MS rating to perform labor-intensive food preparation, unless new food technology offsets the amount of labor necessary, food quality will decline with a concomitant decline in Navy morale.

Aptitude Test Trends

Table 68 and Figure 6 reveal that Armed Forces Qualification Test (AFQT) scores of MS personnel are likely to be lower than AFQT scores of non-MS personnel.

Table 68. MS Versus Other Navy Ratings Scoring Less Than 50th Percentile on AFQT Aptitude Test (%)

Year	Mess Management Specialist	Other
1975	67.5	25.9
1976	62.4	25.9
1977	61.7	28.0
1978	39.1	25.8
1979	48.3	30.0
1980	42.0	23.6
1981	51.9	31.2
1982	54.3	31.0
1983	55.7	36.0
1984	58.3	30.6
1985	59.4	31.0

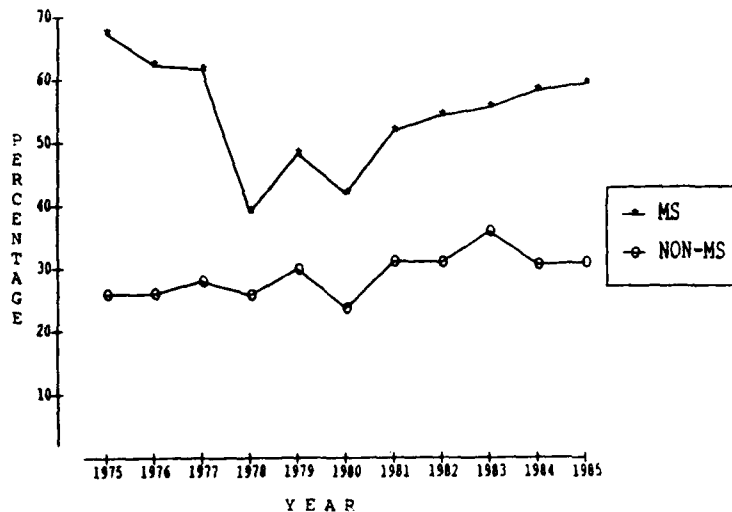


Figure 6
Percentage of MS and Non-MS Ratings Scoring less than 50th Percentile on AFQT

Pay Grade Trends

Table 69 and Figure 7 illustrate MS and non-MS personnel in selected pay grades, specifically E1-E3, E6, and E7-E9. As expected from the age trends, MSs are less likely to be in the lower pay grades (E1-E3) and more likely to be E6 or above than non-MSs.

Table 69. MS and Other Navy Ratings in Selected Pay Grades

Year	Mess Management Specialists			Other		
	E1-E3	E6	E7-E9	E1-E3	E6	E7-E9
1975	28.1	20.0	7.3	39.9	13.9	9.4
1976	25.6	20.0	7.5	41.8	13.9	8.9
1977	23.8	20.0	9.4	40.4	13.8	9.3
1978 *						
1979	24.3	22.1	10.2	38.9	13.9	9.2
1980	26.3	21.3	9.4	38.1	14.2	8.9
1981	28.8	19.3	9.4	38.3	13.9	9.1
1982	28.8	19.6	9.2	38.0	14.0	9.0
1983	26.4	19.5	8.3	36.5	13.7	8.7
1984	25.8	19.1	8.4	35.4	14.7	8.9
1985	23.0	18.1	10.3	33.8	15.6	9.4

* Data Unavailable

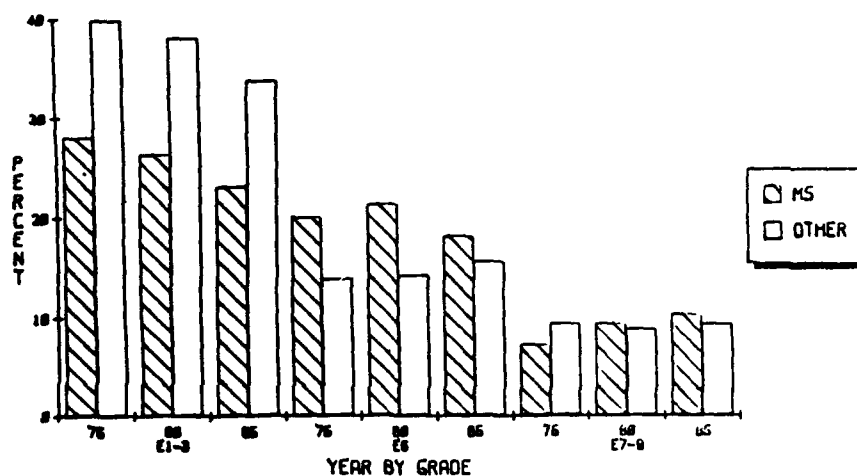


Figure 7
Paygrade Trends: MS and Non-MS in Grades E1-3, E6, and E7-9

Taken together with the age trends shown in Figure 5, these statistics indicate: 1) a lack of E1-E3s in the labor-intensive MS rating and 2) MS personnel may be experiencing difficulty in obtaining rank increases beyond E6. This should result in decreases in the morale of higher rank enlisted in the MS rating.

Table 70 illustrates pay grade ratings for blacks in MS and non-MS ratings and indicates a steadily decreasing representation of middle-level enlisted (E6) in the MS rate. This may result from black MSs leaving the service at a higher rate than caucasian MSs or a discrepancy in promotions across the two races.

Table 70. Pay Grade Ratings for Blacks in MS and Non-MS Ratings (%)

Year	<u>Mess Management Specialists</u>			<u>Other</u>		
	E1-E3	E6	E7-E9	E1-E3	E6	E7-E9
1975	39.1	24.1	16.7	56.9	10.1	6.5
1976	37.5	18.2	12.4	55.5	9.3	6.1
1977	35.5	14.6	11.8	53.5	8.2	5.8
1978	33.4	12.2	9.5	53.9	7.8	5.4
1979	37.4	9.8	8.7	55.4	7.4	4.8
1980	38.6	7.4	4.1	52.1	7.8	4.3
1981	39.5	5.2	5.1	48.2	8.0	4.1
1982	40.8	4.9	3.9	46.5	8.4	3.9
1983	38.8	4.4	3.1	44.4	8.4	3.7
1984	38.2	4.2	2.8	43.1	9.8	3.8
1985	32.7	4.4	2.7	42.3	11.0	3.9

Reenlistment Trends

Table 71 and Figure 8 illustrate the reenlistment trends for MS and non-MS Navy personnel for the years 1977 thru 1985. During this 11-year period, MS personnel were more likely to reenlist than non-MS personnel, average reenlistment being 68.17% for MSs and 50.53% for non-MSs. Since 1979, both MS and non-MS personnel demonstrate a general increase in reenlistment rates. This result is in keeping with the age and pay grade trends discussed earlier.

Table 71. Reenlistment Trends of MS Versus Other Navy Ratings (%)

<u>Year</u>	<u>Mess Management Specialists</u>	<u>Other</u>
1977	73.0	54.0
1978	75.1	56.5
1979	53.1	34.8
1980	60.0	35.1
1981	63.6	42.7
1982	69.2	53.1
1983	74.4	59.2
1984	74.6	58.4
1985	70.6	61.1

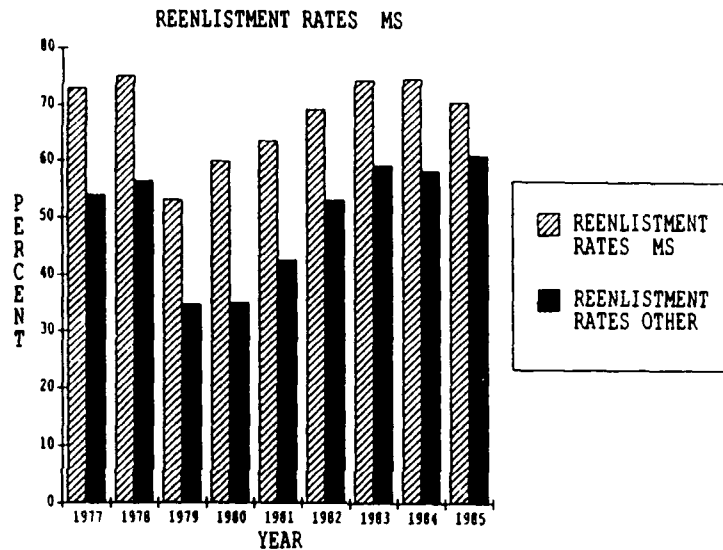


Figure 8
Reenlistment Rates: MS and Non-MS Personnel

Summary

A number of items stand out from the previous tables:

1. The small potential nonprior-enlistment service pool will create manpower shortage problems if no strategy is developed to offset it.
2. The average age and education level of Navy enlisted personnel is climbing and will probably continue to do so. Given needs in critical areas, this may result in older, less educated MS personnel.
3. A trend toward a higher percentage of married personnel, especially within the MS rating, exists and will probably continue. This may lead to a further decrease in use of the in-port and ashore dining facilities. Also, it may become more difficult to keep these married MS personnel, as family members exert pressure on them to not reenlist. This loss of crew may occur if it becomes obvious that MS personnel will be required to spend a greater proportion of their time afloat than non-MS personnel.
4. Currently a higher percentage of MSs are reenlisting in their rate than non-MSs, which may lead to a lack of promotional opportunities in the future.
5. Females, Hispanics and possibly blacks, are underrepresented in the MS rating. The reason for this should be explored given the small nonprior-service enlistment pool.
6. Navy personnel homes of record are similar to the U.S. population pattern, but recruitment effort in Mid-Atlantic, East North Central, and West South Central may prove fruitful as these regions are somewhat underrepresented.

7. The declining E1-E3 labor pool in the MS rate with increasing retention rates may create a distorted pyramidal structure with limited advancement opportunities for senior MS personnel.

G. Trends: Industry

Although Navy Food Service does differ in some respects from the commercial foodservice sector, the two also share many of the same concerns (i.e. budget, staffing, training, and satisfying the customer). Additionally, it is reasonable to assume that the no-prior-service population enters the Navy with a significant level of preestablished eating habits that are directly influenced by commercial foodservice. In this regard, the Navy needs to be aware of changes in food trends in all areas of the commercial foodservice industry to be able to attract and satisfy its wide customer base. We should emphasize the similarities, and not the differences, between military and industrial foodservice and capitalize on what works successfully for industry. Much of the information presented has been garnered from leading industry publications.

Foodservice has in the past typically not been expressed as a satisfying aspect of Navy life (Richardson et al., 1979; see also, Section C. on Customer Surveys). A look at a number of prevailing commercial foodservice trends and several forecasts by industry experts have therefore been made to provide some insight into those areas that could be of potential benefit to future Navy Food Service operations. The list below represents a compilation of some of the more frequently discussed trends--not listed in any order--seen in the various trade publications.

Predicted Long-Term Foodservice Industry Trends

- Better food quality/taste
- More healthy/nutritious food
- Choice of portion size
- Faster service
- More self-service to save customer time
- More extended serving hours
- Increase in nonsmoking areas
- Keeping pace with cultural and menu-related trends
- Quick, friendly and efficient service
- Increased take-out and delivery
- Increased menu variety
- Increased use of convenience foods
- Centralization of food preparation
- Increased automation in the food industry

Lifestyles

Consumer lifestyles greatly influence the foodservice market. Age, income, marital status, social interactions, health, etc. play important roles in determining the consumers' attitude toward food consumption - not only what they will eat but also where it will be eaten.

Demographic changes of the 1980's include an increase in dual income families, more hectic lifestyles, an increased emphasis on the home, more disposable income and an aging population. A resulting demand for high-

quality convenience foods, including an increasing demand for preprepared foods for home consumption, is seen as a trend which will continue into the 1990's. This includes supermarket fresh and frozen prepared foods, restaurant/gourmet shop takeout, and home delivery. In response to this trend more and more upscale/gourmet restaurants are providing takeout and delivery services and many are providing takeout service deli's to compete with the restaurant trade. Also, the frozen-food market has enormously expanded its selection of frozen dinners.

The fast paced 1980's have led to the generation of "grazers" and "couch potatoes," which will surely continue into the 1990's. The traditional three sit-down meals have been replaced in part by eat-on-the-go, snack-type meals, commonly referred to as grazing. The fast-food industry has responded with miniature and hand-held foods and the increased use of prepackaged salads. Shopping malls and restaurants have also adapted by providing food bars/courts which offer a selection of salads, soups, breads, entrees, and desserts from which the customer can choose. These food bars appeal to the "grazers" and promote impulse buys. The increased emphasis on the home and hectic lifestyles has resulted in the "couch potato". This term is used to describe the individual who, after a fast-paced day, prefers to stay home and relax in front of the television, often consuming his/her evening meal at the same time. With the advent of the VCR and an increasing choice of takeout/delivery services, consumers can have it all within the comfort of their own living room.

The health and fitness craze of the 1980's is also being seen as a change in lifestyle and not as a passing trend. There has been a growing public interest in the nutritional value of food and its impact on health. Consumers are changing their eating habits accordingly. A number of food industry surveys support this showing that the American public has become more health conscious in restaurant meal food selection. This increased health awareness of consumers is also reported in Tables 72 and 73.

Table 72. Concerns About Nutritional Content of What Is Eaten (%)

Item	
Fat content/low fat	35%
Cholesterol levels	31
Salt/sodium/less salt	30
Sugar content/less sugar	21
Calories/low calories	16

Source: Duxbury, 1990

Of 1000 adult consumers, polled for the National Restaurant Association by Gallup, 400 reported they had altered their menu choices. Table 73 shows the results of this survey.

Table 73. Things Being Eaten More or Less Often to Ensure a Healthy Diet

Change	
More fruits and vegetables	47%
Less meats/red meats	33
Less fats/oils	31
Less sugar	22
More fiber	21
More fish	18
More chicken	18
Less salt/sodium	18
Less cholesterol	17

Source: Duxbury, 1990

The impact of consumer attitudes on food selections was also supported in a Westat survey for the National Restaurant Association (Nation's Restaurant News, July 14, 1986). Approximately 47% of those polled indicated they chose food due to health-related reasons (19% of the 47% chose foods consistent with government dietary regulations, the remaining 28% were classified as weight conscious as they ordered light, low-calorie foods); 37% were classified as traditional in ordering meat and potatoes or typical fast foods, and 12% were classified as uncommitted either skipping meals or ordering small portions. The remaining 4% were missing.

Consumers are demanding lighter, lower-calorie foods to help maintain or reduce body fat and overall weight. For the same reason, customers want the flexibility to choose smaller portions so they don't feel obligated to eat more food than they need. Consumers are also adjusting their eating habits to aid in disease prevention. They are reducing their sodium intake because of its widely reported effects on increasing blood pressure. The consumption of beef, pork, and other food products high in animal fats and cholesterol has decreased while consumption of fish and poultry has increased. The food industry has responded to these demands with a new generation of "lite", low/no salt, reduced cholesterol, and natural products. Products such as oat bran are being successfully marketed for their alleged health properties. Restaurants are expanding their traditional diet plate to a whole selection of lighter fare.

As far as food selection goes, tomorrow's recruits will be more knowledgeable and, in general, more health conscious but these findings do not mean they are ready to give up their burgers, shakes and fries. Again, looking back to the Navy customer survey, while 93% felt "how good the food is for you" was important, 48% still desired more deep fried foods. Food experts have labeled this inconsistency in eating habits as "dietary schizophrenia". Overall, consumers are eating healthier and exercising more but they still will indulge a rich dessert or other "off limits" food. The popularity of the superpremium ice cream business, (Haagen-Das, Frusen-Gladje, and Ben & Jerry's) is just one example.

Although during the 1990's we will see an aging population, the influence of the younger generation will still be paramount to the food service industry. It was reported in Restaurants USA (1987) that the 18-24 year old age group spends more of their food budget on restaurant meals than any other age group (43% as compared to the average of 36%) and therefore this group has a great deal of influence. Additionally, attitudes of the 18-24 year age group tend to strongly influence the growth of new concepts/food trends since young adults are more experimental in their food selections.

The effects of lifestyle are reflected in the changing American eating habits, as summarized in Table 74.

Table 74. Change in American Eating Habits

<u>Change</u>	
Increased concern with nutrition	59%
Eat smaller portions	53
Prepare more frozen foods (microwave)	31
Skip more meals	29
Eat meals without traditional entrees	28
Buy more foods at supermarket delis	17
Eat more frequently	12

Source: Restaurants & Institutions, 1986

Menu Trends

Increased menu variety was predicted by 84% of a poll of 207 restaurateurs in a recent industry survey as a means of drawing new customers, promoting returns and keeping pace with the latest in food trends. In particular, a National Restaurant Association (NRA) study of menus found appetizer selection was increased by 33% between 1982 and 1988. This trend is apt to continue since it is directly related to the "grazing society" previously mentioned. Fast food operations in particular have increased variety to prevent being cut off from large segments of their potential market. Many have expanded their number of entrees and added salads and breakfast items. Additionally, fast-food operations may achieve menu expansion through the use of limited edition items. An example of this is Burger King's "Burger Bundles", mini hamburgers which can be eaten as a snack or meal. Menu variety is also provided by some restaurants through the use of daily specials and ethnic mix menus. Ethnic mix menus are used to attract a more heterogeneous group of customers. Customers can mix and match a number of cuisines to meet individual or group preferences.

In regard to individual food preferences, increased popularity was predicted for fresh foods, such as vegetarian specials, salad bars, fruits and natural foods, and high-flavor-intensity foods, including a variety of ethnic cuisines (particularly Mexican items - tacos and nachos).

It is predicted that the traditional ethnic foods, Italian, Mexican and Oriental, will continue to be popular and that new ethnic and regional cuisines will rise in popularity, if only for a limited time. Cajun food, for example, has become increasingly popular in recent years; however, indications are that interest may be waning. Savvy food service managers understand well the "life cycle" of such trends.

The philosophy of the commercial food service industry is that a foodservice operation with too-limited a menu cuts itself off from large segments of its potential market. A notable aspect of the commercial food industry is its ability to take advantage of changes in food selection and manipulate menu selections as various items increase/decrease in popularity. The Navy Food Service must be able to identify food trends and respond to them in a manner compatible with the competition. As the Navy draws recruits from all areas of the country, it needs to offer as broad a menu as possible to attract and satisfy this diverse population. Additionally, the menu should be continually updated to keep pace with current trends observed by the commercial food industry.

Attracting Customers

The three main ingredients for a foodservice operation are decor, product and service. The foodservice operator must first determine its target audience and then create an appropriate atmosphere through the manipulation of these three factors in order to attract and retain customers.

According to a recent survey, decor is influenced, in descending order of importance, by: theme; lighting; ambiance; colors; floor, wall and window coverings; and table tops. Since some of these items are more static than dynamic (e.g. lighting, wall and floor coverings), care should be taken in their initial selection.

Table 75 lists the leading restaurant customer complaints as cited in Restaurants & Institutions 1984 Tastes of America Survey. The importance of service is shown since it was the most frequently voiced complaint. In fact a recent Gallup Poll found 50% of US customers were dissatisfied with restaurant dining due to poor, slow and rude service.

Table 75. Customer Complaints

Poor Service	59.2%
Smoking	41.6
Noise	39.5
Lack of Cleanliness	39.5
Loud Music	39.0
Poor Food	35.0
Menu Prices	31.1
Long Lines	26.6
Dim Light	23.5
Portion Size	19.0
Monotonous Menus	18.8
Bright Light	9.9

Source: Restaurants & Institutions, 1984.

Two additional elements in attracting customers are accessibility and marketing. In order to attract more customers, the food industry has sought ways to reach more people than ever before. Concepts such as the use of mobile units as temporary foodservice operations for fairs, construction sites, campuses, seasonal resorts and similar functions and downsizing restaurants to conform to available space are used to widen the customer base. Additionally, merchandising techniques such as promotions (i.e., a free dessert with every order, buy one get one free, games with prizes, discount tickets to local events...) and prompting (what would you like for dessert today) are designed to bring in more customers and boost sales.

The NRA report (1986) on the restaurant industry in 1990 predicts that responsiveness to the consumer will remain the most important factor to the foodservice industry. Thus, to maintain a viable business, any foodservice operation will have the needs/desires of the customer as its driving force.

Foodservice Labor Market

According to the NRA's "Current Issues Report", dated January, 1986, the foodservice industry will be experiencing rapid growth through 1995. The growth in foodservice employment represented more than 10% of all jobs created in the U.S. economy between 1969 and 1979 and more than 16% of all new jobs between 1979 and 1984.

According to the Bureau of Labor Statistics, total employment in foodservice occupations is projected to grow from about 6.6 million in 1984 to more than 8 million in 1995. This projection includes 215,000, more jobs in the fast-food industry, 138,000 more jobs for restaurant

cooks, 73,000 more jobs for waiters and waitresses. As a result of this and the high turnover rate in foodservice, the NRA predicts a shortage of 1.1 million foodservice workers by 1995.

Although the foodservice industry expects that many young people will continue to find their first jobs in the foodservice industry, the total supply of workers from that population segment will decrease. Beginning in 1990, the youth market is expected to decline 20% and there is an anticipated increase of food service jobs of 32%. Also young people will be better educated and, therefore, less interested in low-paying food service positions. Instead, the industry's labor force will look toward new labor sources, increasingly involving women, senior citizens, handicapped people and aliens. According to the NRA's survey on the labor market in 1990, people with few job skills will continue to find jobs in restaurants.

Demographic fluctuations will be responsible for part of the change in the labor market. If restaurants fail to attract enough qualified hourly workers and managers, restaurant growth could slow, especially as it is expected that qualified chefs will be in short supply.

In a competitive labor market, restaurants will have to raise wages and salaries which are already above \$5, even \$6, per hour (nearly double the minimum wage) for fast-food workers in some urban areas (e.g. Washington D.C., New York, Boston). Employers will also have to offer more flexible schedules, including part-time positions, designed to appeal to women with school-age children and retirees. Restaurants will have to upgrade their benefits to include vacation time with pay, improved insurance plans and retirement programs.

In addition to higher pay and better benefits, restaurants will need to improve overall working conditions and develop a system for internal recruitment and training to keep an older workforce satisfied. Streamlining menus, offering more self service, improving scheduling efficiency, cross training food-service workers, and in some cases the use of temporary services will also help with future labor shortages. Finally, relief may be sought through recent advances in food technology including the use of labor saving equipment, robotics, centralized food preparation techniques, convenience foods, and the spreading use of computers as described below.

Technology Trends

The food industry of the 1990's will be strongly influenced by recent advances in food processing, ingredient technology, packaging, equipment, and computer applications. The National Restaurant Association's "Current Issues Report" for 1986 indicates that 1990 industry will allow operators to boost their productivity and lower labor costs through more sophisticated computer applications, advances in food technology and use of new kitchen equipment. In order to profit from this new technology operators must be willing to incur some initial capital investment costs. However, with the reality of future worker shortages, these technologies become a sound investment.

Many experts predict a trend for centralization of food preparation, whereby one food preparation facility is shared by area foodservice operations (schools, hospitals, industrial cafeterias, and in some cases restaurants). These commissary-type cooking facilities would most likely operate on a cook/chill principle where the end-user would simply heat and serve. These food preparation facilities would help control waste, and cut down on labor. In addition to supporting mass feeding operations, these facilities could also provide meals to food outlets located close to home and office. Consumers could then pick up meals and take them to their home or workplace for heating and consumption.

Ingredients

Traditional foods will be modified and new foods developed to meet future food demands. Foods can be fabricated to provide distinct advantages, including the creation of new and satisfying organoleptic sensations, improved nutrient content, diet control, and convenience. Other innovations will limit the effect of ingredient shortages and reduce raw product costs. An increased emphasis on food sensation is expected with high-flavor-intensive foods becoming popular. One example is the increasing demand for hot, ethnic foods by many consumers.

In order to meet consumer demand for low-calorie foods, the food industry has responded with a number of fat and sugar substitutes as well as noncaloric bulking agents.

Two fat substitutes currently under review by FDA are Nutrasweet's Simplese and Proctor & Gamble's Olestra. Simplese, made from protein, can be used in salad dressings, whipped toppings, cakes, icings, and other noncooked applications. The protein in Simplese will harden at elevated temperatures and therefore can not be used for frying or baking. Olestra, made from sucrose polyesters, is nonabsorbable and therefore calorie free. It can be used for both cooked and uncooked foods and is specifically being tested as an additive to shortening and cooking oils.

Currently there are a number of high intensity and nonnutritive sweeteners under FDA review with more on the horizon - all as part of the overall diet trend. Caloric reduction may also be accomplished by means of a variety of noncaloric bulking agents. Two examples include Pfizer's polydextrose and cellulose.

Food Processing/Packaging

As a result of the continuous advances in food technology the food service industry will continually be the benefactor for a greater variety of foods. These foods will be high in quality, offer greater conveniences and most importantly, reduce labor. They will offer increased shelf stability, often without the need for cold storage, thus saving energy, space and, of course, money. They will utilize resources currently not tapped and will therefore increase the availability of certain foods. Nutritionally, food technologists will be developing foods reduced in

salt, sugar, fat and, specifically, cholesterol without sacrificing convenience or flavor.

With the advances in genetic engineering, scientists can alter the protein-to-fat ratio in livestock, thereby producing leaner cuts of meat. Future advances include altering the cholesterol content of eggs and reducing the fat content of dairy products. In addition to changes to the dietary content of foods, advances will allow for extended product shelf life and increased food safety through genetic manipulation.

Meat analogues, made from textured vegetable protein, provide a cost savings as well as reduced saturated fat and cholesterol. Surimi, fabricated from fish, is used to simulate the more expensive seafood products, such as crab and shrimp. Additionally, underutilized species of fish will become increasingly popular as low-cost alternatives to the traditional but more expensive species (e.g., perch, bass).

Packaging will become lighter, more flexible (e.g. dual ovenable), and more convenient to handle as current advances in aseptic and plastic materials continue. Increased shelf life of many products can be expected, often without the need for cold storage, with the technological gains being made in aseptic and controlled atmosphere packaging (CAP). Additionally, "smart packaging". foods with time-temperature indicators for freshness and doneness indicators for use in preparation, will help foodservice managers cope with a less skilled workforce. The future of the traditional packaging containers (steel cans and glass containers) is uncertain as new, lighter, less expensive options, such as paperboard cans and bag-in-box become increasingly popular.

Equipment

New labor-saving equipment, including self-diagnostic equipment, and increased use of automation will help the foodservice manager deal with the shrinking labor pool. Equipment is being designed which is easier to operate, clean, maintain, and repair. This equipment will ultimately trim laborsaving costs by improving worker productivity, and reduce food costs by reducing longevity. Advances in heat recovery systems will help operators economize on energy costs. Additionally, the use of multifunctional equipment, such as combination microwave/convection ovens, will help save on space and overall equipment inventories. One example of a recent equipment innovation is MacDonald's new clamshape grill. This new grill heats both sides simultaneously reducing the cooktime for hamburgers by as much as 60%. An added benefit is the elimination of the manual effort to turn the burgers halfway through the cooking cycle.

Automation of equipment and electronic sensors will be used to measure and assist in controlling critical food processing parameters and specific food properties. These features will not only help reduce the workload but will also help compensate for a less skilled workforce. Examples include temperature monitoring, cooktime setting, ingredient measuring, and stock and inventory controls.

As part of this trend toward automation there will be a rise in the use of robotics in food service. Robots can be effectively used for palletizing, batchfeeding, warewashing, and other repetitive and/or hazardous tasks. For example, one Connecticut hospital is using a robot to deliver food trays to patient rooms. The fast-food industry has already investigated the use of robotics and will probably be the first area of foodservice to employ robots on a large scale since it has a proliferation of repetitive jobs.

An area of foodservice that has already been automated successfully is vending. To further its potential, this automation technique still requires refinement since it currently lacks flexibility and is generally limited to items requiring no final cooking. Also, public acceptance to vending and other front-of-the-house-type automation (order takers, servers) may be slow. Foodservice operators have found that vending machines are more readily accepted when attended, that is, when a hostess is available to make change, refunds, and handle complaints.

Management Information Systems

According to a NRA survey, the computer will continue to revolutionize the restaurant industry during the late 1990's. Operators will learn to adapt hardware and software to their specific needs. Computers will allow for greater information collection and analysis in all areas of the food industry to assist managers in their jobs. Managing inventories, menu planning, recipe files, pricing, and so on can all be assisted through computer applications.

Computers can be successfully combined with state-of-the-art equipment to provide user friendly equipment that will help alleviate the work load and take a lot of the guesswork out of such areas as maintenance. Computerized production centers can offer automatic on/off capability, schedule routine maintenance and troubleshoot equipment repairs. Electronic cash registers and point-of-sale systems can effectively track both food and labor costs. Hand-held computer order takers can relay orders directly to the kitchen as well as generate the food bill, leaving the food server with more time to personally attend tables.

The greater use of computers will enable foodservice operations to lower their operating costs and to respond more quickly to changing consumer tastes. Also, it will give the manager greater control over his foodservice operation and minimize the burden of paperwork, freeing up valuable time needed to properly train and supervise staff.

Summary

Industry surveys predict an increasing demand for high-quality, nutritious, convenience foods. Consumers will be more interested in picking up preprepared meals that can be quickly reheated in the home/office rather than dining out. Takeout, self-service, and home delivery will be increasingly popular. Since future recruits will establish their eating habits based on these trends, the Navy should strive for menus offering a wide variety of popular foods and

alternatives to the highly structured, three meals a day traditional dining hall feeding concept.

Fresh foods will be in demand as well as those with high intensity flavors. Ethnic foods will continue to rise in popularity. Menus will need to be continually updated to meet current food trends and should offer increased variety.

Overall responsiveness to the customers' needs will continue to be the most important factor in foodservice. High-quality foods, good service, accommodating the customers' dietary preferences, building dining room atmosphere, and providing alternatives to onsite dining are all-important factors.

Keeping pace with current technology advances in food processing techniques, ingredient technology, packaging, equipment, and computer applications will enable the food service manager to satisfy the customer within the constraints of future worker shortages. Centralization of food preparation, increased use of automation techniques including robotics, and effective training and management are also ways for the foodservice industry to effectively deal with future demands.

Convenience food products (such as portion-controlled items, precooked meat and seafood, prepackaged spice mixtures, and thaw and bake bakery items) will be used to offset rising labor costs, increasing raw commodity prices and a lack of trained personnel.

By using newer space-saving equipment to streamline the work environment, the Navy could free up space for storage and allow for an increased use of convenience foods. By purchasing labor-intensive food items, such as lasagna, preprepared, the impact of worker shortages could be alleviated without sacrificing variety.

In summary, the Navy should take its cues from industry. Although the types of operations may have differences, both will be strongly influenced by lifestyle changes and future labor shortages.

V. FOODSERVICE EQUIPMENT RECOMMENDATIONS

Introduction

The primary focus of these recommendations is ships and not ashore stations since ships have the more critical reliability, maintainability, space, and utility requirements. Fundamental to the recommendations were such questions as how many ships might benefit from a certain proposal, would the production efficiency of foodservice personnel be enhanced, would the quality of foodservice be improved, would space and equipment configurations be further optimized, would the need for maintenance be reduced, would new maintenance skills be required, would ships' utilities be more efficiently utilized, etc. Adding to this list was an acute sensitivity to take full advantage of industry trends wherever possible and not to develop a host of costly, Navy-unique pieces of equipment that would be difficult to support.

Approach

Data collection consisted of foodservice equipment evaluations and discussions with Navy Food Service Division management and Engineering Department personnel during shipboard visits; surveys of industry; and visits to national exhibits of leading food equipment manufacturers. The Engineering Department of the University of Massachusetts assisted in a number of the shipboard surveys and developed the industry questionnaires. Surveys were sent out to a number of leading manufacturers of convection ovens, food warming devices, and microwave ovens in an attempt to evaluate future design trends that were being considered. As expected, manufacturers were reluctant to reveal priority information. For the most part, we were able to gain a better insight into advanced/future technology trends through our own scientific and industry literature investigations.

Throughout the course of the project, the Natick Food Engineering Directorate provided 15 product assessment reports on the following topics of interest that surfaced during our investigations:

heated holding cabinets	ice makers
rotating serving lines	rotating air oven
centralized refrigeration	solid state controls
trash compactors	temperature controls
tunnel ovens	microwave bread baking
ice & beverage dispensers	deep fat filters
bulk thawing	food processors
food warming devices	

This information was gathered from several sources, including updated progress reports on in-house efforts, status reports on Navy test items, and from investigations of equipment that utilized promising technologies. These efforts were combined with shipboard data, the industry questionnaires, and literature searches to produce the following list of equipment systems for further Navy consideration. The list does not address every equipment problem the Navy has. Some items such as garbage grinders and trash disposal systems are well-known problems that the Navy has been grappling with for years. While these and other similar problems were not selected for more in-depth study in this project, the team does not want to convey the idea that they are of lesser significance. As an example, the effort required to negotiate around the trash piles that accumulate over a few days on a large amphib within the coastal 20-mile dumping limit vividly demonstrates just how severe a problem disposal is.

Solid-State Electronics

Recommendation: Promote changeover to solid-state electronics

The first recommendation of changeover to solid-state electronics in foodservice equipment is in line with industry practice. Solid-state is already employed in some areas, such as deep-fat fryers, dishwashers, and automatic potato extruding units. Based on the typical increase in reliability, this technology takes on new importance to ships in a deployed status. While underway, inoperable foodservice equipment may not be assigned a high repair priority by Engineering for very obvious reasons. Unfortunately, almost everyone is affected in some way or another. The cooks may have to make menu changes or devote more manhours to accomplish tasks that machines did faster and with greater consistency. The quality of foodservice may suffer in that certain items cannot be offered at all. Such loss typically reflects poorly on the Navy Food Service Division more so than on the Engineering Department. In certain cases, such as with disabled soft-serve ice cream units, crew morale can be negatively affected.

The Navy needs to encourage industry in the changeover to solid state wherever possible. Our anecdotal data indicate that electrical problems top the repair list. With the more detailed maintenance tracking system that the Navy maintains, it should be easy to identify the pieces of foodservice equipment that have the highest frequency of electrical repairs. Care should be exercised in the adoption of this technology so that we don't trade one set of problems for another. As the at-sea capability to repair solid-state circuitry is most likely limited, if available at all, specifications should call for modularized board systems that can be readily identified as faulty and replaced with ease. The boards would be disposable or could go into a recycling system to reclaim precious metals. Additionally, will the burden of repair shift from Electrician's Mates (EM) to Electronics Technicians (ET) or will EMs be provided the necessary training to perform these functions? A larger challenge would be to try and develop a series of generic circuit boards. Rather than having four different manufacturers' board designs for temperature control, one generic board would be used by all manufacturers requiring a temperature control device in the 150 - 450° F range.

Overall benefits to the Navy would include reduced repair and maintenance requirements, an improved capability to troubleshoot repairs, reduced spare parts inventories, and an overall increase in equipment reliability.

Shipboard Bakeries

Recommendation: Streamline bakery production by converting to cook-freeze operation

Early on in the project the simple concept of converting to a cook freeze bakery operation on large ships such as aircraft carriers evolved. The concept called for streamlining production by baking larger quantities of products, such as cakes and cookies that freeze well, and storing them for upcoming use on the menu. Considerable time would be saved by not changing over production runs so frequently, as is the case with the present daily order system. Bread and roll formulations would be modified to improve quality and extend shelf life. They would also be sliced and wrapped to accommodate a new three-day production cycle. Space was identified on several ships to install commercially available upright freezers. The proposed new system is a low-technology, low-cost approach to improving production efficiencies and product quality.

Bulk-Thawing Device

Recommendation: Use bulk-thawing devices aboard large ships

With the seemingly unending popularity of hamburgers in fast-food service systems afloat, in addition to regular A Ration requirements, existing spaces for tempering frozen products properly have been seriously taxed. For a large aircraft carrier operating a successful fast-food service facility, the quantity of hamburgers that need to be in the tempering pipeline (estimated at up to 72 hours) is considerable. The survey team observed that thawing products under proper conditions and in necessary quantities is easier said than done. There were also a few instances where ships' schedules were abruptly changed (in these cases going into port earlier than expected) leaving the Food Service Division with "underway" quantities of thawed and thawing product on their hands for an "in port" crew to consume. Despite the best planning efforts by management, these things happen, will continue to happen, and in the process make it very difficult to successfully manage a conservative food budget.

Investigations uncovered a large, industrial-capacity microwave thawing unit that could temper up to 300 pounds of frozen meat in approximately seven minutes. Such a unit would be capable of tempering meat within hours of the actual time it were needed, versus days. This unit would significantly cut down on the total space now being utilized for thawing and would help to free up valuable space in the butcher shop. The unit would, additionally, provide for much better inventory control over this high-value item. In the case of some menu items that run out before a meal ends, additional products could be thawed for immediate use, thus preserving menu continuity and, in the process, customer satisfaction.

with the foodservice system. Advantages cited by the manufacturer of one unit include:

- flexibility to food preparation: tempering is done only as required
- predictable ending temperature of product
- space savings: elimination of the tempering room and racks
- sanitation improvement - there is no bacterial growth during tempering
- improves quality and yield since there is no drip loss.

The microwave unit would most likely have to come down into the general area of the butcher shop through the large aircraft engine loading hatch that appears to be located in close proximity on most of the carriers that we observed. The tempering unit itself is 6 ft 10 in wide, 8 ft 11 in deep, and 7 ft 2 in high - still less in size than the old, extra-deep deck ovens. In addition to the tempering unit is its power unit that is 4 ft X 3 ft X 6 ft 7 in. This unit, though, can be remotely located wherever there is space available.

The study team recommends that Natick purchase a unit, work with SUPSHIPS to install the unit on a "soon to deploy" carrier and conduct a one-year test of the system to assess its overall cost/benefit.

Multifunctional Equipment

Recommendation: Reduce production equipment by use of multifunctional equipment and single-unit designs

The fourth recommendation is more conceptual in nature--to reduce the number of pieces of production equipment by combining functions wherever possible and producing more multifunctional, single unit designs. The objective is to reduce the total number of pieces of equipment used in food preparation, minimize maintenance, increase efficient utilization of space, and quality of finished products.

An example is the convection oven, which appears on almost every ship in the Navy from a single unit on board a minesweeper up to an estimated 30 or more units on a carrier. The list of desirable features to be integrated into the design of a new oven is considerable in length. Even though the likelihood of combining all of these features into a single design is remote at best, the features listed below provide a desirable contribution to the end design and illustrate a multifunctional, single unit.

It was proposed that the unit be the same as existing units in that it have the same approximate dimensions, be stackable two units high, have extra depth for roasting pans, be modularized to fit through hatches, and have see-through doors. Additional new features would include:

- solid state, modularized circuitry
- waterproof, touchpad controls, digital display, time/cook readout
- self-calibrating temperature control
- temperature probe for roasting
- self-diagnostics for troubleshooting problems

- expert systems for repair and maintenance
- memory storage for recipe times/temperatures
- top and bottom oven microwave generators for two-shelf, microwave-assisted convection cooking
- thaw, cook, and hold capabilities
- self-cleaning capability and/or be continuously self-cleaning
- side-by-side (touching) positioning (multiple units)
- moist air capability (for vegetable cooking & hard crusted breads)
- insulation sufficient to increase efficiency (save energy) and reduce heat load in the galley
- air-curtained doors for heat retention, and
- a design to eliminate or substantially reduce the need for overhead exhaust systems.

Obvious engineering benefits from such a unit would include simplified retrofitting, single-unit design (for thawing, cooking and holding) that reduces requirements for four pieces of equipment, savings in galley space, savings in maintenance and repairs, increased reliability through solid-state, modularized circuitry, speed in troubleshooting, repair and maintenance through expert systems, energy savings through increased unit efficiency and reduction in galley ventilation requirements.

For foodservices, the benefits include improved versatility to microwave bake bread and cakes, roast meats, microwave vegetables in moist heat, thaw, hold foods at proper temperatures, etc. In addition, higher quality end-products are achieved since foods are cooked to exactly the correct internal temperature using the probe and can be held at precise low temperature settings with little product degradation. Additionally, cooking to internal temperature rather than time/bake removes the guess-work out of lower temperature meat roasting and produces more tender, higher yield products.

Substantial foodservice labor savings are achieved because products no longer have to be moved between various production stages; preprogrammed recipes and time-of-day displays save MS time in checking/testing product, and lengthy and tedious cleanup is significantly reduced with the self-cleaning features.

In addition, improved cost control results from microwave thawing as only the exact quantity of product needed each day is removed from the freezer; additionally, drip loss is reduced.

For foodservice workers, the galley work environment is significantly enhanced due to improved heat containment, i.e., air curtained doors, better insulation, and the full/partial use of microwave cooking.

Refrigeration/Freezer Concepts

Recommendation 1: Provide foodservice with modularized freezer/refrigerator systems for greater flexibility/control

This first concept is based on more than one observation that subsistence support is not the driving force in determining a ship's

operations schedule. While not being able to expand the total amount of refrigeration space, just having the flexibility to convert reefer space to freezer space when needed would be an improvement. Such a modularized system would not only provide adaptable space for changing product and customer trends, it would also provide foodservices with more storage options when it came to predeployment loadouts, major underway replenishments (UNREPS), transporting troops/evacuees, or operating in remote areas. The technology is here and versions of such a modularized system are commercially available. A feasibility assessment should be performed and a single site test conducted.

Recommendation 2: Conduct a comprehensive concept analysis to include a cost/benefit study on replacing the proliferation of refrigeration systems typically found in the aft galley areas of a carrier with a single, multi-ton compressor system

The second refrigeration systems concept involves the numerous units typically found in the galley/messdeck areas. Based on the number of units and the frequency of electrical and refrigeration repairs and/or replacement, the team gave consideration to the design of a single system similar to that used for the main refrigeration storage. We estimated that on a carrier in the aft galley area alone there were approximately 28 independent refrigeration systems. Even if 12 of these were "design to replace" units, that still leaves 16 systems requiring repair and maintenance. Add in all of the other units in the Forward Galley, CPO Mess, 1st Class Mess, Main Wardroom, Flight Galley, etc., and the situation becomes an engineering nightmare.

Considerations favoring such a cost/benefit study include how food sanitation and safety can be compromised when galley reefers go down, how foodservice personnel are inconvenienced to find alternative refrigeration, how customer satisfaction deteriorates when soft-serve ice cream machines and ice-making equipment are down, how engineering repair priorities can result in long delays (with the question, did the right union--air conditioning/refrigeration or electrical--person come to fix it?).

The single unit, multi-ton compressor systems are water-cooled and typically have a high degree of reliability. They can be remotely located so the heat load can be dumped in an unoccupied area. This last point may seem inconsequential until a ship is operating in a warm climate and the air conditioning system can barely maintain a comfortable temperature. A back-up compressor would be installed for obvious reasons. Refrigerant would be pumped to all galley, bakery, butcher shop and vegetable prep area reefers and freezers, soft-serve ice cream machines, ice-making units, ice dispensing units, salad bars, and all beverage dispensing units. Flexible hose with quick disconnects would provide the final hook-up between the distribution lines and the individual units themselves. One of the major considerations of this concept is to determine the feasibility of industry providing the standard units without the compressor units.

Food-Holding Equipment

Recommendation: Expand the use of effective food-holding and serving equipment

The recommendation to expand the use of effective food-holding and serving equipment is compelling because the equipment, for the most part, is commercially available but its use aboard ships is limited or nonexistent. This fact is particularly distressing because all of the time that goes into preparing quality products is compromised if the items are not held under proper conditions. While the goal may be "progressive cooking," the unavoidable reality is all too often "cook to inventory." We found this to be particularly true on large ships.

Two reasons that are typically put forth for not having these types of units are that the ovens work just fine for food holding and/or that there is no room for the units. While some newer generation ovens may have accurate "holding temperature" controls, the models we saw on most ships could not maintain accurate low temperatures. Aside from this, the dry, hot air from an oven represents only one type of holding environment for specific foods. In many instances, problems with space limitations are acute. The optimal approach to this constraint is to design proper and adequate food holding systems from the start.

In the case of aircraft carriers, pass-thru systems would not only provide the proper holding conditions for food and greatly facilitate replenishing the serving lines, but would also serve to visually separate the customer from the food production area, a much-needed enhancement.

Assuming most fixes will be retrofits, the next best thing is to take better advantage of the space under counters and down from the overheads. In nearly every ship we visited these spaces were being underutilized. The best overall system would contain a mix of holding devices to accommodate cold items; hot, moist items; and hot, dry items. Forced hot air would be used in fried-food holding systems where surface moisture was undesirable and microwaves would likely be employed for rapid reheating of chilled items.

Convection Deep Fat Fryers

Recommendation: Investigate a new technology--convection deep fat fryers

The next recommendation involves the newly introduced convection deep fat fryers. Though the units are currently limited to gas models, the potential cost savings appear attractive enough to further investigate this technology at this time. It is recommended that a unit be purchased and tested at Natick. A complete cost analysis should be conducted to include labor savings, product (oil) cost savings, supporting equipment savings such as fat filtering machines, etc. As oil is one of the top "high volume" Mobile Logistics Support Force (MLSF) resupply items, any opportunity to reduce the need for deep fat frying oil should be aggressively pursued.

Dry Milk Reconstitution/Dispensing System

Recommendation: Develop the means to reconstitute and serve the newly developed, low-fat (dry) milk substitute product

This recommendation came about because there was considerable concern that the new low-fat product might be introduced into the fleet with little consideration as to how it is to be reconstituted. As product quality was high, it seemed reasonable to assume that ships might be faced with reconstituting and serving much larger quantities of this product than the traditional nonfat milk product.

The prospect of using the metal milk cans and dispensing tubes for large quantity production seemed completely inappropriate. Aside from the fact that sanitizing the units is difficult, the product is typically mixed on one deck and then has to be transferred to another deck where the main reefers are located. This transfer is fine in theory until one undertakes all of the back and forth. During one of our project reviews with NAVFSSO, this subject was raised and we were told that the Taylor Mixer/Blender would be used to reconstitute and serve the milk. Other than the rather high price tag that comes with the Taylor unit, we began having second thoughts as to how practical this application would be onboard carriers with their large crews. How many of the units would be needed, where was the space going to be found on the messdecks, and how many messcooks would be needed to monitor the units, i.e., meter in the water measure and add the mix, tag the unit off-line until the milk was mixed and chilled (approximately nine minutes), etc.

While none of these concerns is insurmountable, our feeling was that there just must be a better and more efficient way to do the job. The concept was really quite simple. If a very modest countertop unit could measure water and dry product and mix and dispense a cup of hot chocolate, why couldn't it be modified to produce a cup of cold milk? The units are relatively small, inexpensive, and dispense only on demand by the customer. Water could be supplied directly from the ship's chilled water system or a small refrigeration system could be used similar to the Jet Spray beverage units. There would be no need for messcook personnel to be supervising the system.

A nationally known manufacturer was asked to evaluate the concept. They were able to jerry-rig components from existing systems to construct an actual working model. The general feeling was that any problems with the equipment could be overcome but there seemed to be a problem with the product. Even after mixing there seemed to be a noticeable and undesirable quantity of undissolved product on the sides of the glass. While part of the problem could have been due to insufficient mixing, our inquiries did reveal that there was an allowed standard of these undissolved particles and that the standard was in the process of being changed to allow an even greater percentage of this material in the finished product. At this time no further tests were conducted on the unit or product to identify the actual problem(s) or to find solutions.

Modular Ventilation/Grease Extraction System:

Recommendation: Design and test a modularized, bulkhead-mounted grease extraction/interior ventilation system

This recommendation calls for a new, expanded application of an existing technology. On many of the ships we visited we found that the combination ventilation, grease extraction, and fire suppression system was considered to be a constant maintenance problem. To reduce significantly the life-cycle costs of such systems, improve ship safety, and simplify cleaning and maintenance, we propose designing and testing a modularized, bulkhead-mounted grease extraction/interior ventilation system. These units would be self-contained and divorced from the ship's main ventilation system.

The benefits of such a system include:

- improving fire safety by ensuring that there would never be any gradual, long-term build-up of grease that gets past the filters;
- making future galley modular units both possible and less costly because equipment locations would no longer be dictated by existing Gaylord locations. As many two-foot modules as needed would be mounted on the bulkheads to the rear of grills, deep-fat fryers, etc. The only utility needed would be a power source;
- costly water wash-down systems and the need for deck drains would be eliminated.
- scheduled maintenance, i.e., daily cleaning and preventative procedures, would be significantly easier to perform. Cooking units would be pulled out to gain easy access to the grease filters for cleaning. Optimally, these could even be designed as disposable (paper) filters.

Two issues remain to be addressed: first, as vent hoods would no longer be required over specific pieces of cooking equipment, the air supply and exhaust system would have to be adjusted to handle the waste heat. The second issue involves the continued need and placement of a chemical fire suppressant system.

Robotics

Recommendation: Investigate robotics applications to shipboard foodservice

While the robotics/artificial intelligence (AI) technologies are rapidly expanding, their application to this type of foodservice is presently limited. Since the evolutionary phase of new ship design is so lengthy, potential robotics/AI applications should be sought out as an on-going process.

Some of the suggested areas to examine include receiving, storage and handling of bulk stores; scullery and pot-washing systems; satellite vending systems; food production equipment; and repair and maintenance functions. Any such applications would help to increase the efficiency of

foodservice operations in general and more specifically, to reduce manpower requirements. While some reductions in MS manpower could be achieved, the more significant reductions are likely to be in the numbers of mess attendants needed to directly support foodservice operations and in the large numbers of personnel typically required to load stores. While not a direct benefit to the FSD, these manpower savings would be of value to all of the other divisions throughout the ship, which routinely have to supply this manpower to support foodservices. Additionally, detailing highly trained and impressionable young men to three months of messcooking the minute they report aboard is not making the best use of a resource in which the Navy has invested thousands of dollars.

Centralized Food Preparation Facility (CFPF)

Recommendation: Expand the application of the Centralized Food Preparation Facility

To maximize space and manpower efficiencies, expanding the application of the CFPF is strongly urged. The proposed use of this system would in no way compromise the level of service that wardroom customers now experience. This modification is a behind-the-scenes change that affects food preparation only. A Natick cost/benefit analysis of the application of CFPF to selected ship types, entitled "Comparative Analysis of Centralized and Decentralized Food Service Systems on Selected Naval Ships," by Mr. Joseph Wall, U.S. Army Natick RD&E Center, is available on request.

Satellite Foodservice System

Recommendation: Establish a satellite foodservice system

The last proposal in this series is for a satellite foodservice system. The need exists, particularly on larger ships, to dramatically improve customer access to food. This access refers to both time and location. As both a matter of convenience and prudent management, a busy individual should have the option of taking a quick break for a ready and nutritious meal and eating where convenient or returning to the workplace to eat. This option would be particularly applicable to Engineering personnel who, in the middle of a major repair, are faced with the alternative of stopping to wash-up and change clothes to eat or going hungry. The reward for putting in an extra effort to get the job done should not be to go hungry.

The concept to be implemented would consist of a modest refrigerated vending machine and microwave oven. The individual's ID/meal access card would provide entry into the system. The system can be designed to accommodate all packaging concerns, such as for shipboard sanitation and jet intakes for sucking in trash.

So as not to delay progress in the follow-on phases of the Navy 1990's project, these concepts were presented to NAVFSSO in December 1985 for consideration. A number of concepts subsequently transitioned into Exploratory Development (6.2) and Advanced Development (6.3B) in the Natick's Food Engineering Directorate.

In addition to the preceding concepts, the Engineering Department of the University of Massachusetts developed prototype models of two of the more promising advanced technology concepts that were investigated. These models are presented in the following section.

VI. AUTOMATED SYSTEMS RECOMMENDATIONS

Introduction

Three concepts on automated systems were particularly intriguing to the study team. The first involved a computer-based foodservice equipment maintenance and repair program, and the second a foodservice facility design and layout program. Both of these came as a result of observations made during our ship visits and an interest in putting developing artificial intelligence (AI) technologies to practical use. The University of Massachusetts was asked to develop two pilot programs to see if we could produce the type of dynamic program (high level user/data interaction) we sought. The third involved the expanded application of BAS (Basic Allowance for Subsistence) to ships. Through various project updates NAVFSSO was kept apprised of these efforts.

Food Service Equipment Repair and Maintenance Model

Recommendation:

Utilize a computer system to

1. decrease the average downtime of foodservice equipment.
2. make the most efficient use of each Engineering and Supply manhour

We found that there appeared to be at least five significant factors that influenced the status of food equipment repair and maintenance:

- the overall condition of the ship with regards to engineering spaces, repair priorities, and parts
- the numbers of Electricians Mate (EM), Air Conditioning and Refrigeration (AC&R), and Machinist Mate (MM) personnel onboard
- the relationship between key foodservice personnel and key Engineering personnel,
- the resourcefulness of foodservice management to utilize the expertise of Engineering messcooks, and
- the level of interest/support for foodservice demonstrated by the Commanding Officer (CO), Executive Officer (XO).

We observed that these factors, singly or in combination, seemed to have a marked effect on the repair status of food equipment onboard. In the case of ships with a good repair record, the program would help improve on the overall efficiency of conducting maintenance and repairs by reducing the total number of manhours typically spent in the diagnostics and repair of foodservice equipment. In the case of ships having difficulties maintaining equipment, the program would make the best use of engineering's limited resources. It appeared that in many instances significant

amounts of time were being spent in just evaluating the problem, i.e., who do we need to fix this unit - an electrician, an air conditioning & refrigeration person, or a machinist mate? Then a search is initiated for the item's technical manual, which may not be onboard at all. Once a needed repair part is identified, it then takes time to coordinate with Supply to see if it is in stock. The study team admits that on a large ship, such as an aircraft carrier, the number of trips a repair person might have to make to finally complete a job is enough to discourage anyone. It would be easier to simply "tag off" the unit and say the parts are on order.

The model that was developed and demonstrated by individuals at the University of Massachusetts is entitled "A COMPUTER SYSTEM FOR THE SUPPORT OF FOODSERVICE EQUIPMENT: A Systematic And Interactive Approach to Repair And Maintenance, Inventory, Records and Reports." To demonstrate the system, a convection oven was selected as the basis of all scheduled and deferred maintenance required. The program, if implemented, would specifically show the individual what maintenance tasks to perform and what tools would be needed. If a repair were needed the program would walk the person through a series of diagnostics to correctly identify the problem. Once the problem is identified a parts assembly diagram would be printed, a list of parts and tools that are needed would be provided, and step-by-step procedures for making the repair would be listed. The repair person could even access Supply Dept. inventories to see if the needed parts were on-hand before initiating the repair. All order forms required to get the part out of stock would be printed by the computer. As part of the overall program, all equipment manufacturers in the future would be required to put the information contained in the technical manuals into an IBM-compatible data base. The complete report, including the step-by-step convection oven repair example, is available upon request.

On 20 March 1986 we briefed the project to NAVFSSO. NAVFSSO invited representatives from a number of major commands. The meeting concluded with the NAVSEA Representative stating that they were already working on a similar system for foodservice equipment and that their program would be available in the very near future. CAPT Whitman subsequently cancelled further work on that portion of the 1990's effort.

Automated Galley Design and Layout

Recommendation: Develop a model to assist in the design and layout of galleys.

While seldom used, a number of analytic models to achieve efficiencies in this area have been around for years. With computer aided design (CAD) capabilities becoming more widespread, the thought was such a model and CAD could be integrated to make the draftsman that much more efficient in the initial design phase of a project. In the latter design stages it was envisioned that NAVFSSO designers would be able to interact with NAVSEA designers on a real time basis, particularly in the final ship design phase when last minute changes seem to have the most negative impact on the food-service facility.

The system would perform in much the same manner as any basic CAD program, only with a few enhancements. It would recall existing drawings, place fixed obstacles, identify utility locations, provide three dimensional drawings, list required galley equipment (based on ship type and complement), and size the equipment to any scale desired. The aspect of the system that made it unique was the use of AI technology to eliminate the present time-consuming methods for assessing the overall effectiveness of the galley layout. The program would automatically evaluate the overall efficiency of the galley layout, identify any problem areas, and provide alternatives to improve the design. The complete report, including the USS Mississippi EDF example, is available upon request.

While the system would provide a big assist in the area of new ship design, the biggest payoff appeared to be in the area of ship alterations (shipalts). As existing designs could be easily retrieved by everyone at any time, foodservice on the ship could study and make recommendations well in advance of the scheduled yard period. Food Management Teams (FMT's) would also have access to provide their expertise in any redesign efforts. It would be envisioned that all involved commands, i.e. NAVFSSO, NAVSEA, and the various SUPSHIP facilities would be capable of sharing design information. While the total number of potential system users in the area of new galley design was relatively small, the number of users involved in the redesign of existing facilities was significant.

At the conclusion of the briefing the representative from the Facilities Branch (NAVFSSO) stated that they already had (or were in the process of getting) CAD capability. The effort was cancelled by CAPT Whitman.

Shipboard Application of the A La Carte Concept

Recommendation: Change afloat enlisted dining facilities to the "a la carte" system.

This proposed concept would provide the maximum in customer service flexibility. Ideally, all EDF outlets, i.e. main serving lines, express lines, remote vending operations, etc. would go to an "a la carte" pricing system. A subsistence account would be established for each person that was based on RIK credit while underway and BAS credit while in port. Individual menu items would be priced similar to Air Force Foil Packs while underway and then adjusted upward while in port to reflect the higher BAS allowances. At the time of purchase the customer would merely give the cashier his or her ID card and the cost of the meal would be automatically debited to that person's subsistence account in Disbursing. The card could also be inserted into remote vending machines aboard larger ships to credit snack meals. While in port, customers could directly access their subsistence account to pay for meals consumed away from the ship. Several larger ships already have Automatic Teller Machines (ATM's) to accommodate such transactions. If the customer exhausted his or her subsistence allowance before the end of the month, cash would be required for the purchases. The study team strongly supports a limited test of this concept.

VII. LOGISTICS/NEW ITEMS RECOMMENDATIONS

Introduction

The topic of logistics support was of particular interest to the study team due to the vast amount of resources (manpower, dollars, and equipment) that is expended on it. Our limited resources did not allow us to investigate all aspects of the system. The paths between the Defense Personnel Support Center, the Naval Supply Centers and depots, and the inport resupply system were not addressed so that we could focus greater attention on the matter of afloat resupply. The investigation was to address the needs of both the end-user (the combatant) and of the supplier (the Mobile Logistics Support Force (MLSF)). Submarine forces were not considered as they do not typically resupply while underway.

Investigation

While combatants from both the Atlantic and Pacific Fleets participated in the survey, the Atlantic MLSF was chosen over the Pacific for the study as it was felt that the Atlantic force did not have the benefit of a large, land-based facility like Subic Bay, Republic of the Philippines from which to resupply. It appeared that the Sixth Fleet was considerably more dependent on afloat resupply than the Seventh Fleet. Several visits were made to the MLSF Office at NOB Norfolk, VA, including a ship tour of the USNS Rigel. We were interested in how the overall afloat resupply system operated, its current and future ship assets, how the system would be operated in time of war and how the "Load Lists" were determined.

Having completed this preliminary investigation, we concluded that the most appropriate way to address the issue of new food trends and products was through an afloat logistics study since this system would ultimately bear the burden of supporting any new items introduced into the fleet. This approach also solved a nagging inconsistency with the issue of the "product/trend life cycle." While the report consistently emphasizes the management strategy of timely response to new trends, i.e., get in and get out, we realized that there were practical limitations on the degree of change the Resupply Force could accommodate.

What the study did hope to achieve was a series of objectives that would be mutually beneficial to both the resupply ships and the combatants. These included:

- increase combat ship endurance
- increase Combat Store Ship (AFS) resupply capability
- reduce along-side time during replenishments
- maximize ration-dense inventories
- minimize shipboard inventories (number of items carried)
- reduce transportation/warehousing costs

Without physically changing the subsistence storage spaces on combatant ships the analysis sought to make more efficient use of the existing space, thus providing the ship with a number of options.

For instance, ships could now carry additional "luxury" food items that had poorer storage characteristics; carry "trendy" items that would appear and soon fall out of favor; carry larger quantities of basic food items, thus increasing their at-sea endurance and time between resupply missions or they could choose to store other priority nonfood items in the available space. By making better use of existing space it would also be possible to carry greater quantities of stores on the AFSs, thus allowing them to stay out longer and replenish more ships. Any amount of time to execute an underway replenishment is always felt to be too long as the ships are more vulnerable to attack and/or collision. Lost time and delays in operations alone cause Captains and Air Bosses on aircraft carriers considerable distress.

Data Collection

Table 76 is the representative sample by ship type from the Atlantic and Pacific Fleets that was requested for the survey.

Table 76. Sample of Ship Types and Underway Replenishments
for Logistics Survey

Ship Type	Atlantic Fleet		Pacific Fleet	
	# Ships	# UNREPS	# Ships	# UNREPS
CV/CVN	4	16	4	16
CG/CGN	5	20	5	20
DD/DDG	8	32	8	32
FF/FFG	8	32	8	32
LPH	3	12	3	12
LHA	2	8	2	8
LPD	3	12	3	12
LSD	3	12	3	12
LST	5	20	5	20

The number of requested UNREPS was based on the understanding that ships will replenish, on average, once every 30 days. In an attempt to even out variations in the actual resupply schedule, we requested that the test run be for a period of at least four months. An extensive survey package was forwarded to each ship. The surveys themselves, one for in port and one for underway (see Appendix K), were to be completed by the Food Service Division after each replenishment evolution. Examples of questions on the surveys included: number of days at sea/in port since last resupply, geographic location, ship's complement, type of resupply ship, numbers of personnel in the working party, quantities of food received, pallets delivered by vertical or conventional replenishment, stores handling equipment used, total time to strike stores, etc. A copy of NAVSUP 1059 documenting receipts was also requested. At the end of the data collection period, 32 underway replenishments and 77 in port subsistence receipts had been received. While these numbers are far from the requested sample size, they were adequate for purposes of our analysis and evaluation.

Data Analysis

The investigation commenced with an analysis of the 213 line items in the Fleet Load List that were then rank ordered from the largest quantity carried on the typical AFS to the smallest. Volume was regarded as the more critical factor in the analysis, thus the ordering was done based not on numbers of units carried, but on the total volume of each item carried.

A number of interesting data started to emerge from the rank ordering. The top 10 items carried, listed below, accounted for 26% of the total volume of stores onboard and the top 100 items (47% of the Load List) took up 84% of the total storage volume.

MLSF High-Volume Food Items (Rank Ordered)

1. Flour
2. Cereal, Indv Serving
3. Sugar
4. French Fries, Fzn
5. Chicken, Cut Up Fzn
6. Beef Pattie Mix, Bulk
7. Potatoes, Dehy, Sliced
8. Beef Patties W/Soy
9. Shortening, Liquid, Frying
10. Pizza Crust, Fzn

The study team noted with some interest the second most-volume-intensive item carried, i.e., Ready To Eat (RTE) Cereal. It was curious how an item associated with the least attended meal of the day, and certainly not the first breakfast choice of many, was being carried in such large quantities. Was the product packaging that inefficient to account for such a large volume? From previous shipboard observations we could speculate that a large amount of the product was being used as breading for deep-fat fried products. As it turns out, this is the principal source of breading used on many ships and not merely the frugal use of old/unused cereal. In any event, it was encouraging that this high volume item had such a strong potential for volume reduction.

Before initiating a volume reduction study of these items, a quick check was made to ensure that the items being carried by the AFS's were, in fact, being used in equally high quantities by the fleet. In the unlikely event that a high volume item being carried on the AFS was not in high demand by the fleet, then there would be little value in pursuing a volume reduction study of that item. If the cross-match were good between what the AFS's carried and what the ships ordered, then the choice as to what items would potentially yield the most bang for the "volume reduction" buck was clear. The match, in fact, was good, indicating that the MLSF loads were reflective of fleet demand.

Each of the 213 items was evaluated as to its potential for volume reduction (described in Appendix L). The evaluation form (Appendix M) lists six categories, i.e., product substitution, product reconfiguration, product densification, packaging reconfiguration, other, and no possible improvement.

Some items would benefit through the application of more than one technology. In these cases, the savings were not double counted, but apportioned according to the contribution of each technology. Additional factors, indicated below, included: 1. when a particular technology would be available, 2. how costly would modification be, and 3. what was the probability of success to implement the volume reduction.

1. Technical Availability

- a. Immediate
- b. < 1 year
- c. < 5 years
- d. < 10 years
- e. > 10 years

2. Cost Effectiveness of Modification

- a. High (10% or less cost increase)
- b. Mod High (11-50% cost increase)
- c. Mod Low (51-90% cost increase)
- d. Low (91-100% cost increase)

3. Probability of Success

- a. High
- b. Average
- c. Low

Several of items from the analysis that demonstrated potential volume reductions were presented to NAVFSSO, including the following four categories.

1. Product Reconfiguration

- Frozen Pizza Crust: change from round to square, 27% savings
- Frankfurters: square-off ends, 10% savings

2. Product Densification

- Tomatoes (#10 can): semiconcentrate and repackage, 24% savings
- Bacon Sliced: use restructured, precooked bacon and repackage, 60% savings

3. Product Substitution

- Pork Spareribs: replace with restructured, rib formed, boneless BBQ flavored, precooked pork, and vacuum package, 60% savings

4. Packaging Reconfiguration

- Beans (#10 can): package in institutional pouch, 15% savings
- Cereal, Indiv Serving: purchase larger boxes, 44% savings
- Salad Dressing (#2-1/2 can): package in Polyethylene Terephthalate (PET) jar, 30% savings
- Cake Mix (#10 can): change package to bag-in-box, 30% savings

With the exception of spareribs and salad dressing, the technologies to implement the above changes are currently available. Spareribs could be available within a year and the salad dressing within five years.

The analysis identified that 23,000 cubic feet could potentially be saved on an AFS "Load One" configuration. Of that, 75.5% of the savings came from product reductions and 24.5% came from packaging reductions, as the list below indicates.

Volume Reduction Alternative - Potential Savings (%)

a. Product Densification	57.5
b. Product Reconfiguration	14.9
c. Product Substitution	3.1
d. Packaging Reconfiguration	24.5

More specifically, the breakdown consisted of the methods indicated in Table 77.

Table 77. Methods of Achieving Volume Reduction Alternatives' Savings

<u>Method</u>	<u>Applications(%)</u>
Shape To Square	16.8
Compression	13.6
Freeze-Dry/Dehy	13.0
PET Containers	9.4
Compaction	6.6
Institutional Pouch	6.0
Brik Pack	5.4
Restructuring	5.3
Precook	5.1
Concentration	4.1
Bulk Packaging	2.5
Bag-In-Box	2.1
Flaked & Formed	1.2
Miscellaneous	8.9

Additional information on each of these methods can be found in Appendix L.

Unfortunately, while a figure such as a 23,000 cubic foot reduction sounds impressive, it does not translate well into any meaningful decision making information. The results have therefore been restated in several different ways to better convey their significance. For combatants, the reduction can be translated into the following savings per resupply evolution:

- a total volume reduction in stores received of between 14% - 40% i.e., 47 to 1030 cubic feet.
- or, a reduction in numbers of cases received of between 9% - 40%, i.e., 31 to 874 cases, and
- a savings in manpower of between 9 - 40%; or 20 to 368 manhours for receiving and striking stores.

Of further significance to the combatant is the migration of frozen and chill items to ambient storage and the concurrent overall reduction in all storage area requirements (see Figure 9).

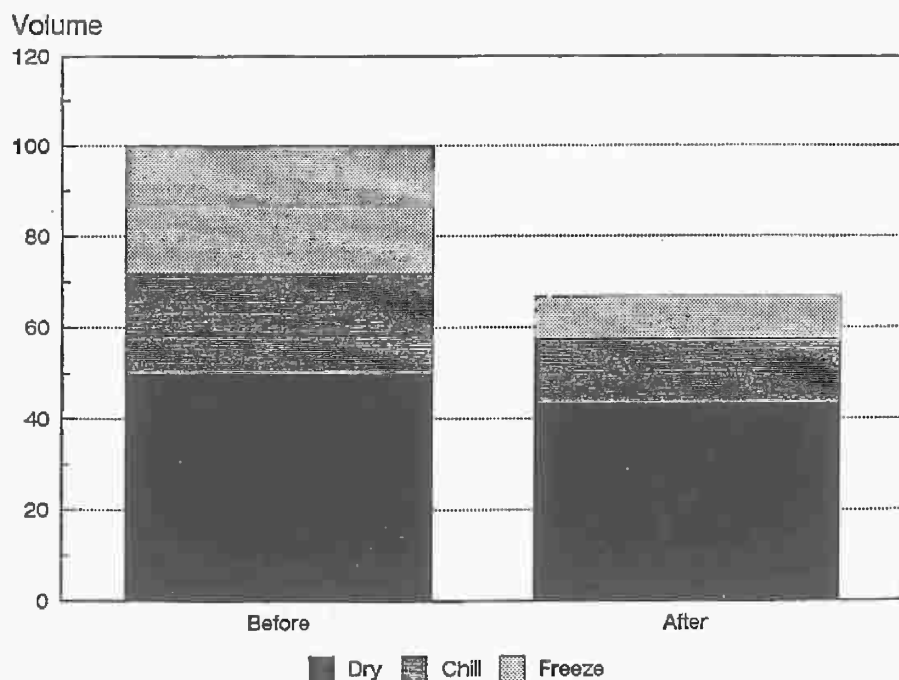


Figure 9. Before and After Volume Reductions: Average Breakdown Subsistence Storage Spaces

In the case of the AFS's, a 38% volume reduction could potentially be achieved if all of the volume reduction proposals were implemented. Realistically, this is unlikely to happen but the potential for significant volume savings has, nevertheless, been theoretically demonstrated.

An important consideration in this analysis is how to assist NAVFSSO in justifying the higher cost of these lower-volume products. While a valid case can be made for enhancing the fleet's operational capabilities (indeed the most important benefit of all), this tack, in the case of food, seldom generates the needed additional dollars to make it happen. It occurred to the study team, however, that there is a cost incurred in carrying this food aboard the AFS's. A rough estimate of an AFS's annual operating costs were obtained from the MLSF. This figure included fuel, OPTAR, personnel, subsistence and Port Services' costs. As a crude approximation, the total amount of storage space available (in ft) was divided by the operating costs to get an annual cost per cubic foot of storage. This cost was then multiplied by the 23,000 ft that might be saved through volume reduction to arrive at a cost of approximately \$500,000 to maintain that amount of space on an annual basis. Since the Navy cannot literally save \$500,000 by eliminating 23,000 ft from the ship, the only choice is in what it chooses to store in the freed-up space. While different pots of money complicate the decision making process, at some level the trade-off between the added cost of implementing the volume reduction technologies and the benefit derived from carrying 23,000 more cubic feet of cargo must be seriously considered.

Cost/Volume Reduction Model

While it was beyond the scope of the project to calculate the cost of implementing the volume reduction technologies, a method for evaluating these costs is offered. Remember, this is not a volume-driven model but a cost/volume model. Items here are ranked on the basis of achieving the greatest volume reduction at the least cost. Data are presented in the following format:

- C1 - item number (from the original volume reduction ranking)
- C2 - number of cubic feet that could be reduced
- C3 - dollar value of the space saved (C2 X \$28.23)
- C4 - technology cost to achieve the reduction
- C5 - difference between the value of the space saved and the technology cost to achieve it
- C6 - rank order of the most cost-effective reductions
- C7 - cumulative dollar contribution available to achieve the next most cost-effective reduction (C5 + C5 + C5 ...)

1 2 3

The following set of random numbers were generated to demonstrate the model:

Table 78. Random Numbers to Demonstrate Cost/Volume Model

C1	C2	C3	C4	C5	C6	C7
12	2.66	75.14	9.27	65.87	1	65.87
77	2.59	78.10	17.51	55.59	2	121.46
18	2.08	58.61	5.25	53.35	3	174.81
...						
124	0.85	23.84	23.58	0.26	79	1473.93
140	1.46	41.07	41.26	-0.19	80	1473.74
...						
101	0.13	3.79	39.08	-35.29	157	12.58
59	1.83	51.65	87.80	-36.15	158	-23.57
...						
200	0.21	5.97	145.14	-139.17	213	-3422.37

Following down column C6 of the hypothetical data set the first point of interest appears on lines 79/80 where you encounter the first technology application that will cost more than the value of the space it will save. The second point appears on lines 157/158 where the break-even point has now been reached in terms of achieving the most cost-effective series of volume reductions. The final point appears at the end on line 213 where we see the cumulative cost of pursuing all of the volume reductions over the value of the space that would be saved. Assuming that cost will always be a major factor, the decision maker now has a tool to assist in how far to pursue the range of volume reduction opportunities that are available. Other factors that could also influence the decision are the value of subsistence storage space onboard combatants (as opposed to the storage of weapons, fuel, spare parts, etc.) and the cost to the shipbuilding program of not doing anything, i.e., by taking advantage of the volume reductions, construction of the next AFS could be postponed indefinitely.

An analysis of volume reduction was presented at NAVFSSO to the CO, XO, and to select Division and Branch Chiefs. No further work was requested on this segment of the project.

VIII. CUSTOMER SERVICE SYSTEM DESIGN RECOMMENDATIONS

Introduction

The condition of the customer service systems on messdecks can be assessed in terms of both the physical conditions onboard Navy ships and the impact of those conditions on crew personnel. Thus, determining shipboard habitability needs require investigation beyond the more obvious physiologic needs. At a past fleet hospitality symposium the following statement on improving shipboard habitability included this description of current conditions in terms of the psychological implications for the crew members:

Most of the human support facilities provided on naval ships are directed to meet physiological needs. They are most easily quantifiable, most easily set forth in discrete standards, and those most likely to survive tradeoffs in the conservation of resources because they are so basic. It is the physiological needs that require satisfaction even in war, when other needs may be less crucial. This suggests that a problem we must address concerns the extent to which we will meet those needs now evident in a peacetime environment on a ship designed for war.

The naval ship environment is extremely responsive to the need to know in that it is self-revelatory: Pipes, wires, ventilation ducts, structure, and the countless appurtenances of military/marine technology are exposed to view. The exposure is made, however, without regard to any aesthetic sensitivities. The result is a "basement environment" of elements arranged in haphazard fashion (depending on which trade got into the space first) that is a visual assault on the aesthetic values of most people. The order and harmony that we have been raised to expect from the built environment are totally lacking. Furthermore, the resultant disordered environment is extremely difficult to clean, maintain, and repair.

The most obvious constraint is space. Space allocations for the competing shipboard functions are usually based on past practice: What did the last ship of this type have? Any attempt to deviate from the past practice must not only be considerate of the historical change involved, but must be mounted in the awareness that other, competing systems are going to resist any claim for increased space at their expense.

1. Any habitability system must be responsive to a hierarchy of individual and group needs and cannot be based solely on the satisfaction of basic physiological needs.

2. Human organizations are structured to provide a social order that establishes a sorting process, a system of territoriality, and a set of rules to govern behavior within the group and to indicate who are insiders and outsiders with respect to the organization.

3. Persons in groups respond to peer pressures from within the group more than they do to pressures from larger collectives. Moreover, they judge their performance by their standing in the total population.

4. Rapid technological and social changes are major factors in producing behavioral stress and strains affecting the quality of life and morale, productivity, and retention of personnel.

Habitability facilities for naval ships provide some unique challenges to the environmental designer, chief among the reasons for which are:

1. The sea is an alien medium for land-oriented man, the naval ship a confined, narrowly limited, stressful environment.

2. Naval ship personnel are all male, young, and rigidly class structured by military rank in a traditional system undergoing strain in adapting to social and technological change.

3. Traditional ship design methodologies are focused on optimization of engineering hardware- "nuts and bolts" -with personnel requirements somewhat grudgingly addressed by officially promulgated numerical standards.

4. As a consequence, the naval ship environmental designer must do two things: (1) understand the total ship design within the context not only of engineering requirements, but also of military practice and bureaucratic organization; and (2) provide data, theory, and methodology that not only produce the desired functional results, but that are also credible and acceptable to the other (non-personnel-oriented) users of ship resources.

The Customer Service System

The customer service system impacts the enlisted diner more than any other aspect of the foodservice system, equal at least to the quality of the food itself. Certainly everyone has experienced the compensating effects of pleasant service and surroundings when the food is not up to expectations. Conversely, enjoyment of the best prepared meal can be overshadowed by inattentive service or an "unappealing" environment.

The overall system can be segmented into four areas (see Figure 10). The first is the "how, when, where" the customer enters the system; the second, is how the customer actually receives the food; third, where and when the food is consumed; and fourth, exiting the system, how is this accomplished, with or without a visit to the scullery.

Following the traditional system design approach of first determining what type of menu will be offered and then subsequently designing to that concept, a comparative evaluation of various "service" alternatives was conducted. Rather than presenting a detailed review of every service style evaluated, it appeared more practical to just list the principal features characterized by each and decide if they were or were not desirable features to include in our design recommendations. Arguably, the list of features could be longer, but it was felt that the following were adequate to generally outline the system.

<u>Customer Service Feature</u>	<u>For Shipboard Application</u>
Full-Service Menu	Yes
Limited Menu	Yes
Table Service	No
Self-Service	Yes
Dining Area	Yes
Take Out	Yes

Full-Service Menu/Limited Menu

Recommendation: Support both a limited and full-service menu

The types of menus selected and how they are constructed have an obvious effect on the overall design of the foodservice system. The rationale for supporting both a limited and full service menu concept focuses primarily on the issue of variety. If the Navy mission did not require lengthy deployments overseas, coupled with considerable days spent underway, the issue would not warrant such attention. The fact is that the average shipboard sailor cannot "vote with his feet" and select where he chooses to eat. The significance of the issue is difficult to appreciate by those who have not been at sea month after month during deployment. Given that a great deal of investigative work remains to be done by the behavioral psychologists to better understand the complex set of factors that influence both real and perceived variety, the immediate

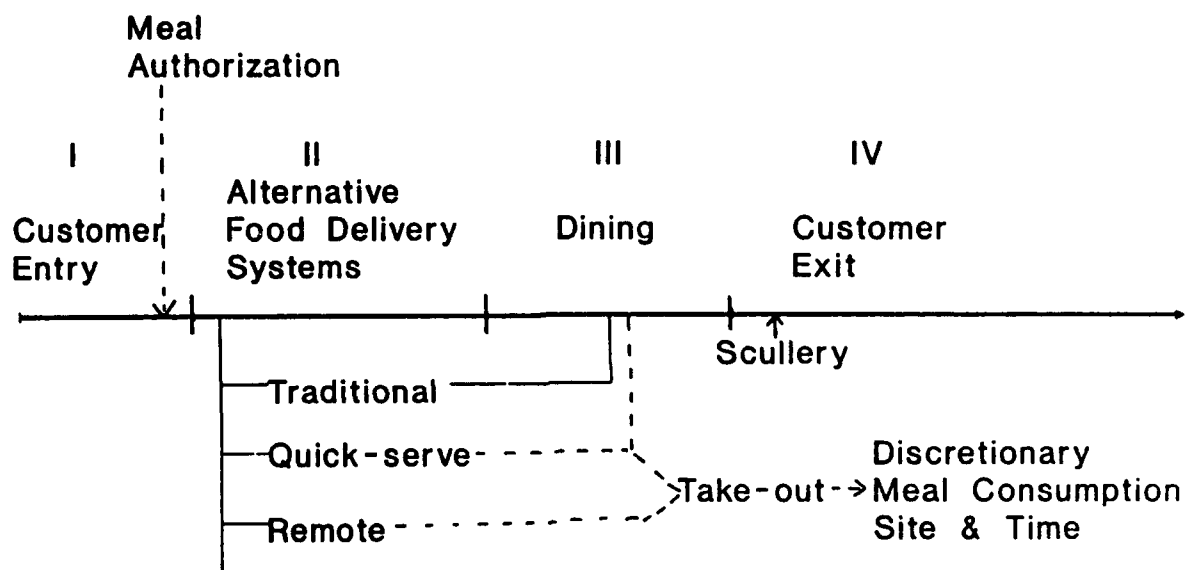


Figure 10. Customer Service System

issue for today's system designers becomes - do we wish to err on the side of too much variety or too little? We can only look back on such limited scientific experiments as USS Saratoga and conclude that expanding menu variety and improving the messdeck area has a significant positive effect on customer satisfaction.

Essentially the entire operational structure of the ship's food-service system is determined by the extent of the menu alternatives available. Both full and limited menu concepts have been proposed to provide relief from the monotony of a single menu theme. The requirement for providing a full-service menu is without question; from both an esthetic and a nutritional perspective, this is baseline. The limited menu on the other hand, would be designed to offer a range of popular items that lend themselves to fast service and the option to consume the meal away from the main dining area if this is more convenient for the customer. At this time the actual design of the menus is not the important factor, but rather the alternative menu styles that are made available to the customer.

The practice (as was sometimes observed on small single, serving line ships) of periodically preempting the full service menu to offer a popular limited menu meal is considered inappropriate. A full-service menu should always be available. Likewise, offering popular limited-menu items on the full-service menu fails again to recognize and adequately address the issue of menu monotony and the perception of variety as may be experienced by the customer. In this situation nothing is distinctly different enough to capture the customer's interest.

The proposal for all new construction to design two separate and distinct food distribution systems is viewed as critically important. It is felt that even on existing ships the design could be implemented with minimal negative impact on the overall foodservice system provided, of course, that local management wishes it to happen.

Table Service/Self-Service

Recommendation: Adopt alternatives to cafeteria-style service

By initially including table service in the evaluation, the study team sought to explore an alternative to the exclusive cafeteria style of service. Consideration was given to adopting a modified style of table service with waiters. On the one hand it was argued that providing this level of service could significantly enhance customer satisfaction with the overall system and would require only a modest increase in manpower (mess attendant) requirements. For example, customers, having selected a table, would be responsible for getting their own salad, bread, beverage, soup, etc. from self-service centers located in the dining area. Once reseated, the customer would circle the appropriate menu selections from an inexpensive and simply designed order sheet.

USS NEVER SAIL

Dinner Selections
14 October 1999

(Make one selection from each category)

- 0 Baked Chicken
- 0 Spaghetti & Meatballs w/ Sauce

- 0 Mashed Potatoes
- 0 Buttered Noodles

- 0 Seasoned Green Peas
- 0 Buttered Carrots

The mess attendant would then pick up the order sheet, have the order filled, and return the order form and plated meal to the customer. Customers would likewise be responsible for getting their desserts. Once the customer finished and left the dining area, mess attendants would clear the serviceware and reset the place setting with flatware and a new menu order form.

On the other hand, however, it was felt that any proposed increase in manpower requirements, mess attendants or otherwise, would not be responsible in view of potential future manning levels (1990's-2000). Additionally, while most would agree that it would be nice to have table service, the (unanswered) question remains, what greater degree of customer satisfaction would be achieved from this service and would this be sufficient to offset the cost? The issue of turnover rates becomes a particular problem with this style of service too, since it is highly unlikely that enough dining area would ever be provided onboard a combatant ship to feed everyone at a single seating. It was felt if table service were provided, the necessary number of turnovers could not be maintained without either increasing seating or extending the meal period. Neither of these alternatives were considered acceptable.

A further alternative was proposed that would provide for a faster paced self-service meal at noontime and a slower paced, modified table service meal in the evening when the majority of personnel did not have to return to their work stations. This concept was dubbed "The Eating Club" (see Figure 11). Still, with the high number of customer arrivals that typically occurs in the earlier phases of any meal period, it was felt customer waiting times would be increased to an unacceptable level. Additionally, it was felt that any attempts to schedule crew members into specific time slots for dining would be viewed negatively. While the benefits of staggered arrivals are obvious to the foodservice system and to the customer (by way of reduced waiting times and mess deck congestion), this degree of control over such individual decisions as "when do I want to eat" could be counterproductive to morale.

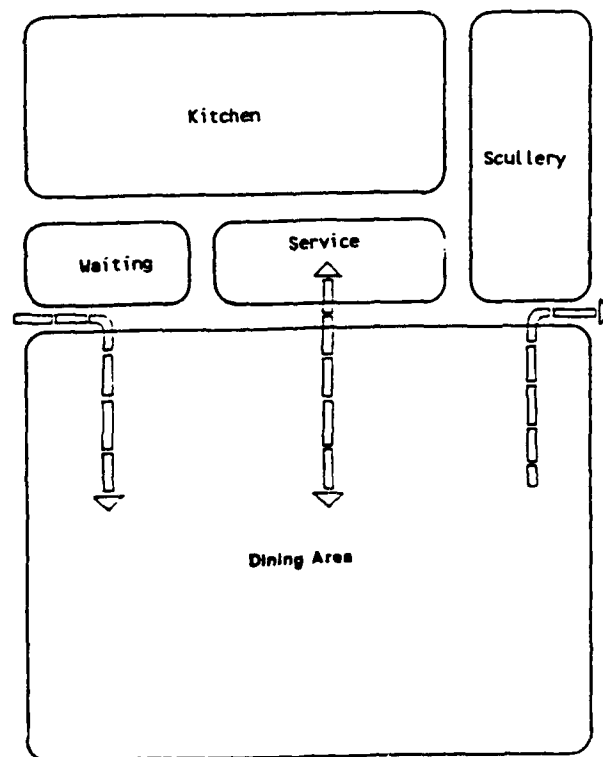
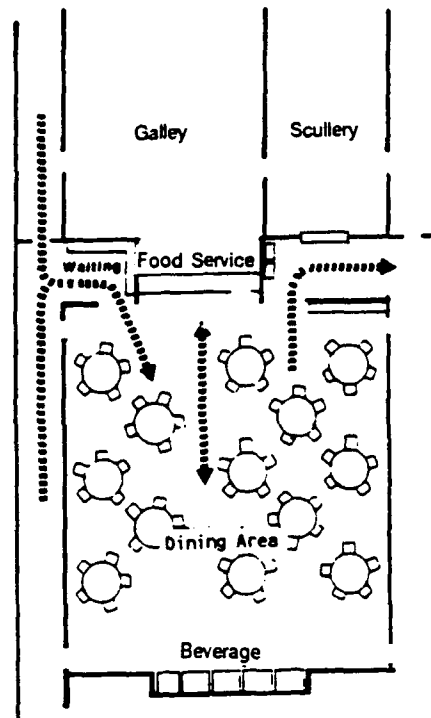


Figure 11. The Eating Club Layout

This evaluation was not initiated to intentionally reject the concept of table service in favor of self-service. Quite to the contrary, the self-service system is seen as a degrading influence on the quality of the overall customer service system. The problem is, from the technical aspect of efficiently distributing food to large numbers of people, the system works well.

Three common food delivery systems that lend themselves to the concept of self-service are the traditional cafeteria line, the more upscale buffet serving line, and vending (see Figures 12, 13, 14). Cafeteria service has traditionally been the style on ships where the serving line is to one or both sides of the galley in full view of the preparation area. Any newly proposed system would ideally seek to combine the better aspects of both systems, i.e., the improved decor and presentation of the buffet line with the speed and efficiency of the cafeteria line. Vending, which will be discussed in the next section, offers the customer who cannot conveniently come to a central serving location the opportunity to get a quick meal and return to the work site.

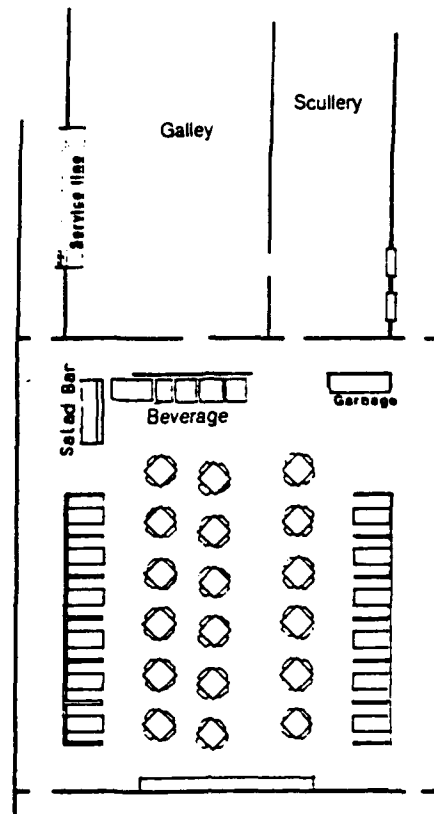
Thoughtful design of the self-service system can provide the desired efficiencies while at the same time minimizing its inherent faults. The system should address the following in order to make the self-service system as pleasant as possible:

- design the serving area (line) as part of the dining area, not the food preparation area
- provide continuity of a decor theme throughout the entire customer service system
- minimize the number of items on the serving line
- preportion starch and vegetable selections into individual servings for customer pickup
- provide continual MS supervision of the line

Dining Area/Take Out

Recommendation: Provide both dining areas and take-out service

The last customer service features address the desirability of providing dining areas and take-out service. Both of these design alternatives are encouraged. The illustrated take-out service concept is shown as "The Vending Galley." This example, more suited for larger ships, illustrates limited on-site eating if a compartment adjacent to the vending area is available. It is envisioned, though, that most customers would take their prepackaged meal items to another location. On smaller ships, take out should be made available to the customer from the EDF.



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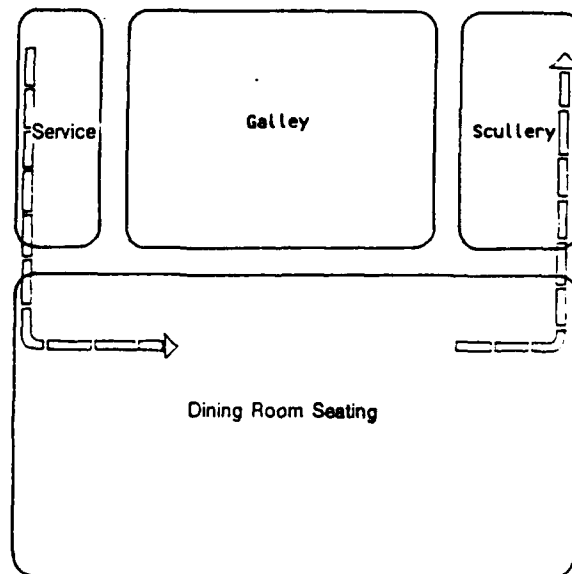


Figure 12. Conventional Cafeteria Layout

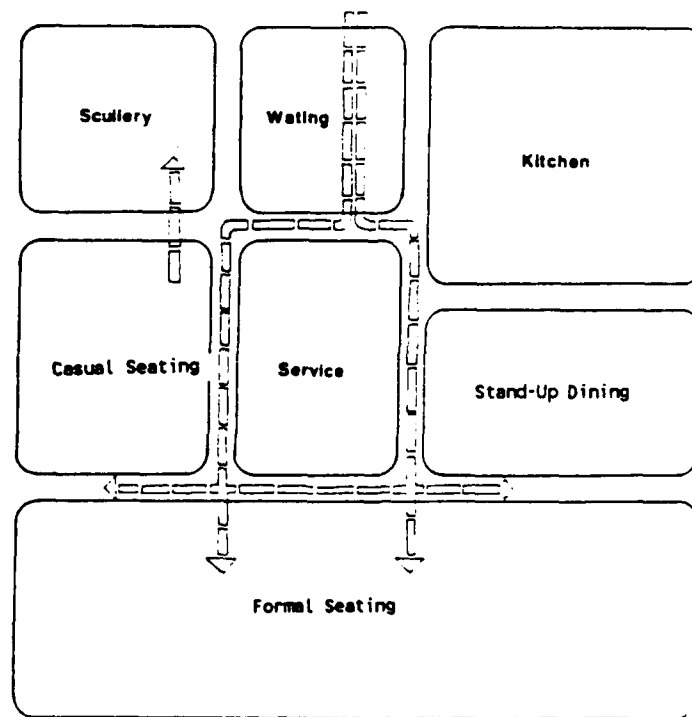
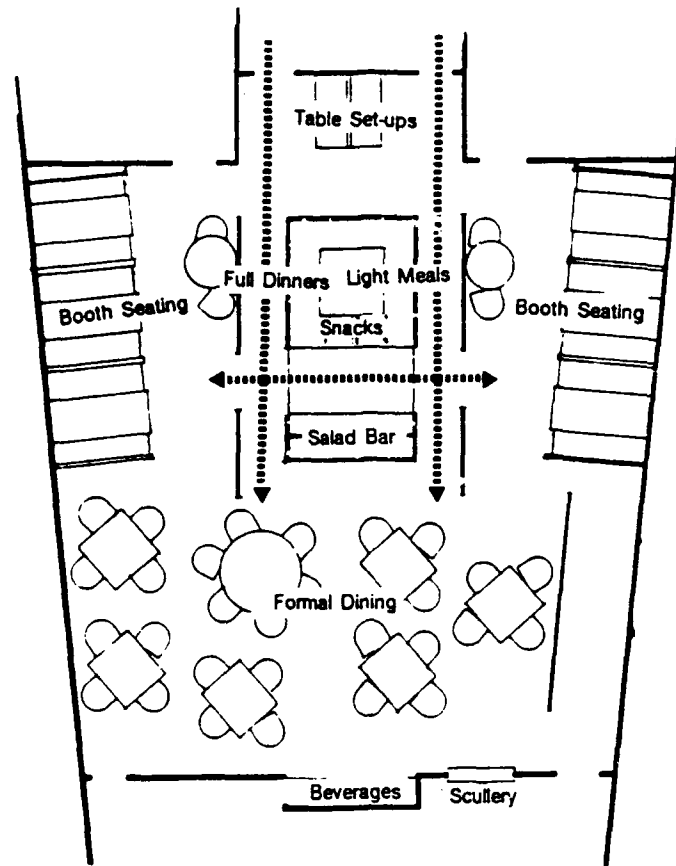


Figure 13. Island Buffet Layout

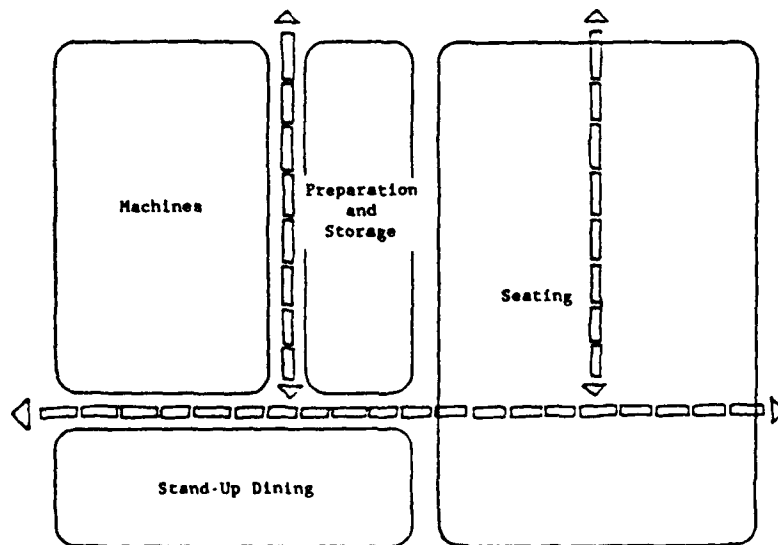
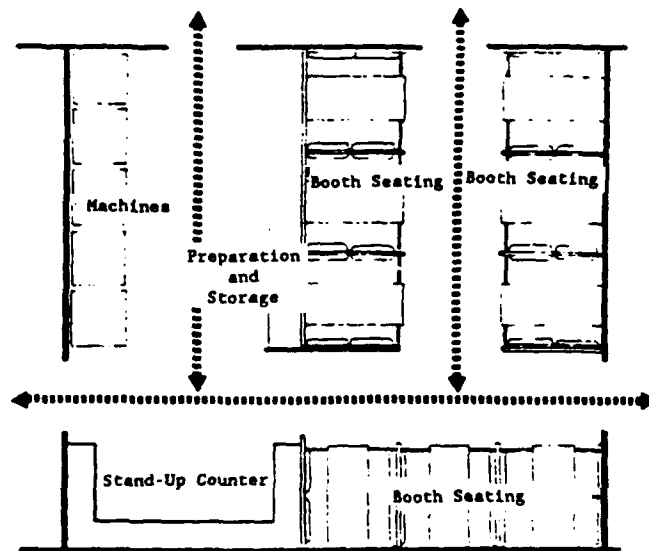


Figure 14. The Vending Galley Layout

Within the context of the "dining area", many opportunities are offered to positively reinforce the total dining experience. While all four areas of the customer service system are important and must be addressed as a "total" package, the dining area assumes a major role in the experience. In order to take positive advantage of the opportunities present in the dining area, the following general design considerations are proposed:

- Provide a mix of seating configurations to include stand-up counters, two-, four-, and six-man tables.
- design obvious customer flow patterns throughout the entire customer service system
- maintain a semblance of identity - do not position the dining area in high traffic area, i.e., main passageway or crossover traffic.
- address noise attenuation so that a dining area is not just another "workplace" for eating

Implications of Alternative Service Systems

The evaluation and selection of a customer service system for use in a particular situation must take into account the implications of that alternative and the subsequent impact of that system on the total dining experience. A brief analysis of some of the implications inherent in several systems are as follows; two have been previously mentioned in the above text.

Scramble System: Also known as hollow square or free flow. Separate tables positioned around the perimeter of the room or scattered throughout the area offer certain foods, e.g., hot foods, sandwiches, salads, or desserts. Customers go directly to the desired section without waiting in line. Throughput rates can be high once customers are familiar with the system. The scramble system is more space intensive (not an asset for shipboard use) and requires some mechanism of controlling the number of people who enter at one time.

Circle Serve: The circle serve system has in past research been proven to be a popular alternative that positively reinforces the "choice" that should be available to crew members through the presentation and selection process of food items. The use within the mess deck context however may be questionable due to the amount and the type (shape) of space required for inclusion in the relatively tight shipboard environment. Mechanical problems might also arise as a result of ship movement.

Single/Double Line Serve: This type is probably the most common system presently in use. It is efficient in terms of the distribution of food items and throughput of personnel into the dining area. It does, however, provide the least choice to personnel involving food selection, and tends to make the "meal assembly" process the most inefficient and possibly frustrating.

Peninsula Service: This type, which is a variation of the single/double line system, allows for more efficient staffing of the food distribution point while also offering the opportunity for greater customer interface. In addition, it allows the positioning of food items so that crew members not interested in the full meal have the opportunity to "jump out" of line at an earlier point, thus reducing time spent waiting (see Figure 15).

Island Service: This service offers the crew choices as to at which island they will receive food. If there are items they are not interested in, crew members can bypass those islands. It also offers the opportunities of greater customer interface, mentioned above. The system does, however, require more room for the distribution of food and therefore may not be applicable in the messdeck setting.

Table Service: This system reinforces the image of meal time as a social activity. It offers some consistency at meal time and the fostering of crew member relationships. It does, however, present some issues which must be addressed concerning scheduling, turnover and throughput. The positive aspects of the system do merit its consideration and possible use on an infrequent or special-occasion basis.

Vending: The vending system is a viable alternative for all ship types as an option to the full, prepared meal. The system offers a choice to crew members without using a large amount of valuable shipboard space. The resulting trash items of food wrappers and containers require strong policy and procedures to prevent insect and other problems.

It seems that each of the alternatives listed has certain implications which would make it attractive for shipboard use; however, each system has to be viewed in a total context to evaluate its overall contribution.

The Navy understands well that the dining area is reflective of a series of trade-offs relative to the individual ship and its mission. The solution to one service problem may well spawn a problem in another area. To increase the through-put rate on the serving line, for example, may overwhelm seating capacity in the dining area, and so forth. The design solution must achieve the best overall system balance based upon the physical and operational constraints of the ship. Once this "optimization" has been achieved specific problem areas can be reworked. If, for example, the best possible balance between crew arrival rates, food production, and diner turnover has been achieved, and still leaves crew members with a 15-20 minute wait in line for food, then the design envelope must be expanded to create a more appealing environment that makes the wait less negative. Only after this total design approach is pursued will a reasonable amount of success in the dining area be realized.

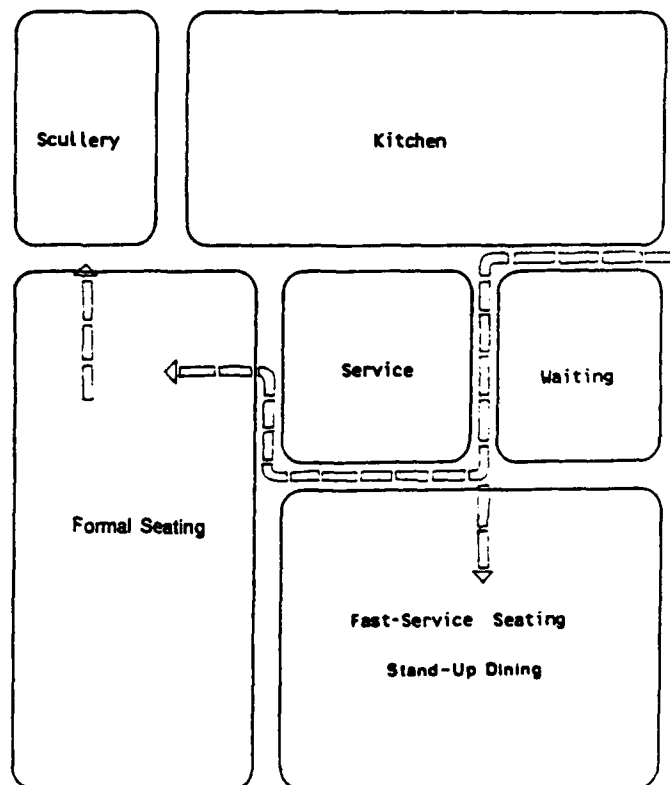
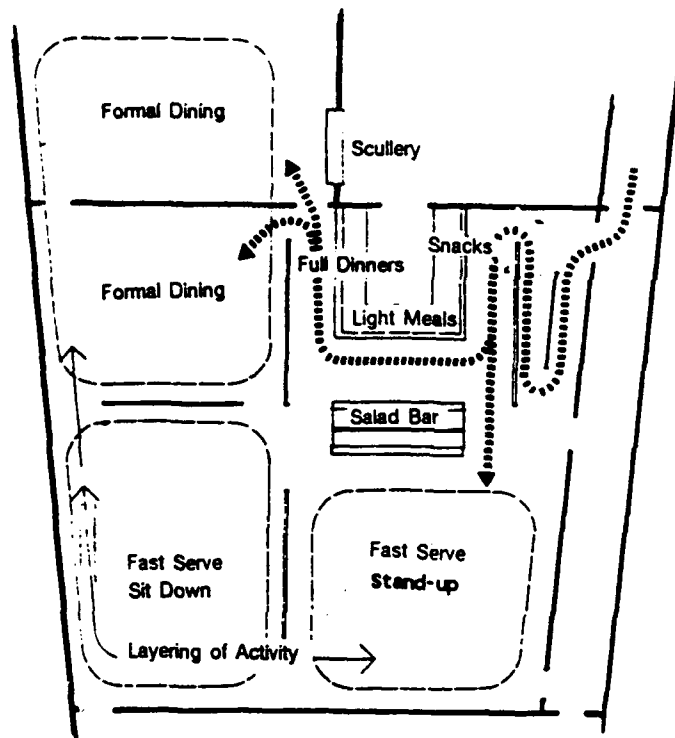


Figure 15. Peninsula Buffet Layout

Data Collection and Previous Research

In order to help in understanding the operational and behavioral environment of the mess deck, information was sought through several different means.

Site Visits/Personnel Interviews: In preparation for the development of the customer service concept design, some eight ships were visited to observe the service system along with the physical condition of the mess deck itself. During the visits photographic and written records were kept outlining both positive and negative aspects of the spaces. Also, during ship visitations, various personnel, both foodservice and users, were interviewed to determine their attitudes towards foodservice system issues. The following were several recommendations put forth by crew members.

1. More "color" in the crew and Chief Petty Officer (CPO) mess areas.
2. More obvious separation between the wardroom and the officer's lounge.
3. Break-up of large messing areas into smaller areas. Partition off major passageways.
4. More distinct "character," and more seating options, i.e., booths and two-, four-, six-, and eight-person tables.
5. Be able to modify the decor over the length of the deployment.
6. Improve traffic flow around mess deck beverage bar areas.
7. Crew "participation" in developing decor items at both serving line and mess deck areas.
8. Easier to clean surfaces--i.e., darker color deck tile; plastic laminate bulkhead panels, darker colored overhead.
9. Adjustable lighting level in crew's mess.
10. Provide more comfortable seating (booths and chairs).
11. Faster "through-put" on crew serving lines.

Previous Research: Studies relating to shipboard habitability were consulted for application to this current effort. The study involving the USS Saratoga is almost identical in that the requirement to improve the quality of the mess deck environment is also a major objective. The framework for organizing mess deck user requirements and improvement opportunities was reused and further expanded for this work (see Figures 16, 17). The following recommendations are based on research results from an analysis of enlisted personnel responses to improvements made on the USS Saratoga (CV-60) in 1979.

1. Any messdeck compartment that also serves as part of the for/aft main passageway systems should have some form of vision screening so that those dining will not be seen to be a part of the more dynamic circulation activity.
2. The messdeck layout should be designed as a total environment for a systematic sequence of activities such that the user does not need to overcome a series of obstacles and possible delays.
3. In order to establish a distinct character for a shipboard compartment, the apparent extent of piping, fixtures, and other gear should be minimized within the constraints of emergency accessibility, low head room, and multiuse of compartments.
4. All aspects of the messdeck furnishings should be color-coordinated, with strong vivid color that ties into other parts of the messdeck area (serving line, deck, and bulkheads).
5. The total messdeck environment should be designed with an integrated color scheme. Strong earth tone colors are one example of a color combination that would probably have universal acceptance if there were no other constraints.
6. Select shipboard messdeck furnishing items that will not show hard use, i.e., anodized metal rather than painted metal, "thru-color" chair backs and seats rather than "surface-color," and repair requirements with on-board tool and workmanship capabilities.
7. The breakup of the larger messdeck compartments into obvious smaller dining areas should be continued for reduced perception of distracting noise. An acceptable sound-attenuating carpeting should be used on all reasonable vertical surfaces to quantitatively reduce the decibel level as well.
8. Messdeck area chairs should be selected for user comfort as well as necessary stack-ability and durability.
9. Any panels or dividers used on mess decks should be located to maximize the "separation" of the dining areas from other activities.
10. Shipboard dining for enlisted personnel necessarily involves a certain amount of time waiting in lines. Whatever can be done to shorten mess lines should be tried.

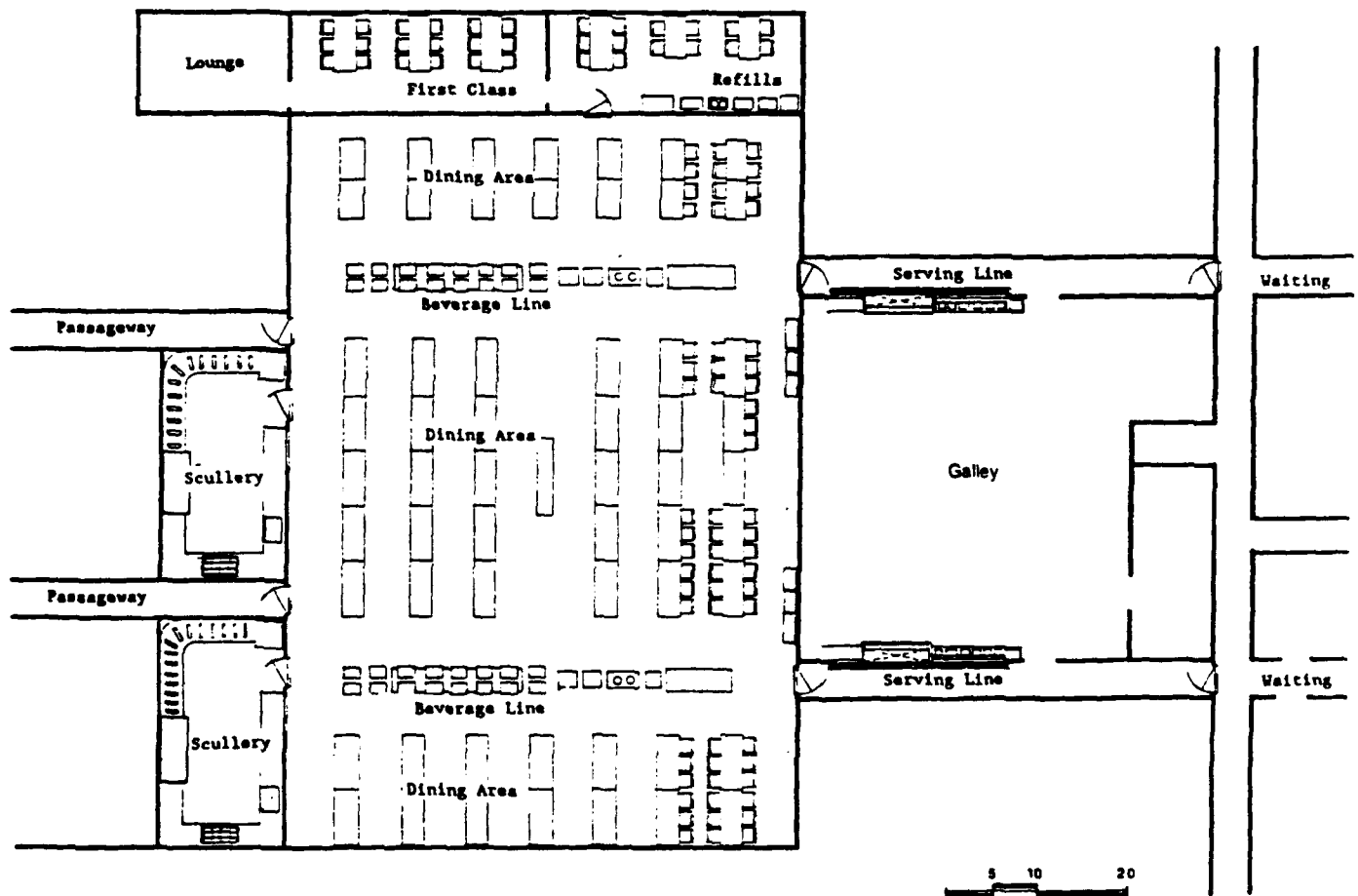


Figure 16. Typical Messdeck Layout

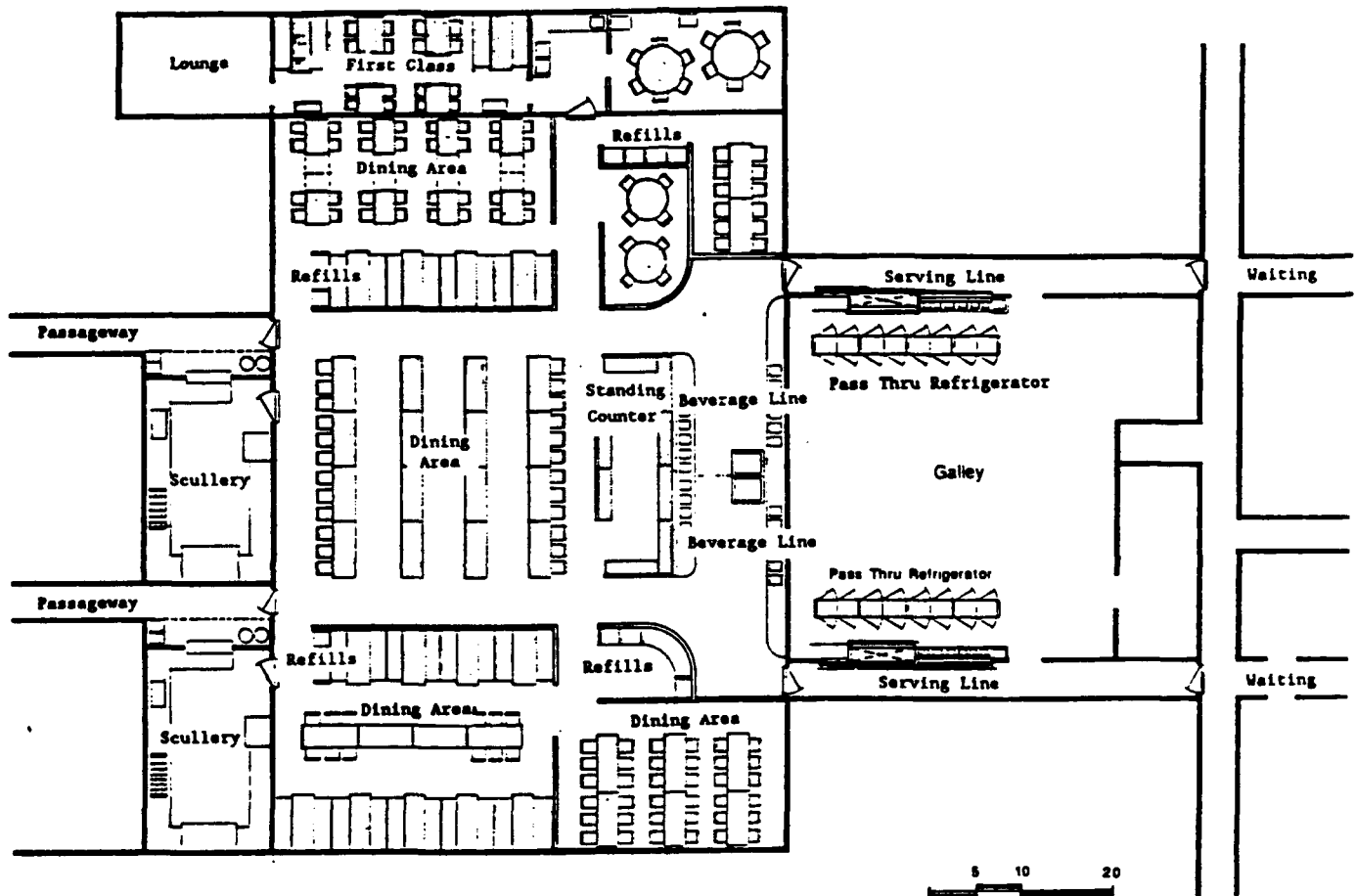


Figure 17. Improved Messdeck Layout

11. Crowdedness and finding a place to eat appear to be the major problems for messdeck occupants. The two factors are related and could both be improved by providing more space. Staggered scheduling of meal times for different groups would help also. Both are unlikely solutions to the problem.

12. The table space available per person is directly related to the total number of eating places available within the limited space for shipboard messdeck. An acceptable table size appears to be 325 sq in per person, even though 400 sq in per person is considered optimum.

User Requirements

A principal reason for conducting a thorough information-gathering effort is to elicit and identify user requirements. The crew members, after all, are the ones which must use these facilities, sometimes for extended periods of time. Therefore their input is invaluable for any design or design guidance.

A series of generalized habitability requirements have been used as a means of organizing current mess deck conditions and improvement opportunities. The habitability requirements are: efficiency, choice, privacy, sociability, comfort, and image. The conditions and improvement opportunities pertaining to each of these categories are outlined in the following table.

<u>Habitability Requirements</u>	<u>Current Conditions</u>	<u>Improvement Opportunities</u>
Efficiency	Limited space yields long lines for food service, at salad bar, for seating, and around scullery. This contributes to general crowding and clutter. Mess deck crew not adequately motivated to provide quality service.	Provide better organization of food service stations and allow more room for circulation. Initiate alternative dining methods, which encourage the mess crew to feel responsible for and proud of mess deck service.
Choice	Limited selection of table sizes (often only one size is available). Limited selection of dining environment. Dining spaces are of uniform character.	Provide varied table sizes and configurations to allow for possibility of eating alone if desired or of limiting the number of people at a table. Provide alternative dining methods to allow for choice of environment.
Privacy	Open dining areas with excessive circulation and milling about in dining areas gives perception of crowding. Limited opportunity to control the number of people with whom one eats.	Provide screening of circulation areas. Screen views of general crowding and clutter. Provide varied table sizes and booths.

Sociability	General rushed, crowded environment not conducive to social interaction. Limited seating restricts opportunities for groups to eat together.	Provide dining alternative that fosters meal time as a social occasion. Allow for varied groups with different table configuration.
Comfort	Some of the seating provided is fixed, rigid plastic shell type; these are consistently rated as uncomfortable. General noisy, distracting conditions in the total mess deck compartments.	Provide seating that is adjusting, i.e., not fixed. Assure that temperature, humidity, air movement, smells, lighting, and noise level, are all controlled to acceptable levels.
Image	Mess decks are not distinctly different areas of their ships. There is a perception of the mess deck as the same as the workstation. Mess deck appearance is cluttered and unorganized, and in many cases, unappetizing.	Reduce cluttered appearance. Unify dining area with a common design theme. This will also serve to differentiate dining areas from ship work areas.

User Participation

At the individual level:

One finding during the information gathering phase was the desire by crew members to participate some way in the creation of the foodservice solution. Efforts by the crew to "personalize" their dining spaces help to foster pride in themselves, their ship and their service. This behavior should be encouraged by providing as many opportunities as possible to incorporate crew ideas to personalize into the design solution. A brief listing of some ideas which would allow crew members this opportunity could include:

- crew display areas for awards, honors, etc.
- a "Cruise History" which could include a map, log, and significant events relating to the current cruise.
- a "Graffiti Bulkhead" to allow crew members the opportunity for self expression.
- a projected display of slides or static display of pictures crew members have taken during liberty, on-board ship or may have received from home.
- cases for the display of crew members' crafts, hobbies, artwork, etc.

These ideas, among others, can provide users with an active, participatory opportunity to affect their environment on an almost daily level.

At the command level: Beyond what has just been discussed is the effort to allow the crew to participate in more long-term design decisions. While this is assuredly a more critical area, user involvement may still be practical if handled carefully. The key to this would be to limit the opportunities and choices for major design decisions. A standardized approach remains possible with user involvement, for instance, in the decision between standard "A" or "B". It has been proven in many other research situations that, when the user is involved, even to a seemingly minor degree, the resultant solution elicits a greater degree of overall user satisfaction.

Theory/Design Concepts

The logical progression, once current conditions have been analyzed and user requirements have been identified, is to give this collection of words and ideas the physical embodiment within an integrated design solution. Three principles of design are considered relevant to provide improved, variable mess deck dining areas:

1. provide a dining environment that from an aesthetic perspective removes the customer from the working shipboard environment,
2. provide a "neutral" mess deck area that can accommodate several distinct decor packages that can be changed periodically, and
3. standardize a mix of customer service system decor packages and provide for their periodic review and update.

The alternative decor packages would be distributed to all levels of the design and user communities. Standardization of such packages would not usurp local command discretion and would leave such decisions as color selection, equipment arrangements, and design alternatives with the ships, while standardization of the construction materials used, material safety standards, and ease of new design modifications would be assured.

There is circumstantial evidence to indicate that one positive feature of certain chain foodservice and lodging systems is the customer's assurance of continuity in design and operation throughout the entire system. To quote Holiday Inn's advertisement, "The best surprise is no surprise at all." The approach has certainly worked well for a number of major fast-food service companies. Possible situations that can arise from allowing ships' autonomy in mess deck design is that the system will typically, and for some time, reflect the personal preferences of a few individuals who made the decor decisions. Additionally, the decor, rather than contributing to a positive environment, could conceivably generate dislike on the part of customers for the system. Standardization of these packages by design experts familiar with ships would provide for more universally acceptable dining themes.

There are extensive ways to increase ship dining area acceptability. The following are offered as a stimulus to all decision makers, from operators to designers:

1. Design the area to be appealing
2. Promote patron satisfaction
3. Maintain an inviting image of the area
4. Personalize the area
5. Optimize comfort

Listings of specific ways to achieve the above objectives can be found in Appendix N.

Physical Implementation

The remodeling of mess deck areas constitutes a manipulation of environmental components. These components are the lighting, colors, textures, graphics, and quality of materials which surround the diner.

1. Lighting

Lighting is one of the most crucial environmental components. It has a powerful effect on the environment through its color, intensity, and direction. By its color lighting can affect the appearance of both people and food. For example, food seldom looks its best under the cool white fluorescent lighting used on Navy mess decks. Lighting can be used to direct traffic by increasing its intensity along circulation routes, and it can hide clutter by its absence along walls. Lighting levels and distributions are easily varied. Controls on lighting can provide for easy transformation of the environment. This control can provide for variety between dining areas and for variety over time. For example, lighting levels may be set high for lunch times, and lowered for dinners. Lighting may be lowered further for religious services. At a general level, lighting levels, intensity, and colors are easily and economically varied to powerful effect.

2. Colors

Background colors for mess deck areas should be neutral and warm. These colors should be used to be nonintrusive. They should create a neutral background. Accent colors can then be used to guide traffic, for interest and variety, and as a unifying element. Color can be expressive of each Department/Division or overall crew unity. An essential component in selecting colors is maintenance. Colors and textures may be selected to minimize cleaning expenses.

3. Textures

Textures provide warmth, interest, variety, and familiarity. Where possible provide fabric-covered chairs or tablecloths; curtains may also be provided to take advantage of their textural qualities. Screens around dining areas can be fabric covered, wood, or wooden egg crate to provide textures in the environment. Tabletops in wood also can provide textural qualities.

4. Graphics

Graphics offer an opportunity to provide accent and variety in what should be a generally neutral environment. By their subject matter graphics can create a theme for a dining area. It is also easy to vary the theme by changing the graphics. Graphics may also operate at the scale of the floor or wall. These treatments can serve to unify a number of small spaces or to direct traffic, activity, and attention.

5. Quality of Materials

The quality of materials used in a dining area can provide familiarity and comfort. Better quality materials are often expensive both in initial cost and for maintenance. These higher costs may be offset by greater durability however. Examples of better quality materials are cloth over vinyl, wood over plastic laminate, or carpet over linoleum. The use of these materials can serve to distinguish mess deck areas as places for people, distinct from work areas.

A note of caution: Be careful in approaching the design of mess deck areas in the same vein as one might approach restaurant design. Commercial restaurants are often designed around some theme or with a unique image. This is done to reinforce the distinct identity of the restaurant to make it memorable and exciting. It is an approach that is often heavy handed. There is an important difference between restaurants and mess decks, however, in that restaurants are designed for occasional visits whereas mess decks are for continuous daily usage for all three meals. Therefore, the kind of lively and thematic designs seen in restaurants can become dull and uninteresting in the face of continuous use.

To conclude, four operational groupings have been targeted for improvements. These include:

- Customer Waiting
- Customer Service
- Seating/Dining
- Customer Exit

Illustrating "before and after" drawings of these areas depicting specific improvements/enhancements can be found in Appendix O.

IX. SUMMARY CONCLUSIONS AND RECOMMENDATIONS

Although many different aspects of foodservice were investigated during the course of this project, the objective, nevertheless, was to develop a single, integrated plan for Navy Food Service through the 1990's. We have focused on various food, equipment, customer, and design proposals throughout the course of the study. However, we would be remiss to merely present these segmented studies without having developed some overall perspective of the entire effort. We have identified the most significant aspects of the project and integrated them into an action plan. The following recommendations, therefore, represent a midrange investment strategy that outlines potential areas for resource investment.

■ Develop A Strong Foodservice Management Program:

To best position the Navy for the challenging times ahead, the following steps are proposed.

■ Exploit "High-Potential" Management Candidates:

- develop a Navywide system for the early identification of high potential enlisted foodservice manager candidates.
- design a management development program for these candidates.
- develop a fast-track program within the existing promotion structure to make maximum use of these high potential candidates.

■ Reorient Training:

- train managers to be more competitive in attracting customers (increasing headcounts).
- redirect the considerable talents of the Food Management Teams to improving foodservice management training aboard ships.

■ Develop Standards, Strategies, and Support:

- develop position standards and performance criteria that better reflect foodservice managerial duties; that clearly identify what is expected; the relative importance/priority of what is expected; and establish a realistic and achievable set of performance goals (on an annual basis) that will challenge managers in their position. The present system gives equal weight to unequal duties and responsibilities. If NAVPERS Form 16-16/24 cannot be modified, then a supplemental performance evaluation is suggested.
- develop proactive management strategies, not reactive.
- develop strategies to enhance positive local command level interest/support for foodservice.

■ Improve the Customer Service System:

- take cues from industry, put more dollars into design, decor, product presentation and customer service training for cooks and messcooks.
- expand foodservice access/outlets to 24-hour service, where appropriate.
- provide BAS/commuted rations to shipboard personnel while in port. Foodservice must effectively compete with other vendors to attract/keep customers.
- improve customer service training for management, cooks and messcooks.
- improve management responsiveness to customer needs, i.e., new food trends, dieters, greater nutritional awareness, etc.
- develop improved customer feedback techniques. Current systems, such as the suggestion box and menu review committee are, for the most part, ineffective.

■ Increase Logistics Capability:

- continue investigation of volume reduction technologies.
- improve the all-around responsiveness of the supply system to changing commercial trends (get new items in fast and out fast).
- develop a category of "specialty test items" that can be quickly fielded and the requirement cancelled when no longer desired. If necessary, develop AFS (refrigerated stores ship) "set aside" space for such items.

■ Develop a Program to Improve Pride in the MS Rate:

- order free industry publications for MS reading as part of a more comprehensive program, and
- encourage personnel to attend local trade shows. Send the best personnel to the annual National Restaurant Association show in Chicago.

■ Emphasize Equipment Planning. Foodservice in Ship Design. Layout:

- maximize (vendor) equipment repair support while ships are in port.
- expedite delivery of new foodservice equipment to ships.
- become more assertive in the foodservice design process at NAVSEA.

- construct CFP facilities wherever and whenever possible.
- improve preplanning efforts during SRA's and overhauls.

■ Develop a Long-Range Systems Planning and Integration Division at NAVFSSO.

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APPENDICES

APPENDIX A

Outline of Individual Command Level Data Collection Plan

The following list identifies four specific area of foodservice investigation. Under each area are listed the numerous topics on which data were collected.

I. AREA: Administration/Operations

Ships complement (rates, ranks)	Resupply schedule/loadouts
FSD organization chart/personnel rotation	UNREP/VERTREPs - time & people
FSA Allocations Enlisted dining facility Wardroom	Annual Ship Schedule
Subsistence flow patterns	CONUS/OCONUS resupply problems
Galley observations	In port, at sea, CONUS, OCONUS operations
Mess deck observations	FSD Support Requirements: donuts, coffee, USOs, Flight meals USMC amphibious support
Waiting line data	MS GQ stations
Chief Petty Officer Mess observations	Administrative duties:
Private Messes: - Flag Mess - CO Mess - Chief of Staff Mess	- time - people
Number duty sections	Garbage/trash related problems
On/Off duty schedule	
FSD Branch Interactions	Uniforms worn (cooks and mess cooks)
Meals/per man ratios	Trade magazines and industry shows
	Cleaning materials
	Food Management Team - last visit, critique
OPTAR Availability	Supply Corps School
Habitability funds	Navy Supply Center Support

APPENDIX A (cont'd)

Medical Dept. Interview

- Sanitation

Food

- Weight Control Program

II. AREA: Foodservice

Menu cycles

- EDF
- Wardroom
- Chief Petty Officer

Heavy Seas Menus

Galley Worksheets - NAVSUP 4061

Daily meal attendance

NAVSUP 335 Qtrly receipts
& expenses

Production flow

Mess decks:

- salads
- beverages
- layout

Work station evaluation

Multiple Large Afloat Dining
Facilities

Wardrooms

Bakery

Butcher Shop

Operational rations: B, Meal
Ready-to-Eat

Endurance levels

Freeze Dried Comp Food items

NAVFSSO Support

Desirability of heading the

Service Division or Wardroom

Feeding in chemical/biological
environment

Battlestation General Quarters
Feeding
Work Measurement

Merchandising the Menu

Stores Quality

Chow hours at sea, in port

Serving Rates

Mess Gear

Serving line

- food temperatures
- rationed vs. self
serve
- MS vs. FSA

Progressive cookery

Prepared food holding

- methods
- times

Snack Store (Gedunk)

Menu review boards

Refrigerated Stores Ship food
Support

Pest control

APPENDIX A (cont'd)

III. AREA: Foodservice Equipment

Engineering Officer Interview

IV. AREA: Human Factors

Customer Survey

MS Survey & Interview

S2 & S5

Wardroom Customer Survey

- type service preferred
- age rank
- similarity with EDF
- quality

MS Senior Management survey & interview

Onboard training

MDMAA's Interview

Percept of higher level Command
support, interest

Previous training

- Civilian
- Navy

Self perception

FSD job motivators

Management reaction to FSD

MS recognition

- shipboard
- Navy wide

Job descriptions

Weight Control

Nutrition

APPENDIX B
Customer Survey. Navy Food Service

The U.S. Army Natick Labs has been asked by the Navy to study food service aboard a number of ships and to recommend long-term changes in foodservice operations. This is your opportunity to have a say in this study. In the past we have implemented recommendations made by customers in studies for the Navy (NAS Alameda), Air Force (Travis AFB), and Army (Fort Lewis). Please take this survey seriously; we take your opinions seriously. Read every question carefully and give your honest answers. We have not asked for your name or social security number. The answers you give us on this survey are confidential.

1. What is your age? _____ years.
2. What is your grade? E-_____. What is your rate? _____.
3. How long have you served in the military? _____ years.
4. How long have you been assigned/attached to this ship? _____ years _____ months.
Is the ship currently underway? (Circle one) YES NO
Have you previously been underway on THIS ship? YES NO
5. Are you a member of: (Circle one number only)
 1. Ship's company
 2. Marine detachment
 3. Aircrew squadron (CV's only)
 4. Other
6. In which department do you work? Circle one number. (Navy personnel only).
 1. Supply
 2. Engineering
 3. Operations
 4. Combat systems
 5. Administration
 6. Communications
 7. Other. Please specify: _____
7. To how many ships (not counting this one) have you been permanently assigned/attached?
Number of other ships: _____
8. If there is more than one dining facility for your grade aboard ship, which do you usually eat at? (Please specify).

9. What are your FEELINGS ABOUT MILITARY SERVICE? Circle one number.

Dislike	Dislike	Dislike		Like	Like	Like
Very Much	Moderately	Somewhat	Neutral	Somewhat	Moderately	Very Much
1	2	3	4	5	6	7
10. Do you plan to REENLIST when your present enlistment ends? Circle one number.
 1. Definitely Yes
 2. Probably Yes
 3. Don't know
 4. Probably No
 5. Definitely No
 6. No, retiring

11. How satisfied or dissatisfied are you with the following aspects of military life? Please circle one number for each aspect.

	Very Dis- satisfied	Moderately Dissatisfied	Somewhat Dis- satisfied	Neither Satisfied nor Dis- satisfied	Somewhat Satisfied	Moder- ately Satisfied	Very Satisfied
a. Travel	1	2	3	4	5	6	7
b. Pay	1	2	3	4	5	6	7
c. Food	1	2	3	4	5	6	7
d. Job	1	2	3	4	5	6	7
e. Benefits	1	2	3	4	5	6	7
f. Berthing	1	2	3	4	5	6	7
g. Friends	1	2	3	4	5	6	7
h. Training	1	2	3	4	5	6	7
i. Discipline	1	2	3	4	5	6	7
j. Work Hours	1	2	3	4	5	6	7

12. How much better or worse is your mess on this ship compared to other ships' messes in which you have eaten?

This mess is: (Circle one number)

This is my first ship	Much Worse	Moderately Worse	Somewhat Worse	No Better or Worse	Somewhat Better	Moderately Better	Much Better
0	1	2	3	4	5	6	7

13. When this ship is IN PORT, how often do you eat each of the following meals at your mess? Circle one number for each meal. Leave this question blank if you are not assigned/attached to ship in port.

	Almost Never	Sometimes	Often	Almost Always
Breakfast	1	2	3	4
Midday Meal	1	2	3	4
Evening Meal	1	2	3	4

14. How much better or worse is your mess when the ship is IN PORT compared to when the ship is UNDERWAY?

When IN PORT, the mess is: (Circle one number)

Don't eat at mess in port	Much Worse	Moderately Worse	Somewhat Worse	No Better or Worse	Somewhat Better	Moderately Better	Much Better
0	1	2	3	4	5	6	7

15. What dinnerware do you prefer to eat from? Place the number 1 next to the dinnerware you prefer the MOST, the number 2 next to your SECOND choice, the number 3 next to your THIRD choice, and the number 4 next to your FOURTH choice.

_____ Metal tray with compartments
 _____ Plastic tray with compartments
 _____ China dishes
 _____ Paper dishes

16. How important is each of the following in determining what you choose to eat at a meal? Use the following scale:

0	1	2	3
Not Important	Somewhat Important	Moderately Important	Very Important

Circle one number for each:

a. How the food looks	0	1	2	3
b. How the food tastes	0	1	2	3
c. How good the food is for you	0	1	2	3
d. How filling the food is	0	1	2	3
e. How familiar you are with the food	0	1	2	3

17. Do you feel there should be MORE or LESS military atmosphere in your mess? Circle one number.

Much Less	Moderately Less	Somewhat Less	About the Same	Somewhat More	Moderately More	Much More
1	2	3	4	5	6	7

18. If you would like LESS military atmosphere in your mess, what would you change? Circle as many as you like.

1. Make the mess look like a civilian cafeteria
2. Remove the Master-at-Arms
3. Do not enforce a dress code
4. Install video games in the mess area
5. Other. Please specify: _____
6. Do not change it

19. Not counting when you are on a diet, do you ever leave your mess hungry? Circle one number.

Almost Never	Sometimes	Often	Almost Always
1	2	3	4

20. Are you on a diet to lose or maintain weight? Circle one. YES NO

If yes: How difficult do you find dieting while you are underway compared to when you are in port? Circle one number.

1. More difficult while underway than when in port.
2. About equally difficult in port and underway.
3. Less difficult while underway than when in port.
4. Have not dieted while underway.

21. Does your mess offer low calorie foods for people who want to diet? Circle one number.

Almost Never	Sometimes	Often	Almost Always
1	2	3	4

22. How often do you WANT seconds from the serving line? Circle one answer.

Almost Never	Sometimes	Often	Almost Always
1	2	3	4

23. How easy or difficult is it to GET seconds from the serving line? Check one answer for IN PORT and one answer for UNDERWAY.

	IN PORT	UNDERWAY
Easy	_____	_____
Some trouble	_____	_____
A lot of trouble	_____	_____
No seconds provided	_____	_____

24. For each of the following foods, rate the amount given in one serving. Circle one number for each food.

	Much Too Small	Moder- ately Too Small	Somewhat Too Small	Just Right	Somewhat Too Large	Moder- ately Too Large	Much Too Large
a. Meat	1	2	3	4	5	6	7
b. Starches (Potato, Rice, Bread, etc.)	1	2	3	4	5	6	7
c. Vegetables	1	2	3	4	5	6	7
d. Dessert	1	2	3	4	5	6	7

25. How often is the food in your mess: (Circle one number for each).

	Almost Never	Sometimes	Often	Almost Always
a. Overcooked	1	2	3	4
b. Undercooked	1	2	3	4
c. Cold	1	2	3	4
d. Tasteless or bland	1	2	3	4
e. Burned	1	2	3	4
f. Dried out	1	2	3	4
g. Greasy	1	2	3	4
h. Tough	1	2	3	4
i. Too spicy	1	2	3	4
j. Raw	1	2	3	4
k. Still frozen	1	2	3	4
l. Too salty	1	2	3	4
m. Spoiled	1	2	3	4
n. Stale	1	2	3	4

26. Describe the cooks (MS's) in the galley. For example, if you think the cooks are VERY CLEAN, circle the number 1 on the first line. On the other hand, if you think the cooks are SOMEWHAT DIRTY, circle the number 5 on that line. For VERY DIRTY, circle the number 7. If you think the cooks are neither clean nor dirty, circle the number 4 (NEUTRAL). Please rate the cooks on each of the following aspects by circling one number on each line.

	Very	Moderately	Somewhat	Neutral	Somewhat	Moderately	Very	
a. Clean	1	2	3	4	5	6	7	Dirty
b. Unpleasant	1	2	3	4	5	6	7	Pleasant
c. Well Trained	1	2	3	4	5	6	7	Poorly Trained
d. Hard Working	1	2	3	4	5	6	7	Not Hard Working
e. Poor Attitude	1	2	3	4	5	6	7	Good Attitude

27. Describe the foodservice attendants (mess cooks). Circle one number on each line.

	Very	Moderately	Somewhat	Neutral	Somewhat	Moderately	Very	
a. Clean	1	2	3	4	5	6	7	Dirty
b. Unpleasant	1	2	3	4	5	6	7	Pleasant
c. Well Trained	1	2	3	4	5	6	7	Poorly Trained
d. Hard Working	1	2	3	4	5	6	7	Not Hard Working
e. Poor Attitude	1	2	3	4	5	6	7	Good Attitude

For the next series of questions, please answer each question based on your experience while this ship is UNDERWAY. If your ship is an Aircraft Carrier, base your answers on your experience while underway with the airwing embarked. If your ship is an amphibious assault ship, base your answers on your experience while underway with the Marines embarked. If you have NEVER been underway on this ship, please skip to Question 37.

28. How would you rate your mess while underway? For each aspect circle one number.

	Very Bad	Moderately Bad	Somewhat Bad	Neither Bad Nor Good	Somewhat Good	Moderately Good	Very Good
a. The mess overall	1	2	3	4	5	6	7
b. Chance to sit with friends	1	2	3	4	5	6	7
c. Cleanliness of dining area	1	2	3	4	5	6	7
d. Hours of operation	1	2	3	4	5	6	7
e. Boredom of same facility	1	2	3	4	5	6	7
f. Quality of food	1	2	3	4	5	6	7
g. Quantity of food	1	2	3	4	5	6	7
h. Service by dining facility personnel	1	2	3	4	5	6	7
i. Variety of food	1	2	3	4	5	6	7
j. Speed of lines	1	2	3	4	5	6	7
k. Appearance of food on serving line	1	2	3	4	5	6	7

29. Describe the GENERAL CONDITION OF YOUR MESS while underway. Circle one number on each line.

	Very	Moderately	Somewhat	Neutral	Somewhat	Moderately	Very	
a. Too brightly lighted	1	2	3	4	5	6	7	Too dimly lighted
b. Attractive appearance	1	2	3	4	5	6	7	Unattractive appearance
c. Quiet	1	2	3	4	5	6	7	Noisy
d. Overcrowded	1	2	3	4	5	6	7	Uncrowded
e. Comfortable seating	1	2	3	4	5	6	7	Uncomfortable seating

30. While underway, how often is your mess: (Circle one number for each).

	Almost Never	Sometimes	Often	Almost Always
a. Too cold	1	2	3	4
b. Too warm	1	2	3	4
c. Stuffy	1	2	3	4
d. Smoky (Cigarette, cigar)	1	2	3	4
e. Full of steam	1	2	3	4
f. Full of unpleasant food odors	1	2	3	4
g. Full of fuel smells	1	2	3	4

31. While underway, how often do you find: (Circle one number for each.)

	Almost Never	Sometimes	Often	Almost Always
a. Missing silverware	1	2	3	4
b. Not enough condiments (ketchup, salt, pepper)	1	2	3	4
c. Salad bar has run out	1	2	3	4
d. Not enough trays	1	2	3	4
e. Not enough dishes	1	2	3	4
f. Napkins missing	1	2	3	4
g. No ice	1	2	3	4
h. Menu run-outs	1	2	3	4
i. No milk	1	2	3	4
j. No other cold drinks	1	2	3	4
k. No coffee	1	2	3	4
l. No other hot drinks	1	2	3	4

32. How often do you see the following problems at your mess while underway:
(Circle one number for each).

	Almost Never	Sometimes	Often	Almost Always
a. Bugs	1	2	3	4
b. Dirty dishes or glasses	1	2	3	4
c. Dirty tables	1	2	3	4
d. Dirty silverware	1	2	3	4
e. Dirty trays	1	2	3	4
f. Dirty serving counters	1	2	3	4
g. Bomb handling on mess deck (CV's only)	1	2	3	4
h. Loud people on mess deck	1	2	3	4

33. How often do you eat each of the following meals at your mess while underway.
(Circle one number for each meal.)

	Almost Never	Sometimes	Often	Almost Always
Breakfast	1	2	3	4
Midday Meal	1	2	3	4
Evening Meal	1	2	3	4
MIDRATS	1	2	3	4

34. For each of the following meals, give your opinion of the times your mess is open while underway. (Check ALL that apply for each meal).

	Fine as is	Should open earlier	Should stay open longer
Breakfast	_____	_____	_____
Midday Meal	_____	_____	_____
Evening Meal	_____	_____	_____
MIDRATS	_____	_____	_____

35. Rate your opinion of the VARIETY of food at an average meal while underway.
Do you have enough to select from at that meal or do you want more or less choice?

	Want Much Less Choice	Want Moder- ately Less Choice	Want Somewhat Less Choice	Choice Now Enough	Want Somewhat More Choice	Want Moder- ately More Choice	Want Much More Choice
a. For short order foods (burgers, sandwiches, etc.)	1	2	3	4	5	6	7
b. For meats	1	2	3	4	5	6	7
c. For starches	1	2	3	4	5	6	7
d. For vegetables	1	2	3	4	5	6	7
e. For salads	1	2	3	4	5	6	7
f. For beverages	1	2	3	4	5	6	7
g. For desserts	1	2	3	4	5	6	7

36. Rate your opinion of the VARIETY of foods offered in the menu during the course of several weeks while underway. Do your choices change enough from day to day or do you want more or less choice?

	Want Much Less Choice	Want Moder- ately Less Choice	Want Somewhat Less Choice	Choice Now Enough	Want Somewhat More Choice	Want Moder- ately More Choice	Want Much More Choice
a. For short order foods (burgers, sandwiches, etc.)	1	2	3	4	5	6	7
b. For meats	1	2	3	4	5	6	7
c. For starches	1	2	3	4	5	6	7
d. For vegetables	1	2	3	4	5	6	7
e. For salads	1	2	3	4	5	6	7
f. For beverages	1	2	3	4	5	6	7
g. For desserts	1	2	3	4	5	6	7

37. Which of the following would you like served MORE FREQUENTLY in your mess? Check all that apply.

Sandwiches (Subs) _____

Grilled sandwiches _____

Beef Burgers _____

Pizza _____

Ethnic foods
(for example, Mexican, Chinese) _____

Stews and casseroles _____

Deep fried foods
(for example, fish fillet, fried chicken) _____

Hot dogs or Chili dogs _____

38. Are the "fast foods" at your mess (such as burgers, french fries, pizza and sub sandwiches) better, worse or about the same in quality as those available at civilian restaurants? Circle one number.

1. Better than in civilian restaurants
2. About the same as in civilian restaurants
3. Worse than in civilian restaurants
4. Mess does not serve such foods

39. Is the day's menu usually posted at various locations throughout the ship or only at the dining facility itself? Circle one number.

1. Menu not posted anywhere.
2. Menu posted at dining facility only
3. Menu posted at various locations throughout the ship, including the dining facility.

40. How often does the menu correctly list what is actually being served at your dining facility on a given day? Circle one number.

1. Almost never
2. Sometimes
3. Often
4. Almost always
5. Menu not posted

41. How often are the choices offered in the serving line identified by labels (for example, "BBQ Chicken")? Circle one number.

1. Almost never
2. Sometimes
3. Often
4. Almost always

42. How often does your work schedule while underway prevent you from eating a meal at your mess? Circle one number for each meal.

	Almost Never	Sometimes	Often	Almost Always
Breakfast	1	2	3	4
Midday Meal	1	2	3	4
Evening Meal	1	2	3	4
MIDRATS	1	2	3	4

43. Please rate how IMPORTANT each of the following changes would be in improving foodservice onboard this ship. Use the following scale:

NOT IMPORTANT	SOMEWHAT IMPORTANT	MODERATELY IMPORTANT	VERY IMPORTANT
0	1	2	3

Circle one number for each.

a. Open a speed-line at your dining facility which serves high-quality fast-food items.	0	1	2	3
b. Set up strict schedules when various departments can eat in order to avoid long lines.	0	1	2	3
c. Put more tables in the dining area.	0	1	2	3
d. Stay open longer hours.	0	1	2	3
e. Have take-out items.	0	1	2	3
f. Open one or several new food outlets in other parts of the ship.	0	1	2	3
g. Limit the time at the tables so there is always a place to sit.	0	1	2	3
h. Reduce time spent in serving line by not having any self-serve items in the line.	0	1	2	3
i. Make sure the serving line does not run out of food.	0	1	2	3
j. Open a separate serving line for high-quality, LOW CALORIE, foods.	0	1	2	3
k. Have vending machines onboard with sandwiches and other single-serving meals.	0	1	2	3

44. Below is a list of Navy jobs. Please rate how RESPECTED each of the jobs is within the Navy, using the following scale.

NOT RESPECTED	SOMEWHAT RESPECTED	MODERATELY RESPECTED	VERY RESPECTED	EXTREMELY RESPECTED
0	1	2	3	4

Circle one number for each.

a. Storekeeper	0	1	2	3	4
b. Electronics Technician	0	1	2	3	4
c. Machinist Mate	0	1	2	3	4
d. Mess Management Specialist	0	1	2	3	4
e. Corpsman	0	1	2	3	4
f. Sonar Technician	0	1	2	3	4
g. Hull Technician	0	1	2	3	4
h. Quartermaster	0	1	2	3	4
i. Fire Control Technician	0	1	2	3	4
j. Signalman	0	1	2	3	4
k. Data Processing Technician	0	1	2	3	4

45. Keeping in mind the problems of being underway, what foods would you like added to the menu or served more frequently? Be specific.

MAIN DISH: (ENTREE)	_____	FRUIT:	_____
	_____		_____
	_____		_____
POTATO/ STARCH:	_____	DESSERT:	_____
	_____		_____
	_____		_____
VEGETABLE:	_____	BEVERAGES:	_____
	_____		_____
	_____		_____
OTHER:	_____		

46. What foods would you like dropped or served less frequently? Be Specific.

MAIN DISH: (ENTREE)	_____	FRUIT:	_____
	_____		_____
	_____		_____
POTATO/STARCH:	_____	DESSERT:	_____
	_____		_____
	_____		_____
VEGETABLE:	_____	BEVERAGES:	_____
	_____		_____
	_____		_____
OTHER:	_____		

47. Please comment on any problems with foodservice at your mess. What improvements can you suggest?

PLEASE FILL IN THE NAME OF YOUR SHIP: _____

Name of Ship: _____

APPENDIX C
Wardroom Survey. Navy Food Service

The US Army Natick Labs has been asked by the Navy to study food service aboard a number of ships and to recommend long-term changes in food service operations. This is your opportunity to have a say in this study. In the past we have implemented recommendations made by customers in studies for the Navy (NAS Alameda), Air Force (Travis AFB), and the Army (Fort Lewis). Please take this survey seriously; we take your opinions seriously. Please read every question carefully and give your honest answers. We have not asked for your name or social security number. The answers you give us on this survey are confidential.

1. What is your age? _____ years

2. What is your grade? _____

3. Which service do you belong to?

Check one. _____ Navy _____ Marine Corps

4. How long have you served in the military? _____ years

5. NAVY officers only: how long have you been assigned/attached to this ship?
_____ years; _____ months

6. If there is more than one dining facility for your grade aboard ship, at which dining facility do you usually eat? (please specify)

7. Using the scale below, rate how satisfied or dissatisfied you are with the following aspects of military life. Please circle one number for each aspect.

		NEITHER						
VERY DISSATISFIED	MODERATELY DISSATISFIED	SOMEWHAT DISSATISFIED	SATISFIED NOR DISSATISFIED		SOMEWHAT SATISFIED	MODERATELY SATISFIED	VERY SATISFIED	
1	2	3	4		5	6	7	
a. Travel		1	2	3	4	5	6	7
b. Pay		1	2	3	4	5	6	7
c. Food		1	2	3	4	5	6	7
d. Job		1	2	3	4	5	6	7
e. Benefits		1	2	3	4	5	6	7
f. Berthing		1	2	3	4	5	6	7
g. Friends		1	2	3	4	5	6	7
h. Training		1	2	3	4	5	6	7
i. Discipline		1	2	3	4	5	6	7
h. Work hours		1	2	3	4	5	6	7

8. Using the scale below, how would you describe your dining facility aboard this ship WHILE UNDERWAY? For each area circle one number. Do not answer this question if you have never been underway on this ship.

VERY BAD	MODERATELY BAD	SOMEWHAT BAD	NEITHER BAD NOR GOOD	SOMEWHAT GOOD	MODERATELY GOOD	VERY GOOD
1	2	3	4	5	6	7

Area or topic:

a. The facility overall	1	2	3	4	5	6	7
b. Cleanliness	1	2	3	4	5	6	7
c. Hours of operation	1	2	3	4	5	6	7
d. Monotony of same facility	1	2	3	4	5	6	7
e. Quality of food	1	2	3	4	5	6	7
f. Quantity of food	1	2	3	4	5	6	7
g. Service by dining facility personnel	1	2	3	4	5	6	7
h. Variety of food	1	2	3	4	5	6	7
i. Speed of lines or service	1	2	3	4	5	6	7

9. Below is a list of four serving styles. For each meal, write a "1" next to the serving style that you prefer THE MOST, a "2" next to the style you prefer SECOND MOST and so on, ranking the four serving styles for each meal. For example, under BREAKFAST use the numbers 1, 2, 3, 4 to rank the serving styles for that meal.

	BREAKFAST	LUNCH	DINNER
Cafeteria style - serving line where someone serves you	_____	_____	_____
Buffet style - serving line where you serve yourself	_____	_____	_____
Family style - you serve yourself from large platters at table	_____	_____	_____
Table service - waiters serve you at table	_____	_____	_____

10. Do you prefer more or less formality than exists now in your dining facility? Check one answer for each meal.

	BREAKFAST	LUNCH	DINNER
More	_____	_____	_____
Less	_____	_____	_____
Fine as is	_____	_____	_____

If you answered MORE or LESS formality, what would you change?

11. Do you have any comments on the food service at your dining facility?

NAME OF SHIP: _____

APPENDIX D
Afloat Mess Management Specialist Survey

The U.S. Army Natick Labs has been asked by the Navy to study food service aboard a number of ships and to recommend long term changes in food service operations. The worker should have a voice in the description of the current system and in this study. In the past we have implemented recommendations made by customers and workers in studies for the Navy (NAS Alameda), Air Force (Travis AFB), and Army (Fort Lewis). Please take this survey seriously; we take your opinions seriously. Please read every question carefully and give your honest answers. We have not asked for your name or social security number. The answers you give us in this survey are completely confidential.

1. What is your age? _____ years. 2. What is your grade? E-_____.
3. How long have you been assigned/attached to this ship? _____ years, _____ months.
Is the ship currently underway? (Circle one) YES NO
Have you previously been underway on THIS ship? (Circle one) YES NO
4. How long have you been in Navy Food Service? _____ years, _____ months.
5. What rate were you before the merger? (Circle one number).
 1. CS
 2. SD
 3. Neither/I don't know/I wasn't in the Navy before the merger
6. How would you describe your present job in food service? (Circle the most appropriate number).
 1. Striker
 2. Designated Striker
 3. Cook
 4. Baker
 5. Watch captain
 6. Galley supervisor
 7. Senior MS or assistant to senior MS
 8. Breakouts/Storeroom (Jack of the Bust)
 9. Other (please specify) _____
7. Where are you now working on this ship? (Circle the correct number).
 1. Enlisted galley. If there are two or more, specify which one: _____
 2. CPO mess
 3. Wardroom mess. If there are two or more, specify which one: _____
 4. Bakery
 5. Other (please specify) _____
8. To how many ships (not counting this one) have you been permanently assigned/attached as an MS, CS, or SD?

Number of other ships _____

9. Are you a member of: (Circle one number).

1. Ship's company. Which division? (Circle one) S-2 S-5
2. Marine detachment
3. Air squadron
4. Other

10. Do you plan to REENLIST in food service when your present enlistment ends? (Circle the appropriate number).

1. Definitely yes
2. Probably yes
3. Undecided
4. Probably no
5. Definitely no
6. No, retiring

11. What are your FEELINGS ABOUT MILITARY SERVICE? (Circle the appropriate number).

Dislike Very Much	Dislike Moderately	Dislike Somewhat	Neutral	Like Somewhat	Like Moderately	Like Very Much
1	2	3	4	5	6	7

12. How satisfied or dissatisfied are you with the following aspects of military life? Please circle one number for each aspect.

	Very Dis- satisfied	Moderately Dissatisfied	Somewhat Dis- satisfied	Neither Satisfied nor Dis- satisfied	Somewhat Satisfied	Moder- ately Satisfied	Very Satisfied
a. Travel	1	2	3	4	5	6	7
b. Pay	1	2	3	4	5	6	7
c. Food	1	2	3	4	5	6	7
d. Job	1	2	3	4	5	6	7
e. Benefits	1	2	3	4	5	6	7
f. Berthing	1	2	3	4	5	6	7
g. Friends	1	2	3	4	5	6	7
h. Training	1	2	3	4	5	6	7
i. Discipline	1	2	3	4	5	6	7
j. Work Hours	1	2	3	4	5	6	7

13. Circle the HIGHEST GRADE of HIGH SCHOOL that you have completed:

None 9 10 11 12(Graduated)

14. What Navy Food Service Schools have you completed? (Circle ALL that apply).

- 1. A school
- 2. B school
- 3. C school - Food Production
- 4. C school - Food Management

15. What civilian schooling did you have in food service BEFORE joining the Navy?
(Check ALL that apply).

- ☐ none
- ☐ courses in high school
- ☐ vocational or technical school
- ☐ junior college courses
- ☐ correspondence courses
- ☐ courses at food service institute
- ☐ college courses

16. Did you have any civilian job experience in food service BEFORE joining the Navy? (Circle one answer).

YES NO

If YES, was this experience working as any kind of COOK? (Circle one answer).

YES NO

17. SINCE becoming a Navy MS, have you ...
(Circle one answer for each).

- | | | |
|---|-----|----|
| 1. Taken Navy food service correspondence courses.
(<u>not</u> counting MS 3&2 or MS1&C exams)? | YES | NO |
| 2. Taken civilian food service correspondence courses? | YES | NO |
| 3. Attended food service courses at college, technical school, or food service institute? | YES | NO |
| 4. Attended food service trade shows? | YES | NO |

18. How often have you prepared B-rations (non-perishable, group level feeding) on this or any other ship? (Circle one number).

Never	Once or twice	Several times	Often
0	1	2	3

19. How often in the past 12 months have you read food service trade journals, such as "Institutions" and "Restaurant Business"? (Circle the appropriate number).

1. Never or almost never - not interested
2. Never or almost never - journals not available
3. Once or twice
4. Three to five times
5. More than five times

20. We would like you to rate the PRESENT FOOD SERVICE OPERATION onboard your ship in terms of the factors below, indicating HOW GOOD OR BAD each factor ACTUALLY IS. Please use the following scale:

Very Bad	Moderately Bad	Somewhat Bad	Neither Bad nor Good	Somewhat Good	Moderately Good	Very Good
1	2	3	4	5	6	7

Please circle one number for each factor, keeping in mind that you are rating how good or bad each factor is on your ship.

a. The food preparation skills of Navy MS's	1	2	3	4	5	6	7
b. Leadership from watch captain	1	2	3	4	5	6	7
c. Leadership from galley supervisor	1	2	3	4	5	6	7
d. Leadership from senior MS	1	2	3	4	5	6	7
e. Support and cooperation among Navy MS's	1	2	3	4	5	6	7
f. Interest and support of food service officer	1	2	3	4	5	6	7
g. Interest and support of the supply officer	1	2	3	4	5	6	7
h. Interest and support of the ~~commanding~~ officer	1	2	3	4	5	6	7
i. The On-the-Job training (OTJ) program	1	2	3	4	5	6	7
j. The job performance of the foodservice attendants	1	2	3	4	5	6	7

21. Using the same scale as above, please rate HOW GOOD OR BAD your dining facility is in terms of the factors below. Rate the facility at which you are presently working (EDF, CPO mess, or wardroom).

a. The condition (repair) of equipment and utensils	1	2	3	4	5	6	7
b. The menu	1	2	3	4	5	6	7
c. Customer satisfaction	1	2	3	4	5	6	7
d. The dining facility overall	1	2	3	4	5	6	7
e. Effectiveness of the Messdeck Master-at-Arms (EDF only)	1	2	3	4	5	6	7

22. Please rate THE PLACE WHERE YOU NOW WORK (for example, the enlisted galley) on board this ship in terms of the factors below, indicating HOW GOOD OR BAD each factor actually is.

	Very Bad	Moder- ately Bad	Somewhat Bad	Neither Bad nor Good	Somewhat Good	Moder- ately Good	Very Good
a. Cleanliness of work area	1	2	3	4	5	6	7
b. How easy to get at supplies	1	2	3	4	5	6	7
c. Size and layout of workspace	1	2	3	4	5	6	7
d. Noise	1	2	3	4	5	6	7
e. Lighting	1	2	3	4	5	6	7
f. Temperature	1	2	3	4	5	6	7
g. Ventilation	1	2	3	4	5	6	7
h. Bumping into others while working	1	2	3	4	5	6	7

In this next series of questions (23-26), we are interested in your honest feelings about your work in Navy Food Service. Please read each question carefully and circle the number that BEST describes your current feelings.

23. On most days on your job, how often does time seem to drag for you?

1. About half the day or more
2. About 1/3 of the day
3. About 1/4 of the day
4. About 1/8 of the day
5. Time never seems to drag

24. Some people are completely involved in their job - they are absorbed in it day and night. For other people, their jobs are simply one of several interests. How involved do you feel in your job?

1. Very little involved; my other interests are more absorbing
2. Slightly involved
3. Moderately involved; my job and my other interests are equally absorbing
4. Strongly involved
5. Very strongly involved; my work is the most absorbing influence to my life

25. How often do you do some extra work for your job which isn't really required of you?

5. Almost every day
4. Several times a week
3. About once a week
2. Once every few weeks
1. About once a month or less

26. Would you say you work harder, less hard, or about the same as other people doing your type of work on this ship?

5. Much harder than most others
4. A little harder than most others
3. About the same as most others.
2. A little less hard than most others
1. Much less hard than most others

27. How would you describe the mess at which you work when the ship is IN PORT?
For each category indicate your opinion of the mess by circling one number.

	Very Bad	Moderately Bad	Somewhat Bad	Neutral	Somewhat Good	Moder- ately Good	Very Good
a. General eating environment	1	2	3	4	5	6	7
b. Sanitation in dining area	1	2	3	4	5	6	7
c. Quality of food	1	2	3	4	5	6	7
d. Quantity of food	1	2	3	4	5	6	7
e. Variety of food	1	2	3	4	5	6	7

28. How would you describe the mess at which you work when the ship is UNDERWAY.
For each category indicate your opinion of the mess by circling one number
Do not answer this question if you have NEVER been underway on this ship.

	Very Bad	Moderately Bad	Somewhat Bad	Neutral	Somewhat Good	Moder- ately Good	Very Good
a. General eating envir- onment	1	2	3	4	5	6	7
b. Sanitation in dining area	1	2	3	4	5	6	7
c. Quality of food	1	2	3	4	5	6	7
d. Quantity of food	1	2	3	4	5	6	7
e. Variety of food	1	2	3	4	5	6	7

29. Please rate how SATISFIED or DISSATISFIED you are with each of the following aspects of your job. Use the following scale:

Very Dis- satisfied	Moderately Dissatisfied	Somewhat Dissatisfied	Neither Satisfied nor Dissatisfied	Somewhat Satisfied	Moderately Satisfied	Very Satisfied
1	2	3	4	5	6	7

The work you actually do aboard ship				1	2	3	4	5	6	7
The number of hours you work a day while UNDERWAY				1	2	3	4	5	6	7
The number of hours you work a day while IN PORT				1	2	3	4	5	6	7
The schedule of weekly hours while UNDERWAY				1	2	3	4	5	6	7
The schedule of weekly hours while IN PORT				1	2	3	4	5	6	7
The schedule of rotation among dining facilities aboard ship				1	2	3	4	5	6	7

30. Please rate HOW IMPORTANT each of the following changes would be in IMPROVING the operation of the mess at which you work. Circle one number for each change, using the following scale:

CHANGE NOT NEEDED	SOMEWHAT IMPORTANT	MODERATELY IMPORTANT	VERY IMPORTANT	EXTREMELY IMPORTANT
0	1	2	3	4

a. More MS's				0	1	2	3	4
b. More foodservice attendants				0	1	2	3	4
c. Better supervision by senior chief				0	1	2	3	4
d. Better supervision by watch captains				0	1	2	3	4
e. More On-the-Job training				0	1	2	3	4
f. Stricter supervision of foodservice attendants				0	1	2	3	4
g. More or better equipment				0	1	2	3	4
h. More recognition for doing a good job				0	1	2	3	4
i. More foods that are easier to prepare (such as pre-breaded chicken; frozen, fully prepared foods; boil-in-bag entrees and vegetables; dehydrated mixes).				0	1	2	3	4

Among the improvements listed above, what are the THREE MOST IMPORTANT IMPROVEMENTS? Write in one letter for each. Write in the letters of the improvements in the order of their importance, with the MOST important in the space labelled FIRST.

FIRST: _____ SECOND: _____ THIRD: _____

31. Please rate HOW EFFECTIVE you think each of the factors below is in MOTIVATING YOU to do a good job. Use the following scale:

- 4 Extremely effective motivator
- 3 Very effective motivator
- 2 Moderately effective motivator
- 1 Somewhat effective motivator
- 0 Not an effective motivator

Please write in the appropriate number next to each factor.

- _____ 1. Recognition for good performance on the job, such as: picture on the bulletin board, name mentioned in written newsletter, etc.
- _____ 2. Awards for good performance on the job, such as 3 day passes, tickets to events, cash, restaurant tickets.
- _____ 3. Written commendation from supervisor.
- _____ 4. Words of appreciation from supervisor.
- _____ 5. Verbal "well done" from C.O.
- _____ 6. Senior MS checking up on cooks to make sure they do things correctly.
- _____ 7. Feedback from customers that service is appreciated.
- _____ 8. Being included in planning and evaluating the food service operation.
- _____ 9. Senior MS conducting daily inspections of MS's.
- _____ 10. Allowing flexible work hours.
- _____ 11. Senior MS taking good suggestions from the MS's seriously.
- _____ 12. Having the dining facility be in the running for the Ney award.
- _____ 13. Short term (2, 3, or 4 weeks) OJT in a good-high quality civilian restaurant.
- _____ 14. The Navy providing time and paying for courses toward a food service degree in a college or community college program (e.g., Johnson & Wales).
- _____ 15. The chance to obtain food service certification in preparation for later civilian employment.
- _____ 16. Senior MS taking names and kicking ***.
- _____ 17. Please write in any other things you can think of that might be good motivators for you.

32. Below is a list of Navy jobs. Please rate how RESPECTED each of the jobs is within the Navy, using the following scale.

NOT RESPECTED	SOMEWHAT RESPECTED	MODERATELY RESPECTED	VERY RESPECTED	EXTREMELY RESPECTED
0	1	2	3	4

Circle one number for each.

a. Storekeeper	0	1	2	3	4
b. Electronics Technician	0	1	2	3	4
c. Machinist Mate	0	1	2	3	4
d. Mess Management Specialist	0	1	2	3	4
e. Corpsman	0	1	2	3	4
f. Sonar Technician	0	1	2	3	4
g. Hull Technician	0	1	2	3	4
h. Quartermaster	0	1	2	3	4
i. Fire Control Technician	0	1	2	3	4
j. Signaller	0	1	2	3	4
k. Data Processing Technician	0	1	2	3	4

33. How would you compare the job you have in Navy foodservice to a similar job in civilian foodservice? Do you feel you are more, less, or about equally respected as the person with the job in civilian food service?
(Circle one number).

1. More respected in Navy foodservice than civilian food service
2. About equally respected in Navy and civilian food service
3. Less respected in Navy foodservice than civilian food service

34. How would you rate the mess on this ship in comparison to other ships' messes in which you have worked? Circle one number.
The mess is:

This is my First Ship	Much Worse	Somewhat Worse	Slightly Worse	No Better or Worse	Slightly Better	Somewhat Better	Much Better
0	1	2	3	4	5	6	7

35. Which do you prefer:
(Circle one number).

1. Continue working at present dining facility
2. Being rotated to another facility aboard this ship. Please specify which one: _____.

36. After LEAVING the Navy, do you plan to continue working in the food service area? Circle the appropriate number.

1. Definitely Yes
2. Probably Yes
3. Undecided
4. Probably No
5. Definitely No

37. Please list any pieces of equipment that give you consistent trouble in your job. Briefly describe the kind of problem you experience with the equipment.

38. What new equipment would you like added to your mess? Please be specific.

39. Please list any large pieces of equipment that are permanently out of service or only rarely used.

40. What recipes or foods would you like added to the menu or served more frequently at the mess at which you work?

41. What recipes or foods would you like served less frequently or dropped? Please explain why (poor quality, served too often, difficult to make).

42. Do you have any comments concerning what you LIKE or DISLIKE about your job?

LIKE: _____

DISLIKE: _____

43. Do you have any suggestions concerning how to improve food service at your mess?

FACILITY: _____

APPENDIX E
Ashore Mess Management Specialist Survey

The U.S. Army Natick Research and Development Center has been asked by the Navy to study foodservice ashore and afloat and to recommend long term changes in foodservice operations. The worker should have a voice in the description of the current system and in this study. In the past we have implemented recommendations made by customers and workers in studies for the Navy (NAS Alameda), Air Force (Travis AFB), and Army (Fort Lewis). Please take this survey seriously; we take your opinions seriously. Please read every question carefully and give your honest answers. We have not asked for your name or social security number. The answers you give us in this survey are completely confidential.

1. Age: _____ years.
2. Grade: E-_____.
3. Sex: (check one) ☐ Male ☐ Female.
4. Married: (check one) ☐ Yes ☐ No.
5. How long have you been in Navy foodservice? _____ years, _____ months.
6. What rate were you before the merger? (Circle one number).
 1. CS
 2. SD
 3. Neither/I don't know/I wasn't in the Navy before the merger
7. How would you describe your present job in foodservice? (Circle one number).
 1. Striker
 2. Designated Striker
 3. Cook
 4. Baker
 5. Watch captain
 6. Galley supervisor
 7. Senior MS
 8. Breakouts/Storeroom (Jack of the Dust)
 9. Records Keeper
 10. Other (please specify) _____
8. Where are you now working at this EDF? (Circle one number).
 1. Galley
 2. Vegetable preparation
 3. Butcher shop
 4. Bakery
 5. Storeroom
 6. Office
 7. Other (please specify) _____

9. Where have you worked as an MS? (Circle one answer for each).

- a. Afloat YES NO
b. At a BEQ/BOQ YES NO

10. Are you: (Circle one number).

1. Assigned to EDF
2. Ship's company (TDY)
3. Air squadron (TDY)
4. Other

11. Do you plan to REENLIST in foodservice when your present enlistment ends? (Circle the appropriate number).

1. Definitely yes
2. Probably yes
3. Undecided
4. Probably no
5. Definitely no
6. No, retiring

12. What are your FEELINGS ABOUT MILITARY SERVICE? (Circle the appropriate number).

Dislike Very Much	Dislike Moderately	Dislike Somewhat	Neutral	Like Somewhat	Like Moderately	Like Very Much
1	2	3	4	5	6	7

13. How satisfied or dissatisfied are you with the following aspects of military life? Please circle one number for each aspect.

	Very Dis- satisfied	Moderately Dissatisfied	Somewhat Dis- satisfied	Neither Satisfied nor Dis- satisfied	Somewhat Satisfied	Moder- ately Satisfied	Very Satisfi
a. Travel	1	2	3	4	5	6	7
b. Pay	1	2	3	4	5	6	7
c. Food	1	2	3	4	5	6	7
d. Job	1	2	3	4	5	6	7
e. Benefits	1	2	3	4	5	6	7
f. Berthing	1	2	3	4	5	6	7
g. Friends	1	2	3	4	5	6	7
h. Training	1	2	3	4	5	6	7
i. Discipline	1	2	3	4	5	6	7
j. Work Hours	1	2	3	4	5	6	7

14. Circle the HIGHEST GRADE of HIGH SCHOOL that you have completed:

None 9 10 11 12 (Graduated)

15. What Navy foodservice schools have you completed? (Circle ALL that apply).

1. A school
2. B school
3. C school - Food Production
4. C school - Food Management

16. What civilian schooling did you have in foodservice BEFORE joining the Navy?
(Check ALL that apply).

_____ none

_____ courses in high school

_____ vocational or technical school

_____ junior college courses

_____ correspondence courses

_____ courses at food service institute

_____ college courses

17. Did you have any civilian job experience in foodservice BEFORE joining the Navy? (Circle one answer).

YES NO

If YES, was this experience working as any kind of COOK? (Circle one answer).

YES NO

18. SINCE becoming a Navy MS, have you ...
(Circle one answer for each).

- | | | |
|--|-----|----|
| 1. Taken Navy foodservice correspondence courses.
(<u>not</u> counting MS 3&2 or MS1&C exams)? | YES | NO |
| 2. Taken civilian foodservice correspondence courses? | YES | NO |
| 3. Attended foodservice courses at college, technical school, or foodservice institute? | YES | NO |
| 4. Attended foodservice trade shows? | YES | NO |

19. How often in the past 12 months have you read foodservice trade journals, such as "Institutions" and "Restaurant Business"? (Circle the appropriate number).

1. Never or almost never - not interested
2. Never or almost never - journals not available
3. Once or twice
4. Three to five times
5. More than five times

20. We would like you to rate the PRESENT FOOD SERVICE OPERATION at this EDF in terms of the aspects below, indicating HOW GOOD OR BAD each aspect ACTUALLY IS. Please use the following scale:

Very Bad	Moderately Bad	Somewhat Bad	Neither Bad nor Good	Somewhat Good	Moderately Good	Very Good
1	2	3	4	5	6	7

Please circle one number for each aspect, keeping in mind that you are rating how good or bad each aspect is at this EDF.

- | | | | | | | | |
|--|---|---|---|---|---|---|---|
| a. The food preparation skills of Navy MS's | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| b. The food preparation skills of the civilian cooks | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| c. Leadership from watch captain | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| <hr/> | | | | | | | |
| d. Leadership from senior MS | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| e. Leadership from chief petty officers other than senior MS | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| f. Support and cooperation among Navy MS's | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| <hr/> | | | | | | | |
| g. Support and cooperation between Navy and civilian cooks | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| h. Interest and support of foodservice officer | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| i. Interest and support of the supply officer | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| <hr/> | | | | | | | |
| j. Interest and support of the commanding officer | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| k. The On-the-Job training (OJT) program | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| l. The job performance of the civilian contract workers | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

21. Using the same scale as above, please rate HOW GOOD OR BAD this EDF is in terms of the factors below.

- | | | | | | | | |
|---|---|---|---|---|---|---|---|
| a. The condition(repair)of equipment and utensils | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| b. The menu | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| c. Customer satisfaction | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| d. The dining facility overall | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

22. Please rate THE PLACE WHERE YOU WORK (for example, the galley) in terms of the factors below, indicating HOW GOOD OR BAD each factor actually is.

	Very Bad	Moder- ately Bad	Somewhat Bad	Neither Bad nor Good	Somewhat Good	Moder- ately Good	Very Good
a. Cleanliness of work area	1	2	3	4	5	6	7
b. How easy to get at supplies	1	2	3	4	5	6	7
c. Size and layout of workspace	1	2	3	4	5	6	7
d. Noise	1	2	3	4	5	6	7
e. Lighting	1	2	3	4	5	6	7
f. Temperature	1	2	3	4	5	6	7
g. Ventilation	1	2	3	4	5	6	7
h. Bumping into others while working	1	2	3	4	5	6	7

In this next series of questions (23-26), we are interested in your honest feelings about your work in Navy foodservice. Please read each question carefully and circle the number that BEST describes your current feelings.

23. On most days on your job, how often does time seem to drag for you?

1. About half the day or more
2. About 1/3 of the day
3. About 1/4 of the day
4. About 1/8 of the day
5. Time never seems to drag

24. Some people are completely involved in their job - they are absorbed in it day and night. For other people, their jobs are simply one of several interests. How involved do you feel in your job?

1. Very little involved; my other interests are more absorbing
2. Slightly involved
3. Moderately involved; my job and my other interests are equally absorbing
4. Strongly involved
5. Very strongly involved; my work is the most absorbing influence to my life

25. How often do you do some extra work for your job which isn't really required of you?

5. Almost every day
4. Several times a week
3. About once a week
2. Once every few weeks
1. About once a month or less

26. Would you say you work harder, less hard, or about the same as other people doing your type of work at this EDF?

5. Much harder than most others
4. A little harder than most others
3. About the same as most others
2. A little less hard than most others
1. Much less hard than most others

27. How would you rate this EDF compared to other ashore EDF's at which you have worked? Circle one number.
This EDF is:

This is my first ashore EDF	Much Worse	Somewhat Worse	Slightly Worse	No Better or Worse	Slightly Better	Somewhat Better	Much Better
0	1	2	3	4	5	6	7

28. Please rate how SATISFIED OR DISSATISFIED you are with each of the following aspects of your job. Use the following scale:

Very Dis- satisfied	Moderately Dissatisfied	Somewhat Dissatisfied	Neither Satisfied nor Dissatisfied	Somewhat Satisfied	Moderately Satisfied	Very Satisfied				
1	2	3	4	5	6	7				
a. The work you actually do at this EDF				1	2	3	4	5	6	7
b. The number of hours you work a day				1	2	3	4	5	6	7
c. The schedule of weekly work hours				1	2	3	4	5	6	7
d. The schedule of ashore/afloat rotation				1	2	3	4	5	6	7

29. Please rate HOW IMPORTANT each of the following changes would be in IMPROVING the operation of the EDF at which you work. Circle one number for each change, using the following scale:

CHANGE NOT NEEDED	SOMEWHAT IMPORTANT	MODERATELY IMPORTANT	VERY IMPORTANT	EXTREMELY IMPORTANT
0	1	2	3	4
a. More MS's			0	1 2 3 4
b. More civilian cooks			0	1 2 3 4
c. More civilian contract workers			0	1 2 3 4
d. Better supervision by senior MS or other CPO's			0	1 2 3 4
e. Better supervision by watch captain			0	1 2 3 4
f. More On-the-Job Training			0	1 2 3 4
g. Stricter supervision of civilian contract workers			0	1 2 3 4
h. More or better equipment			0	1 2 3 4
i. More recognition for doing a good job			0	1 2 3 4
j. More foods that are easier to prepare (such as pre-breaded chicken; frozen, fully prepared foods; boil-in-bag entrees and vegetables; dehydrated mixes).			0	1 2 3 4

Among the improvements listed above, what are the THREE MOST IMPORTANT IMPROVEMENTS? Write in one letter for each. Write in the letters of the improvements in order of their importance, with the MOST important in the space labelled FIRST.

FIRST: _____ SECOND: _____ THIRD: _____

30. Who do you think should be operating the ashore EDF's? Circle one number.

1. All Navy personnel
2. All civilian personnel
3. Both Navy and civilian personnel (as it is now)

31. Please rate HOW EFFECTIVE you think each of the factors below is in MOTIVATING YOU to do a good job. Use the following scale:

- 4 Extremely effective motivator
- 3 Very effective motivator
- 2 Moderately effective motivator
- 1 Somewhat effective motivator
- 0 Not an effective motivator

Please write in the appropriate number next to each factor.

- ___ 1. Recognition for good performance on the job, such as: picture on the bulletin board, name mentioned in written newsletter, etc.
- ___ 2. Awards for good performance on the job, such as 3 day passes, tickets to events, cash, restaurant tickets.
- ___ 3. Written commendation from supervisor.
- ___ 4. Words of appreciation from supervisor.
- ___ 5. Verbal "well done" from C.O.
- ___ 6. Senior MS checking up on cooks to make sure they do things correctly.
- ___ 7. Feedback from customers that service is appreciated.
- ___ 8. Being included in planning and evaluating the foodservice operation.
- ___ 9. Senior MS conducting daily inspections of MS's.
- ___ 10. Allowing flexible work hours.
- ___ 11. Senior MS taking good suggestions from the MS's seriously.
- ___ 12. Having the dining facility be in the running for the Ney award..
- ___ 13. Short term (2, 3, or 4 weeks) OJT in a good, high quality civilian restaurant.
- ___ 14. The Navy providing time and paying for courses toward a foodservice degree in a college or community college program (e.g., Johnson & Wales).
- ___ 15. The chance to obtain foodservice certification in preparation for later civilian employment.
- ___ 16. Senior MS taking names and kicking ***.
- ___ 17. Please write in any other things you can think of that might be good motivators for you.

32. Given a choice, where would you most like to be working as an MS? (Check one).

_____ at an ashore EDF
_____ afloat
_____ at a BOQ/BEQ

33. We would like to know which years of an ideal MS career path you think should be spent working afloat, at an ashore EDF or at a BOQ/BEQ. For each two year period of a 20 year career, check ONE answer (EDF ashore, afloat, or BOQ/BEQ). Please answer in terms of the career path you think is best.

YEAR	ASHORE EDF	AFLOAT	BOQ/BEQ
0-2	_____	_____	_____
2-4	_____	_____	_____
4-6	_____	_____	_____
6-8	_____	_____	_____
8-10	_____	_____	_____
10-12	_____	_____	_____
12-14	_____	_____	_____
14-16	_____	_____	_____
16-18	_____	_____	_____
18-20	_____	_____	_____

34. Which statement best describes why you became an MS? Circle one number.

1. The MS rating was my first choice among all ratings.
2. I preferred a different rating, but the MS rating was one of several ratings open to me.
3. I preferred a different rating, but the MS rating was the only rating open to me.

35. Given a choice, which would you prefer: Circle one number.

1. Staying in the MS rating
2. Converting to another rating

36. Below is a list of Navy jobs. Please rate how RESPECTED each of the jobs is within the Navy, using the following scale.

NOT RESPECTED	SOMEWHAT RESPECTED	MODERATELY RESPECTED	VERY RESPECTED	EXTREMELY RESPECTED
0	1	2	3	4

Circle one number for each.

a. Storekeeper	0	1	2	3	4
b. Electronics Technician	0	1	2	3	4
c. Machinist Mate	0	1	2	3	4
d. Mess Management Specialist	0	1	2	3	4
e. Corpsman	0	1	2	3	4
f. Sonar Technician	0	1	2	3	4
g. Hull Technician	0	1	2	3	4
h. Quartermaster	0	1	2	3	4
i. Fire Control Technician	0	1	2	3	4
j. Signalman	0	1	2	3	4
k. Data Processing Technician	0	1	2	3	4

37. How would you compare the job you have in Navy foodservice to a similar job in civilian foodservice? Do you feel you are more, less, or about equally respected as the person with the job in civilian foodservice?

1. More respected in Navy foodservice than civilian foodservice
2. About equally respected in Navy and civilian foodservice
3. Less respected in Navy foodservice than civilian foodservice

38. After LEAVING the Navy, do you plan to continue working in the foodservice area? Circle the appropriate number.

1. Definitely Yes
2. Probably Yes
3. Undecided
4. Probably No
5. Definitely No

39. Please list any pieces of equipment that give you consistent trouble in your job. Briefly describe the kind of problem you experience with the equipment.

40. What new equipment would you like added to your dining facility? Please be specific.

41. Please list any large pieces of equipment that are permanently out of service or only rarely used.

42. What recipes or foods would you like added to the menu or served more frequently at the dining facility at which you work?

43. What recipes or foods would you like served less frequently or dropped? Please explain why (poor quality, served too often, difficult to make).

44. Do you have any comments concerning what you LIKE or DISLIKE about your job?
LIKE: _____

DISLIKE: _____

45. Do you have any suggestions concerning how to improve foodservice at your dining facility:

APPENDIX F
Mess Management Specialists in Unaccompanied Personnel Housing Survey

The U.S. Army Natick Research and Development Center has been asked by the Navy to study food service ashore and afloat. As part of this study, we are surveying MS's that are working ashore, afloat and at BOQ/BEQ's. Please take this survey seriously, we take your opinions seriously. We do not ask for your name or social security number, so your answers will be completely confidential.

1. Age: _____ years
2. Sex (check one): _____ Male _____ Female
3. Grade: E-_____
4. How long have you been an MS? _____ years _____ months
5. How long is your designated tour of duty at this BOQ/BEQ?
_____ years _____ months
6. How long have you been at this BOQ/BEQ? _____ years _____ months
7. Is this your first tour of duty at a BOQ/BEQ? (Circle one)
YES NO
8. Where have you worked as an MS? (Circle one answer for each)
 - a. Afloat YES NO
 - b. Ashore EDF YES NO
9. How would you describe your job at this BOQ/BEQ?
Job title: _____
10. What Navy food service schools have you completed? (Circle ALL that apply)
 - a. A School
 - b. B School
 - c. C School - Food Production
 - d. C School - Food Management
 - e. C School - BOQ/BEQ Management
 - f. None

11. We would like to know which years of an IDEAL MS career path you think should be spent working afloat, at an ashore EDF, or at a BOQ/BEQ. For each two year period of a 20 year career, check ONE answer (EDF ashore, afloat, or BOQ/BEQ). Please answer in terms of the career path you think is best.

YEAR	ASHORE EDF	AFLOAT	BOQ/BEQ
0-2	_____	_____	_____
2-4	_____	_____	_____
4-6	_____	_____	_____
6-8	_____	_____	_____
8-10	_____	_____	_____
10-12	_____	_____	_____
12-14	_____	_____	_____
14-16	_____	_____	_____
16-18	_____	_____	_____
18-20	_____	_____	_____

12. Please rate how much you LIKE or DISLIKE working as an MS at each of three kinds of facilities: at an EDF ashore, afloat and at a BOQ/BEQ. Please circle one number for each. If you have not worked at a facility, circle "0" for "have not worked there".

HAVE NOT WORKED THERE	DISLIKE VERY MUCH	DISLIKE MODERATELY	DISLIKE SOMEWHAT	NEITHER LIKE NOR DISLIKE	LIKE SOMEWHAT	LIKE MODERATELY	LIKE VERY MUCH	
0	1	2	3	4	5	6	7	
a. Working at an ashore EDF	0	1	2	3	4	5	6	7
b. Working afloat	0	1	2	3	4	5	6	7
c. Working at a BOQ/BEQ	0	1	2	3	4	5	6	7

13. Below are listed a number of statements. For each statement listed, we would like to know whether you agree or disagree with the statement. After each statement are five numbers: the LOWER the number the more you tend to disagree with the statement; the HIGHER the number the more you tend to agree with the statement. The five numbers can be described as follows:

1. I strongly disagree with this statement.
2. I moderately disagree with this statement.
3. I neither agree nor disagree.
4. I moderately agree with this statement.
5. I strongly agree with this statement.

Please circle the number that best describes your opinion of each statement.

	STRONGLY DISAGREE	MODERATELY DISAGREE	NEITHER AGREE NOR DISAGREE	MODERATELY AGREE	STRONGLY AGREE
a. Working at a BOQ/BEQ is good management experience	1	2	3	4	5
b. I prefer working at a BOQ/BEQ rather than in food service	1	2	3	4	5
c. MS's should not be assigned to jobs at BOQ/BEQ's	1	2	3	4	5
d. My job at the BOQ/BEQ is good preparation for a civilian job in hotel/motel management	1	2	3	4	5
e. During a tour of duty at a BOQ/BEQ, MS's forget some of their food service skills	1	2	3	4	5
f. When I leave the Navy, I plan to get a job in food service	1	2	3	4	5
g. When I leave the Navy, I plan to get a job in hotel/motel management	1	2	3	4	5

14. Do you have any comments on what you like or dislike about working at a BOQ/BEQ?

LIKE:

DISLIKE:

APPENDIX G
Job Supervision and Description of Work Survey

Think of the kind of supervision that you get on your job. How well does each of the following words describe this supervision? In the blank beside each word below put

Y if it describes the supervision you get on your job

N if it does NOT describe it

? if you cannot decide

SUPERVISION ON PRESENT JOB

 Asks my advice
 Hard to please
 Impolite
 Praises good work
 Tactful
 Influential
 Up-to-date
 Doesn't supervise enough
 Quick tempered
 Tells me where I stand
 Annoying
 Stubborn
 Knows job well
 Bad
 Intelligent
 Leaves me on my own
 Around when needed
 Lazy

Think of your present work. What is it like most of the time? In the blank beside each word given below, write

Y for "YES" if it describes your work

N for "NO" if it does NOT describe it

? if you cannot decide

WORK ON PRESENT JOB

 Fascinating
 Routine
 Satisfying
 Boring
 Good
 Creative
 Respected
 Hot
 Pleasant
 Useful
 Tiresome
 Healthful
 Challenging
 On your feet
 Frustrating
 Simple
 Endless
 Gives sense of accomplishment

PLEASE GO ON TO THE NEXT PAGE

PLEASE GO ON TO THE NEXT PAGE

Think of the pay you get now. How well does each of the following words describe your present pay? In the blank below each word, put

Y if it describes your pay
N if it does NOT describe it
? if you cannot decide

PRESENT PAY

_____ Income adequate for normal expenses
_____ Satisfactory profit sharing
_____ Barely live on income
_____ Bad
_____ Income provides luxuries
_____ Insecure
_____ Less than I deserve
_____ Highly paid
_____ Underpaid

PLEASE GO ON TO THE NEXT PAGE

Think of the majority of the people that you work with now or the people you meet in connection with your work. How well does each of the following words describe these people? In the blank beside each word below, put

Y if it describes the people you work with
N if it does NOT describe them
? if you cannot decide

PEOPLE ON YOUR PRESENT JOB

_____ Stimulating
_____ Boring
_____ Slow
_____ Ambitious
_____ Stupid
_____ Responsible
_____ Fast
_____ Intelligent
_____ Easy to make enemies
_____ Talk too much
_____ Smart
_____ Lazy
_____ Unpleasant
_____ No privacy
_____ Active
_____ Narrow interests
_____ Loyal
_____ Hard to meet

PLEASE GO ON TO THE NEXT PAGE

Think of the opportunities for promotion that you have now. How well does each of the following words describe these? In the blank beside each word put

Y for "YES" if it describes your opportunities for promotion

N for "NO" if it does NOT describe them

? if you cannot decide

OPPORTUNITIES FOR PROMOTION

_____ Good opportunities for promotion

_____ Opportunity somewhat limited

_____ Promotion on ability

_____ Dead-end job

_____ Good chance for promotion

_____ Unfair promotion policy

_____ Infrequent promotions

_____ Regular promotions

_____ Fairly good chance for promotion

APPENDIX H
Feelings about Work in Navy Food Service

Q23. On most days on your job, how often does time seem to drag for you?

Afloat	2.9	About 1/4 of the day
Ashore	3.0	About 1/4 of the day

Scale: 1=About 1/2 the day 2=About 1/3 the day 3=About 1/4 the day
4=About 1/8 the day 5=Time never drags

Q24. How involved do you feel in your job?

Afloat	3.3	Moderately involved
Ashore	3.8	Strongly involved

Scale: 1=Very little 2=Slightly 3=Moderately 4=Strongly 5=Very strongly

Q25. How often do you do extra work which isn't required of you?

Afloat	3.7	Several times a week
Ashore	3.6	Several times a week

Scale: 1=About once a month or less 2=Once every two weeks 3=About once a week 4=Several times a week 5=Almost every day

Q26. Do you work harder, less hard or about the same as others doing your type of work?

Afloat	3.7	A little harder
Ashore	3.7	A little harder

Scale: 1= Much less hard than others
2= A little less hard than others
3= About the same as others
4= A little harder than others
5= Much harder than others

APPENDIX I
Effectiveness of Job Motivators--Survey

Please rate HOW EFFECTIVE you think each of the factors below is in MOTIVATING YOU to do a good job. Use the following scale:

- 4 Extremely effective motivator
- 3 Very effective motivator
- 2 Moderately effective motivator
- 1 Somewhat effective motivator
- 0 Not an effective motivator

Please write in the appropriate number next to each factor.

FLOAT

ASHORE

- | | | |
|------|-------------|--|
| 2.61 | <u>2.85</u> | 1. Recognition for good performance on the job, such as: picture on the bulletin board, name mentioned in written newsletter, etc. |
| 2.96 | <u>2.90</u> | 2. Awards for good performance on the job, such as 3 day passes, tickets to events, cash, restaurant tickets. |
| 2.63 | <u>3.05</u> | 3. Written commendation from supervisor. |
| 2.83 | <u>3.02</u> | 4. Words of appreciation from supervisor. |
| 2.82 | <u>3.00</u> | 5. Verbal "well done" from C.O. |
| 1.77 | <u>1.97</u> | 6. Senior MS checking up on cooks to make sure they do things correctly. |
| 2.85 | <u>2.95</u> | 7. Feedback from customers that service is appreciated. |
| 2.53 | <u>2.59</u> | 8. Being included in planning and evaluating the food service operation. |
| 1.66 | <u>1.77</u> | 9. Senior MS conducting daily inspections of MS's. |
| 2.56 | <u>2.65</u> | 10. Allowing flexible work hours. |
| 3.08 | <u>3.25</u> | 11. Senior MS taking good suggestions from the MS's seriously. |
| 2.40 | <u>2.54</u> | 12. Having the dining facility be in the running for the Ney award. |
| 2.78 | <u>2.52</u> | 13. Short term (2, 3, or 4 weeks) OJI in a good-high quality civilian restaurant. |
| 3.28 | <u>3.36</u> | 14. The Navy providing time and paying for courses toward a food service degree in a college or community college program (e.g., Johnson & Wales). |
| 3.20 | <u>3.15</u> | 15. The chance to obtain food service certification in preparation for later civilian employment. |
| 1.34 | <u>1.23</u> | 16. Senior MS taking names and kicking ***. |
| | | 17. Please write in any other things you can think of that might be good motivators for you. |

APPENDIX J
"Ideal" Mess Management Specialist Career Path Survey

Respondents	Afloat EDF		Ashore EDF		BOQ/BEQ	
Year/ Period	Ashore	BOQ/BEQ	Ashore	BOQ/BEQ	Ashore	BOQ/BEQ
0 - 2	47%	36%	19%	18%	3%	16%
2 - 4	36	40	23	18	18	7
4 - 6	25	15	20	18	23	34
6 - 8	20	22	31	22	17	22
8 - 10	19	24	36	22	12	18
10 - 12	27	22	17	16	23	25
12 - 14	23	31	16	15	12	22
14 - 16	22	25	33	15	12	22
16 - 18	20	18	28	20	17	25
18 - 20	5	5	36	25	25	36

APPENDIX K
Subsistence Receipt Survey

As part of a larger project to identify future foodservice trends for the Navy, the US Army Natick Research and Development Center, sponsored by the Navy Food Service Systems Office, has initiated a logistics analysis of subsistence storage and resupply. The analysis, thus far, has focused on an evaluation of numerous technologies to reduce overall product volume. Particular emphasis has been directed towards packaging redesign, product concentration, product redesign, and possible substitutions. The effect of reducing subsistence volume would, among other things, have a favorable impact on extending mission endurance capabilities, decreasing the manhours required for subsistence receipt and handling, and reducing problems related with trash disposal. The intent of this survey is to identify current manpower requirements involving subsistence receipt and to subsequently determine the impact of reduced volume alternatives in terms of potential manpower savings.

The Subsistence Receipt Survey is divided into three parts as follows:

Part 1 - General Information

This segment asks for general information about the ship. It is to be completed on a one time basis only and returned upon receipt of the survey packet.

Part 2A - Underway Subsistence Receipt

This survey is to be completed after each underway receipt (replenishment) of subsistence.

Part 2B - Inport Subsistence Receipt

This survey is to be completed after each inport receipt of subsistence. This would also include daily milk deliveries.

It is important that Parts 2A and 2B be completed immediately following the receipts in order to obtain accurate information. Please pay particular attention to Questions #6 and #7 of Part 2A and 2B. The accuracy of this information is critical in determining overall manpower requirements.

With each 2A, 2B survey form that you complete please extend the quantities of each line item received onto a NAVSUP Form 1059 and return same with the survey form. This will enable NRDC to crossmatch known volume saving products with those you received.

We ask that you complete a survey form each and every time you receive subsistence during the data collection period. The data collection should begin with the first subsistence receipt after this package is received and continue through 1 June 1985.

It is suggested that this letter be retained for future reference. If you have any questions, or need more survey forms please contact (message, phone, or in writing) Paul Short or Colleen Cathcart at autovon 256-5063, 4387.

Thank you for your participation.

SUBSISTENCE RECEIPT SURVEY

Part 1-General Information

Please complete and return this survey upon receipt of the survey packet. This section covers general information about the ship and is to be completed this one time only. Your participation in this data collection effort is appreciated.

1. Name and hull number of ship _____
2. Name of Food Service Officer aboard this ship _____
3. Please fill in the following:
 - a. Total ships complement _____
 - b. Number of Ship's Officers _____
 - c. Number of Ship's Enlisted Personnel _____
 - d. Number of Marines permanently assigned to this ship _____
 - e. Total number of Airwing Personnel (if applicable) _____
 - f. Number of embarked Marines, for example on Amphibs _____
4. Where is your homeport? _____
What date did you depart homeport? _____
Month Day Year
5. General description of subsistence receipt operations aboard this ship:
In the handling of stores do you use...(circle one answer for each)
 - a. Vertical conveyors? YES NO
 - b. Elevators? YES NO
 - c. Fork lifts? YES NO
 - d. Portable roller conveyors? YES NO
 - e. Ladder slides? YES NO
 - f. Other? _____

6. Please list all subsistence storerooms, type, and location.

<u>Type</u> <u>(Dry, Chill, Frozen)</u>	<u>Space</u> <u>Number</u>	<u>Forward, Aft</u> <u>or Midship</u>
--	-------------------------------	--

7. When topped off, what are your approximate endurance levels based on the current cycle menu. (in number of days)

Dry _____ Chill _____ Frozen _____

8. What is the general location (forward, aft, midship) and space number of the EDF:

Galley(s) _____

Mess Deck(s) _____

9. Please answer the following in reference to the movement of stores aboard this ship. (Give space numbers and/or general location)

a. Where/how does the ship take on stores inport?

b. Where are the con rep stations?

c. Where are the vert rep stations?

- d. How and at what locations are stores brought below decks to the storerooms?
Please give general description, equipment used, etc.

- e. Within the S-2 Division, is there a designated group of personnel
assigned full-time to breakout?

(Circle one)

YES

NO

If YES, how many? _____

- f. Please provide any additional descriptions/information that you feel would be
helpful in understanding the transfer of stores (from receipt to issue)
aboard your ship. Use diagrams if desired. (Use back of page if
needed)

Signed _____
FOOD SERVICE OFFICER

RETURN ADDRESS

Commander
US Army Natick R&D Center
ATTN: STRNC-OA (Colleen Cathcart)
Natick, MA 01760-5015

SUBSISTENCE RECEIPT SURVEY

Part 2A - Underway Receipt

In order to assure accurate information, please complete and return this survey as soon as possible following each UNDERWAY receipt. In addition to the survey, please enclose NAVSUP FORM 1059 documenting receipts. Your participation in this data collection effort is appreciated.

1. Name and hull number of ship _____
2. Date of this underway receipt of subsistence _____
3. Is this the first receipt of subsistence since you deployed, either inport or at sea? Circle one answer. YES NO
 - a. If YES, skip to Question #5.
If No, when was the last receipt? (excluding receipt of commercially produced bread and pastries) _____
Month Day Year
 - b. Was the last receipt of subsistence? (Circle one) AT SEA INPORT
 - c. Since then, how many days were spent at sea? _____
Please give approximate geographic location, e.g., Indian Ocean, Caribbean, North Atlantic _____
 - d. Since the last receipt of subsistence, how many days were spent inport?

<u>Name/Location</u>	<u>Number of Days</u>	<u>Was There an NSC/NSD?</u>
4. From what ship was this subsistence just received? Please give name of ship and hull number. _____
5. How many men were required for the stores handling working party?
 - a. Total number _____
 - b. Number of Navy _____/Number of Marines _____
 - c. Number E4's and above (excluding MS's): Supervising _____, Handling Stores _____
 - d. Number of MS's involved/supervising _____

6. What time was the stores handling working party called away? _____
What time was the stores handling working party secured? _____

7. Please fill in the following:

- a. Total number of pallets received _____
1.) Number of pallets transferred by con rep _____
2.) Number of pallets transferred by vert rep _____
b. Total gross tons of subsistence received _____

8. Please fill in the following concerning equipment used in the stores handling.

<u>Elevators</u>	<u>Vertical Conveyors</u>	<u>Roller Conveyors</u>	<u>Ladder Slides</u>	<u>Other</u>
------------------	-------------------------------	-----------------------------	--------------------------	--------------

a. How many onboard?

b. How many used for
this receipt of
stores?

c. If not used,
briefly state why,
e.g., "not needed,"
"equipment down".

9. Please give any additional descriptions/information that you feel would be helpful
in understanding the transfer of stores (from receipt to issue) on your
ship. Include any special or unique situations concerning this receipt
of stores. Use diagrams if desired. (Use back of page if needed)

PLEASE ENCLOSE NAVSUP FORM 1059 DOCUMENTING RECEIPTS

Signed _____
FOOD SERVICE OFFICER

RETURN ADDRESS

Commander
US Army Natick R&D Center
ATTN: STRNC-OA (Colleen Cathcart)
Natick, MA 01760-5015

SUBSISTENCE RECEIPT SURVEY

Part 2B - Inport Receipt

In order to assure accurate information, please complete and return this survey as soon as possible following each INPORT receipt. In addition to the survey, please enclose NAVSUP FORM 1059 documenting receipts. Your participation in this data collection effort is appreciated.

1. Name and hull number of ship _____
2. Date of this inport receipt of subsistence _____
3. Is this the first receipt of subsistence since you deployed, either inport or at sea? Circle one answer. YES NO
 - a. If YES, skip to Question #5.
If No, when was the last receipt? (excluding receipt of commercially produced bread and pastries) _____
Month Day Year
 - b. Was the last receipt of subsistence? (Circle one). AT SEA INPORT
 - c. Since then, how many days were spent at sea? _____
Please give approximate geographic location, e.g., Indian Ocean, Caribbean, North Atlantic _____
 - d. Since the last receipt of subsistence, how many days were spent inport?

<u>Name/Location</u>	<u>Number of Days</u>	<u>Was There an NSC/NSD?</u>
----------------------	-----------------------	------------------------------
4. From what shore activity did you just receive this subsistence?
Location _____, Type (NSC, NSD) _____
5. How many men were required for the stores handling working party?
 - a. Total number _____
 - b. Number of Navy _____/Number of Marines _____
 - c. Number E4's and above (excluding MS's): Supervising _____ Handling Stores _____
 - d. Number of MS's involved/supervising _____

6. What time was the stores handling working party called away? _____
What time was the stores handling working party secured? _____

7. Please fill in the following:

- a. Total number of pallets received _____
- b. Total gross tons of subsistence received _____

8. Briefly describe how stores were brought onboard from pier (pier assistance, equipment if any, etc.).

9. Please fill in the following concerning movement of stores onboard.

- | | <u>Elevators</u> | <u>Vertical
Conveyors</u> | <u>Roller
Conveyors</u> | <u>Ladder
Slides</u> | <u>Other</u> |
|---|------------------|-------------------------------|-----------------------------|--------------------------|--------------|
| a. How many onboard? | | | | | |
| b. How many used for
this receipt of
stores? | | | | | |
| c. If not used,
briefly state why,
e.g., "not needed,"
"equipment down". | | | | | |

10. Please give any additional descriptions/information that you feel would be helpful in understanding the transfer of stores (from receipt to issue) on your ship. Include any special or unique situations concerning this receipt of stores. Use diagrams if desired. (Use back of page if needed)

PLEASE ENCLOSE NAVSUP FORM 1059 DOCUMENTING RECEIPTS

Signed _____
FOOD SERVICE OFFICER

RETURN ADDRESS

Commander
US Army Natick R&D Center
ATTN: STRNC-OA (Colleen Cathcart)
Natick, MA 01760-5015

APPENDIX L
Volume Reduction Technologies Description

Brick-Style Aseptics:

Aseptic processing/packaging is a method of food preservation by which a commercially sterile (shelf stable) food product is filled and sealed in pre-sterilized containers under sterile conditions. The product does not require refrigeration. Commonly used for juice and milk products its use is expanding to include applesauce, puddings, tomato products and more recently particulates (stews, chilis, pasta products). Tetra Pak (Brik Pak) is one of the leading aseptic packaging containers available. Used predominantly for beverages its rectangular shape maximizes use of space since the contents occupy almost 100% of the available space. Volume reduction of approximately 20% can be achieved for most products when converted from a # 10 can to a Tetra Pak container. An even greater volume savings can be realized when converting from a smaller can (e.g. #2 1/2 or #303).

Aseptic systems offer extended shelf life, increased product quality, ease of handling/no breakage, and act as lightweight alternatives to steel cans and glass containers which saves on transportation costs. Although available in a variety of shapes, rectangular containers (such as Tetra Pak) also save space and related costs since they can be stacked to form a solid block of product.

Concentration:

To concentrate is to eliminate watery fluids of a product thereby reducing bulk. In freeze concentration, used for fruit juice and milk, fluids are removed through ice crystallization. Juices are typically concentrated in a 3:1 ratio which translates into a volume savings of 60%.

In preconcentration pressure is used to drive food material through a semipermeable membrane (reverse osmosis) allowing for the removal of water from the solid matter. Up to 50% of water can be removed. Applications include milk powders, egg products, maple syrup and sugar beet conversion.

Preconcentration can also be used as a volume reduction method with results similar to compression. Ingredients for a product such as beef stew are preconcentrated prior to freeze drying increasing the products density. Since results can be achieved which are within 10 percent of those attained for compression this additional step can often be eliminated.

Dehydrate:

Dehydration achieves both a reduction in weight and an increase in shelf stability through the removal of moisture from a food. There are numerous drying techniques and application varies among them. Selection of a drying method for a particular product depends on product content (high/low sugar, fat, etc.), batch size, and the resources available (time, space, money). Once a suitable drying technique is selected almost any food product can be dried including most fruits, vegetables, dairy products, meats, spices and snackfoods. Weight reduction varies depending

on the initial moisture content of the food. Temendous savings (over 90%) can be made with high moisture foods such as fruits and vegetables. Shelf stability is a factor of the final moisture content and the packaging system used. The main savings of dehydration is in weight reduction however some volume reduction is realized through product shrinkage. For further volume reduction of dehydrated foods see concentration and compression.

Compression:

Compression is used to reduce the bulk of a product (consequently increasing the product's density). Volume reduction can be achieved as much as 90% when combined with an appropriate drying technique. Additionally the product can be compressed to achieve a certain shape that will facilitate volume savings (see shape to square).

Shape to Square:

Volume savings can be realized in some cases by simply changing the shape of the product. Two examples include frankfurters and pizza. By squaring off the ends of frankfurters, a 10% volume savings can be achieved and converting from 12" round pizza crusts to 12" x 12" square can save 27%. Typically volume savings between 10 and 20% are achieved through shape to square reconfiguration.

Institutional Pouch:

The Institutional Pouch is a large trilaminate pouch capable of holding approximately 100 ounces of shelf-stable processed foods. It provides a number of advantages over the #10 can including: faster heat penetration (shorter process time/shorter reheat time), ease of disposal, ease of opening, lighter weight, storage space saver, and does not rust or dent. Typically a 13% volume savings can be made for the filled product and 90% savings for unfilled when comparing to the #10 can.

Bag-In-Box:

The bag-in-box is a sealed, spouted plastic bag (for retention) in a rigid outer container (for strength). It can be used as a container for liquids, semiliquids, granular solids, and powdered products. Capacity ranges from consumer size (1-6 gallons) to transportation packs (55-300 gallons). As an alternative to the #10 can the bag-in-box offers many advantages including reduced weight and volume (with a subsequent reduction in shipping costs and storage space requirements), stackability, ease of empty container handling and disposal (can be transported and stored flat prior to filling) and it is reclosable. Typically a 30% volume savings can be made for dry food products (e.g. powdered mixes) when packaging is converted from the #10 can to a bag-in-box container.

Precook:

Volume savings are achieved when products are precooked through the densification which occurs as water and fat cook out of the product. (See Concentration)

Restructuring:

Meats are typically restructured to eliminate waste (bones, excess fat) and to be formed into space-efficient units for maximum packaging efficiency. Precooked, restructured roasts typically provide a 30% volume savings.

Flaked/Formed:

This technology, a method of restructuring, is used by the meat industry to produce a waste-free product that can be formed into a space-efficient shape to maximize packaging efficiency. Meats are flaked rather than ground, which helps to assimilate the texture of its whole muscle counterpart. Bones and excess fat are removed providing for an end product which is 100% consumptionable.

PET Containers:

PET (Polyethylene terephthalate) is a transparent container material that can be used as a replacement for glass. This material is tough, lightweight, shatter resistant, provides an oxygen and moisture barrier and imparts no off flavors or odors to the food product. It can also be formed into various shapes. PET is used in the manufacture of the plastic bottles used predominantly by the carbonated beverage industry, other applications include condiments and syrups. By converting salad dressing from a #2 1/2 can to a larger, square PET container a savings of approximately 30% could be made.

Compaction:

Volume savings can be obtained when products which would normally settle are presifted/aerated then filled to capacity and sealed. For example a volume savings of about 17% can be made for flour by presifting.

Bulk Packaging:

Packaging in bulk allows for the elimination of a number of intermediary containers and the individual headspace inherent to each which provides significant volume savings. For example when converting from individual serving size to multi-serving size boxes of cereals a 44% volume savings can be made.

APPENDIX M
Subsistence Volume Reduction Program Data Sheet

1. Item Code and Name:
2. Item Cube (use reference number):
3. Item NSN (see Form 1059) and Package Unit (i.e., #10 can, 5 lb bag):
4. Go to Federal Supply Catalog Group 89, Part II, Case Lot Data:
 - a. Number Units/Case
 - b. Case Gross Weight
 - c. Case Net Weight
 - d. Case Cube
 - e. Case Total ($2 \div 4d$)
 - f. Net Weight Product ($4e \times 4c$)
5. Proposal for Subsistence Volume Reduction:
 - a. Product Densification
 - b. Product Substitution
 - c. Product Reconfiguration
 - d. Packaging Reconfiguration
 - e. Other
 - f. No Improvement Possible
6. Briefly describe method or approach to reduce volume:
7. Impact on volume reduction; i.e., number of cubic feet saved:
conventional cube (MLSF List) - new cube:

APPENDIX M Cont'd

8. Technical Availability

- a. Immediate
- b. ≤ 1 year
- c. ≤ 5 years
- d. ≤ 10 years
- e. ≥ 10 years

9. Cost Effectiveness of Modification:

- a. High: 10% cost increase
- b. Mod High: 11-50% cost increase
- c. Mod Low: 51-90% cost increase
- d. Low: 91-100% cost increase

10. Probability of Success:

- a. High
- b. Medium
- c. Low

APPENDIX N
Customer Service Enhancement Recommendations

1. Make mess decks INTERESTING through,
 - a. signage
 - b. variable/stimulating paths through and to compartments
 - c. insulation/separation of personnel by masking technology/equipment
 - d. have both passive/active energy levels in decor
 - e. connectivity of arrival sequence with food service style
 - f. choice in menu
 - g. food display for impulse selection
 - h. food info: nutrition, caloric content, etc.
2. Promote patron SATISFACTION through,
 - a. minimize resistance to making choices
 - b. control by patrons as a group
 - c. control over individual size portions
 - d. speed of receiving total meal and finding seating
 - e. match expectations by involving patrons
 - f. the crew as a community (as family, belonging, cultural links)
 - g. fun (activities & images)
 - h. joyful impulse (high energy)
 - i. variety (release vs. relaxation)
 - j. modifiability
 - k. entertainment (auditory...visual)
 - l. surprise (food item, themes, environmental images)
 - m. interaction (participation) (two person)
 - n. dynamic environment (flexibility), (immediate)
3. Make an INVITING image identification for the mess decks.
 - a. entry/exit path clearly defined
 - b. presentation of meal menu graphically
 - c. service (timely participation by messmen)
 - d. textures and lighting soft, mottled, warm, and muted
 - e. stimulation through bold accents against neutral background
 - f. modifiability (choice/variation)
 - g. obvious identification (trigger synapse -- WOW)
 - h. adequate capacity (conceal density)
 - i. variety of seasonal images, world travel images, navy images, hometown images, or candid shots of crew on leave
 - j. location indicator of where the ship is and where it is going
 - k. clean tables, seating, equipment and overall area
 - l. responsibility and pride indicators for the messmen
4. PERSONALIZATION potential
 - a. patron selection, opportunity for patron input
 - b. immediate "responsiveness"
 - c. graffiti bulkheads
 - d. patron art or graphic illustration displays (competitions)
 - e. recognize/memorialize/award special events and persons

- f. "messmen" personalization
- g. enclosing through the use of territories, i.e. panels/curtains/shades/louvers
- h. self generating meals or snacks
- i. birthday parties for a week or month at a time
- j. "mood lighting", user adjustable
- k. awareness of your "contribution" through a graphic depiction of elements contributing to the total team; i.e. interdependence and connectivity
- l. interdependence of individual and the institution; i.e. pride of belonging
- m. demonstration/display of crew as a team, images/slogans/identifiers
- n. functional ship type as part of a total fleet
- o. "hosting" of evening social events, meetings/mixers/etc.
- p. reinforcement of "team" through colors and insignia

5. Optimize COMFORT conditions through:

- a. freshness of air quality (movement-odors)
- b. coziness (space/furnishings)
- c. comfortable, cushiony/flexible coverings that are maintainable
- d. small, controllable seating (booths)
- e. coordinated/comfortable color/decor
- f. round tables more comfortable than square
- g. variable textures/cloth
- h. repairable/regenerative materials
- i. lighting to enhance moods, themes, times of day
- j. accommodate daylighting color requirements
- k. auditory comfort, isolate unpleasant noises
- l. proportioned spaces
- m. screened movement (entrance/exit)
- n. proper decor for eating process, i.e. fast service--fast eating atmosphere slow serve--relaxed eating atmosphere each has appropriate furnishings/lighting and other characteristics
- o. familiar images, familiar materials, familiar textures --wood grains, cloths, fabrics, non-metal institutional
- p. scaled appropriately to the environment (decor/graphics)
- q. patron design/modification or chair/table locations
- r. family dining concept, i.e. non-institutional dishware, trays, service

APPENDIX O

Customer Service System Design/Decor Recommendations

There are four operational groupings of improvements, with existing conditions followed by recommendations

1. Customer Waiting
2. Customer Service (including chow line)
3. Customer Seating/Dining (including individual and group options)
4. Customer Exiting (including scullery).

1. Customer Waiting

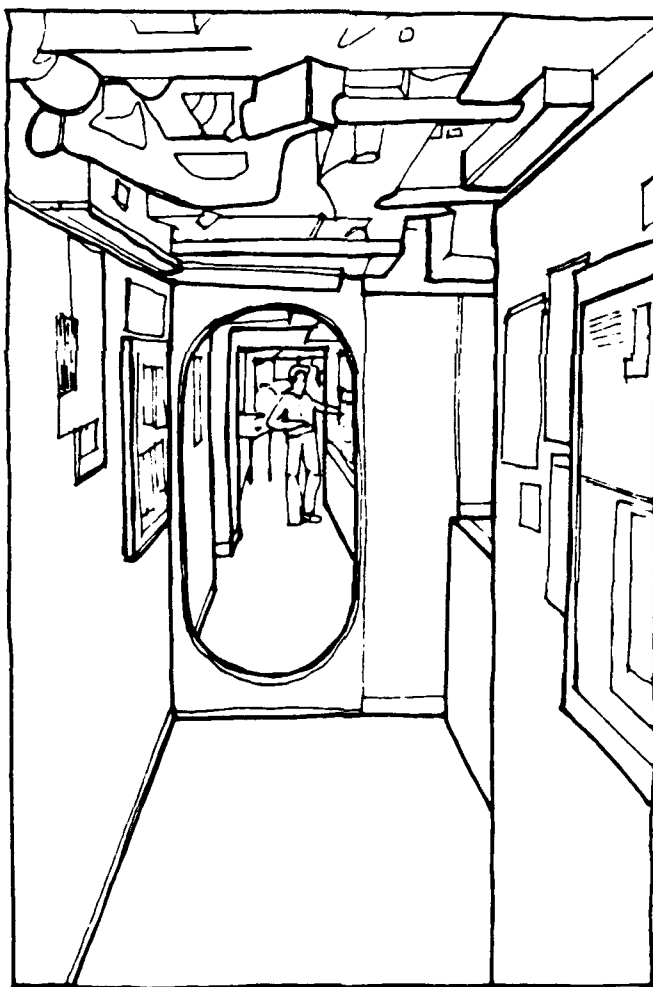


Figure O-1.
Existing Condition, Customer Waiting.

The existing condition is a typical situation found in many passageways aboard ship. Exposed mechanical equipment is located overhead and the bulkheads are filled with a variety of boards, notices and other miscellaneous items.

The waiting area, if properly handled, can be a positive part of the entire experience. It should not be viewed as just a passageway from here to there, but as a place where the dining customers begin the transition from the mechanical portions of the "on duty world" to the social process of relaxed dining.

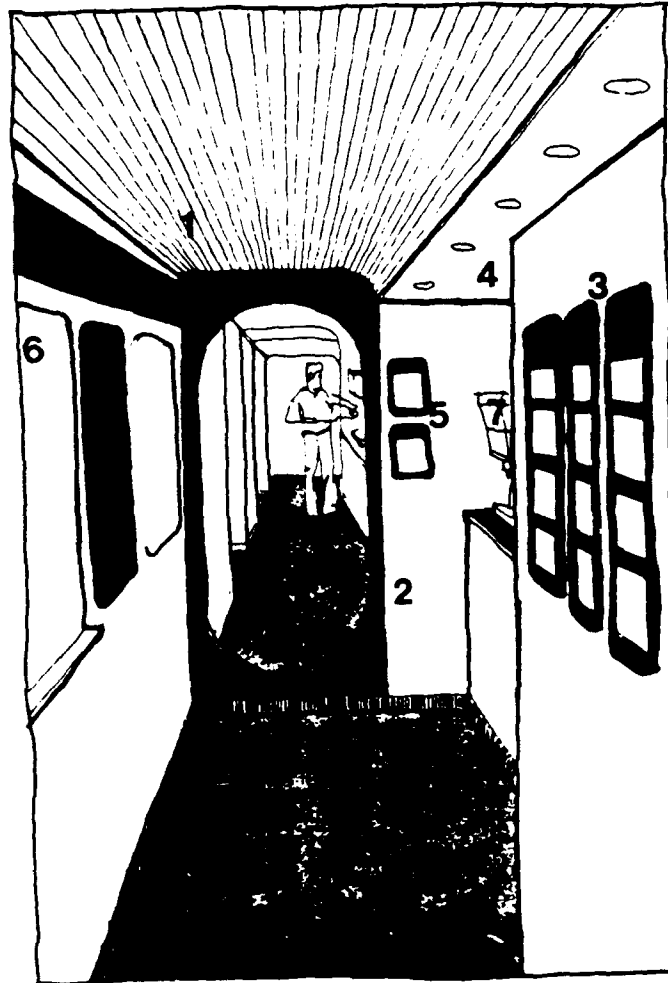


Figure 0-2
Improved Condition, Customer Waiting.

The improved condition illustrates a number of options that could be implemented to help achieve the area's goals.

1. The covering of the exposed mechanical systems to change the character of the space in keeping with the effort to provide transition from on duty to the off duty space.
2. The use of different colors and treatments on the bulkheads to also promote the feeling that this area is different than elsewhere on the ship.
3. The use of an attractive menu display. (The idea here is to present a series of boards which display entrees, side dishes, etc. On each of the boards would be 3-5 "windows" which would hold a backlit slide

or picture of the items being featured during the current meal. Slides would present an attractive view of each dish as well as nutrition information.)

4. The change in the character of the lighting system used in the areas. Shown here is a series of recessed can lights over the menu boards with wall wash valance systems on the other side. The use of different lighting systems will also reinforce the feeling of moving into a special area with a different purpose than the rest of the ship.

5. The presentation of the foodservice crew for the meal. Special frames area affixed to the bulkhead in which to place pictures of the MSs for the meal. These could be changed at the same time as the menu items.

6. The use of several display boards for personalization, information, etc. such as:

A graffiti board on which customers could write, draw, or doodle while standing in line.

A "cruise history" board. This board would graphically show where the ship has been and where it was headed. In addition, it could list the next port of call and give information about where to go, what to do, and the like.

Finally, an informal unofficial bulletin board, for messages, display of informal pictures, etc. would be appropriate for this area.

7. Another feature which has been incorporated into the area is the addition of a noncarbonated beverage dispenser for the customers waiting in line.

The queuing area is typically the first space which the customer encounters in the dining experience. Because of the position of this space in the sequence, the opportunity exists, if the area is modified appropriately, to help "set the stage" for a positive overall dining experience.

2. Customer Service (including chow line)



Figure 0-3
Existing Condition, Customer Service

The existing condition is a typical situation found in many passageways aboard ship. Exposed mechanical equipment is located both overhead and adjacent to the bulkheads. The presence of all of the piping, and equipment tend to distract attention from the meal items.

The customer service area is also a very important part of the total dining experience. Because the food is first viewed in this area, the presentation of the food as well as the physical surroundings is extremely important. Lighting, ventilation, odors, colors, and sounds should all be carefully considered when planning improvements to this area as they can all contribute to the customers perception of the meal.



Figure 0-4
Improved Condition, Customer Service

The improved condition illustrates a number of options which could be implemented to help achieve the aforementioned overall goals of serving area.

1. The covering of the exposed mechanical systems overhead can help to change the character of the space in keeping with the effort to continue the transition from the on duty to the off duty space.
2. The use of different colors and treatments on the bulkheads to also promote the feeling that this area is different than elsewhere on the ship.
3. The use of an opaque ribbon of colored panel to provide a visual separation between the service and preparation area. Shown here is a four panel version in which the upper panel folds down in front of the middle section, the bottom section folds out to form the tray rail. Accommodation is also made for the display of menu identification and nutrition information.

4. The change in character of the lighting system used in the areas. Shown here is a series of recessed can lights over the food display and serving areas with a wall wash valance system on the other side. Proper lighting will enhance the appearance of food items. Incandescent lighting is suggested over the display and serving areas. The use of different lighting systems will also reinforce the feeling of moving into a special area with a different purpose than the rest of the ship.

3. Customer Dining

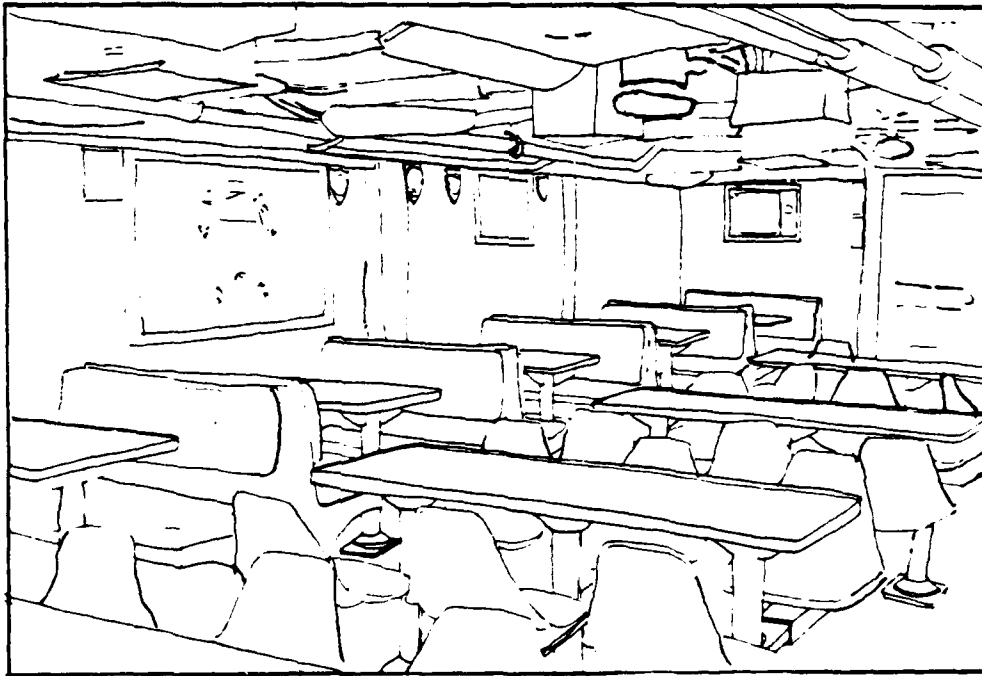


Figure 0-5
Existing Condition, Customer Dining

The existing condition is a typical dining area. The seating accommodations are essentially of similar types with both the fixed tables and booths. Mechanical systems are exposed. Graphics are hung randomly about the bulkhead.

The improved condition illustrates a series of options which reinforce the overall goals of the dining area.



Figure 0-6
Improved Condition, Customer Dining

Some of the options presented include:

1. Concealing the mechanical systems through use of a suspended ceiling overhead;
2. The creation of a different spatial character over the booths by lowering the overhead;
3. The use of 4-6 person round tables, which promote choice and flexibility, instead of fixed units;
4. The use of small wall mounted customer controlled lighting fixtures in the booths;
5. The introduction of a graphics system in which the individual pictures can be periodically changed to create different moods or points of interest within the space;

Perhaps the most important portion of the dining process involves the act of eating the meal. The overall goals for this area should include the presentation of an attractive/inviting image, different from other areas on the ship, an image which is identified with and supports the social experience of dining.

4. Customer Exiting

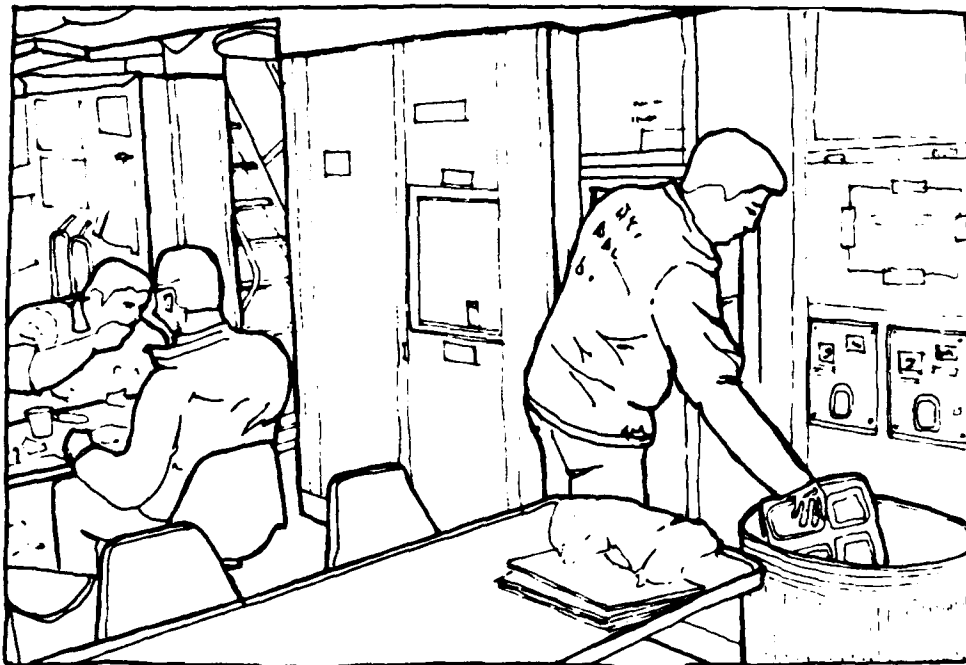


Figure 0-7
Existing Condition, Customer Exiting

The existing situation presented here shows the location of waste cans and the pass thru directly adjacent to the dining areas. This places objectional activities next to one and other and should, if possible, be avoided. In addition, the wall treatment is broken into a number of vertical strips adding to the visual clutter.

The main purpose of the exiting/scullery portion of the process is to efficiently dispose of any waste items and collect all reusable trays and utensils. Efficiency is the important factor to be stressed in this area. A pleasurable dining experience can be negatively impacted by a long wait or unattractive area through which to exit.



Figure 0-8
Improved Condition, Customer Exiting

The Improved condition illustrates some options for eliminating some of the previously mentioned objectionable situations, satisfies the overall goals for the area, and serves to enhance the overall experience.

1. The scullery pass thru has been recessed. This helps, when possible, to get the activity of passing trays and utensils off the main circulation passageways. It also allows a place for the positioning of trash cans away from the passageways.

2. A screen has been placed (shown partially cut away in this view) between the dining and scullery areas. The use of the screen helps to visually separate the two areas making the dining area a much more comfortable space in which to eat.

3. The trash cans have been placed inside the enclosure. The enclosure presents a more attractive image and is open to the scullery to allow workers to easily remove cans and replace them with empties as necessary.

4. Graphics clearly mark the exit.

5. The use of a suspended ceiling system to conceal overhead mechanical systems and to remain consistent with the image of the space.

Viewing these sketches in color conveys a more meaningful appreciation for each change. The only set of colored photos of these sketches was presented to NAVFSSO by LT Dennis Grey as soon as they became available in 1987.

A summary list of typical recommendations for the four operational groupings follows.

1. Customer Waiting

Improved Menu presentation/information
Designated transition from work area to social area
The introduction of personalization/self-expression

2. Customer Service (including chow line)

Improved lighting and food presentation
Screening of mechanical systems
Continued transition from work to social areas
Perceived separation of serving and preparation areas

3. Customer Seating/Dining (including individual and group options)

Choice of dining locations, types and degrees of privacy
Clear circulation through the space
Dispersed locations for the beverage refill dispensers
Screening of different activity types
Use of changeable graphics to modify the character of the space
Screening of mechanical systems

4. Customer Exiting (including scullery)

Separation of the exiting activities from the dining area
Recessed pass window area to allow more efficient circulation
Trash cans placed in more aesthetically pleasing enclosures
Clear indication of circulation path