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TECHNICAL REPORT

75-75-OR/SA

**AN ANALYSIS OF ATTENDANCE
PATTERNS IN THE EXPERIMENTAL FOOD
SERVICE SYSTEM AT TRAVIS AFB**

by

John R. Wetmiller

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December 1974

**UNITED STATES ARMY
NATICK LABORATORIES
Natick, Massachusetts 01760**



**Operations Research and Systems
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REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER Technical Report 75-75-OR/SA	2. GOVT ACCESSION NO.	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) An Analysis of Attendance Patterns in the Experimental Food Service System at Travis AFB		5. TYPE OF REPORT & PERIOD COVERED
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) John R. Wetmiller		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS Operations Research & Systems Analysis Office US Army Natick Laboratories, Natick, MA		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS 6.2 IT762724AH99A
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE December 1974
		13. NUMBER OF PAGES 45
14. MONITORING AGENCY NAME & ADDRESS (If different from Controlling Office)		15. SECURITY CLASS. (of this report) UNCLASSIFIED
		15a. DECLASSIFICATION/DOWNGRADING SCHEDULE
16. DISTRIBUTION STATEMENT (of this Report) Approved for public release; distribution unlimited.		
17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)		
18. SUPPLEMENTARY NOTES Service Requirement Identification Number: AF 3-19, Food Service Systems Analysis		
19. KEY WORDS (Continue on reverse side if necessary and identify by block number)		
Analysis	Food Service System	Air Force Performance
Design	Consumer Requirements	Engineering Data
Food Service System	Evaluation	Food Research Computer Programs
Military Feeding	Nutrition	Development Rations
Menu	Military Facilities	Tests
20. ABSTRACT (Continue on reverse side if necessary and identify by block number)		
The Air Force Food Service System Study was undertaken to develop wide-ranging improvements in current Air Force food service operations. Of particular concern was the need to increase consumer attendance and utilization of the dining facilities. A number of changes were implemented during the experiment including menu modifications, dining hall renovations, and the introduction of three new food service operations - a modular fast food unit, a flight line facility, and an ethnic, specialty meal service provided by one		

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of the renovated dining halls. These changes resulted in an overall 23.3% increase in participation of Air Force enlisted personnel at Travis Air Force Base.

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ACKNOWLEDGEMENTS

This study was accomplished with the valued assistance and diligent efforts of several members of the Operations Research and Systems Analysis Office of the U.S. Army Natick Laboratories. In particular, Mr. Mark M. Davis, Mr. Harry J. Kirejczyk, Dr. D. Paul Leitch, and Mr. Theodore T. Mattus, Jr. participated in the difficult and time consuming task of collecting and reducing the actual data. Additionally, Dr. Robert J. Byrne provided considerable guidance in determining the make-up and structure of the report's final form.

1. Introduction

During FY 1973-74, the U.S. Army Natick Laboratories conducted an investigation of Air Force food service under Task 03, Project No. 1J662713AJ45, Analysis and Design of Military Feeding Systems, of the DOD Food Research, Development, Testing and Engineering Program. The Service Requirement Identification Number is AF 3-19, Food Service Systems Analysis. The purpose of this effort was to define, develop and evaluate broad improvements to the current Air Force food service operations. In particular, the objectives were to obtain higher levels of consumer participation; i.e., attendance and utilization of the dining facilities, and to increase system performance and effectiveness, within existing cost and operational constraints.

Travis Air Force Base, California, was selected as the principal study site, as best representing the characteristics of Air Force food service. Following the initial studies at Travis AFB, which identified the major problem areas in food service requiring improvements, a number of proposed changes were actually implemented and evaluated in an experiment between 1 November 1973 - 31 January 1974. Since these changes included modifications to the Air Force Worldwide Menu and three new food service operations, which affected both customer eating habits and attendance patterns, the nutritional adequacy of the experimental system was a matter of concern. A detailed nutritional evaluation of the meals in the different facilities, as selected by the customers, is provided in reference 1. Descriptions of the new food service operations and their performance, including analysis of consumer attendance, are contained in references 2, 3, and 4. This report studies customer attendance and utilization rates for the basic dining halls and the new food service operations.

11. Attendance Data Collection System

Each of the twenty squadrons and the tenant organizations at Travis AFB was provided a specified sequence of prenumbered plastic meal cards for issue to all assigned or attached enlisted personnel prior to the experiment. Blue cards were supplied for those entitled to rations-in-kind (RIK) and white cards for those receiving a basic allowance for subsistence (BAS).

On issue, the card number and name, ration status, and residence of the recipient were recorded on prepared forms as required by regulation and for use in subsequent analysis. The card number was printed on the card for visual interpretation and was also encoded as punched holes which could be "read" and recorded by an automated source data collection system installed in the dining facilities. The cards and the data collection system were used to obtain attendance data during the experiment. A signature strip was mounted on the card which was required to be signed by the recipient when the card was issued. This provided a means for verifying that the card had been issued to the customer by comparing it with the signature on the individual's official photograph identification card.

In total 6657 meal cards were issued, as shown below, which was 79.9% of the maximum reported present for duty enlisted strength during the three months of the experiment. The remaining proportion of the consumer population who elected not to obtain a card was predominantly BAS personnel that, no doubt, virtually never utilized the food service facilities.

	RIK		BAS		TOTAL	
	N	%	N	%	N	%
On Post In Dormitories	2225	94.9	801	20.5	3026	48.5
On Post Not In Dormitories	6	0.3	942	24.2	948	15.2
Off Post	113	4.8	2157	55.3	2270	36.3
Subtotal	2344	100.0	3900	100.0	6244	100.0
Residence Unknown	147		266		413	
Total Issued	2491		4166		6657	
Maximum Monthly Present for Duty Enlisted Strength	1891		6438		8329	
Average Monthly Present for Duty Enlisted Strength						
Excluding October	2094		5786		7880	
Including October	2128		5823		7951	

On arriving at any of the five dining facilities each customer presented his or her meal card to the headcounter. The card was entered into a card reader which transferred the encoded card number (plus the date, time and facility identification number) as a complete attendance record to a self-contained magnetic tape cassette. The meal card was then returned to the customer. If a customer did not have a meal card, the headcounter entered into the card reader a control card, provided to each dining facility for that purpose, to record the fact that a person had attended. Obviously, these records could not be associated with specific persons as were the regular meal cards.

It is emphasized, and should be understood, that this process of recording attendance data was only for the purpose of acquiring this information for the evaluation of the experimental system. In no way did it affect or eliminate normal headcount procedures other than replacing the standard meal card with a plastic meal card.

The magnetic tape cassettes were periodically retrieved from the card readers in each dining facility and delivered to the Base computer center. The information on each tape was converted to keypunched data cards which were then loaded on computer compatible magnetic tapes for subsequent processing. These tapes formed the data base for the attendance analysis in this and other reports pertaining to the overall study.

III. Total System

A. Attendance

Individual attendance data were recorded between 24 October 1973 and 31 January 1974. A total of 276905 separate RIK and BAS records were obtained at the various food service facilities as described below.

	RIK		BAS		TOTAL	
	N	%	N	%	N	%
Dining Halls Only	164567	77.5	54114	84.0	218681	79.0
Specialty Meal	14185*	6.7	1575	2.4	15760	5.7
Flight Line Facility	10768	5.0	7188	11.2	17956	6.5
Modular Unit	22958	10.8	1550	2.4	24508	8.8
TOTAL	212478	100.0	64427	100.0	276905	100.0

*Approximately 90% of the total.

These 276905 records amount to 91.4% of the reported headcount for the same period of time, which is more than a sufficient sample to derive statistically significant results and conclusions. Some 26002 additional meals were served to transients, National Guardsmen, Army Reserves, foreign nationals, and visitors. The complete attendance, therefore, for the 100-day period under consideration was 302927 meals attended.

These RIK and BAS data indicate that the RIK customers accounted for 77.1% of all meals served, even though they represented only 26.8% of the average present for duty enlisted strength for the duration of the experiment.

It is of significant value to compare attendance and attendance rates during the experimental period with similar pre-experiment data. Table I following presents these data using monthly averages. Although a 1 November 1972 - 31 October 1973 period would have been preferred, only the 1 February - 31 August 1973 period was deemed representative of the before picture and was, therefore, used as the pre-experiment period. Significantly detailed records were not available for January 1973 and before; and, the September and October 1973 data were distorted by dining hall closings for renovations and by the Mideast alert conditions which were in effect during a portion of the two month period.

Attendance rate figures are calculated by the formula: Headcount/ (3 x Number of days x Present for Duty Strength). As done earlier, the headcount figures include only those meals attended by enlisted RIK and BAS personnel assigned or attached to units and squadrons at Travis AFB. In effect, the attendance rate is a measure of the average individual's utilization of the food service system. As the table indicates, the total attendance rate increased by 23.3% (11.7% for RIK and 8.6% for BAS customers) from the base (pre-experiment) to the experimental period.

TABLE I

Base Period/Experiment Attendance and Utilization Comparisons

Monthly Average	Base Period February - 31 August 1973			Experiment Period November 1973 - 31 January 1974		
	Present for Duty Strength	Attend- ance Rate	Meals/ Person per week	Present for Duty Strength	Attend- ance Rate	Percentage Increase Meals/ Person per week
Total	8047	9.7	2.05	7880	12.0	23.3
BAS	6217	3.4	0.71	5786	3.7	8.6
RIK	1830	31.4	6.60	2094	35.1	11.7
	Headcounts			Headcounts		
	Total	BAS		Total	BAS	
Dining Hall 1	25548	8220	17328	22838	7301	15537
3	17936	4583	13353	17438	3750	13688
7*	27768	6219	21549	24429	4804	19625
Dining Hall Total	71252	19022	52230	64705	15855	48850
Modular Unit**						
Flight Line				11257	703	10554
Specialty Meal				5976	2396	3580
				5143	514	4629
New Services Total				22376	3613	18763
Sub Total	71252	19022	52230	87081	19468	67613
Other	6934			7840		
Total	78186			94921		

*Excludes Specialty Meal

**Excludes month of November headcount

Total headcount increased by 22.2% from the base period. RIK headcount increased by 29.5% while BAS headcount increased some 2.3%. As Table I indicates, with only a 2.1% decrease in present for duty strength total attendance at the regular dining hall meals decreased by approximately 9.2%. This decrease in attendance can be attributed to the reduction in the number of different dining hall meals offered each day and to the competing services provided by the two new food outlets (the modular unit and the flight line facility) and the specialty meal served in Dining Hall 7. When the specialty meal headcount is added to the Dining Hall 7 headcount data, overall attendance at the facility, instead of decreasing by 12.0%, actually increased by 6.5%. It should, however, be noted that customers who attended the specialty meal almost never consumed the earlier served supper meal.

Of the 87081 average monthly meals attended by RIK and BAS personnel during the experiment, 25.7% of those meals were assignable to the three new operations initiated during the experiment - the specialty meal, the modular unit, and the flight line facility. Corresponding percentages for the RIK and BAS customers groups individually were, respectively, 27.8% and 18.6%.

Also worthy of note is a comparison of the before and after attendance and utilization figures by weekdays and weekends. Perhaps surprisingly, the average monthly increases in both attendance and attendance rates, as indicated below, were greater for weekends than weekdays for both RIK and BAS personnel. Additionally, weekend attendance represented 17.4% of the total weekly attendance during the base period. For the experiment weekend attendance increased to 19.0% of the weekly total attendance figure.

	Headcount			Attendance Rate		
	Before	After	% Increase	Before	After	% Increase
All Days						
Total	71252	87081	22.2	9.7	12.0	23.3
BAS	19022	19468	2.3	3.3	3.7	8.6
RIK	52230	67613	29.5	31.4	35.1	11.7
Weekdays						
Total	58846	70499	19.8	11.2	13.6	20.8
BAS	15960	16015	0.3	3.9	4.2	6.4
RIK	42886	54484	27.0	36.0	39.4	9.6
Weekends						
Total	12406	16582	33.7	6.0	8.1	34.9
BAS	3062	3453	12.8	1.9	2.3	19.7
RIK	9344	13129	40.5	19.9	24.1	21.4

An explanation of these phenomena can be discerned from the following chart which compares RIK and BAS weekday and weekend attendance rates for both the standard dining hall meals and new services meals.

Attendance Rate			
	RIK	BAS	TOTAL
All Days			
All Meals	35.1	3.7	12.0
Standard Dining Hall	25.4	3.0	8.9
New Services	9.7	0.7	3.1
Weekdays			
All Meals	39.4	4.2	13.6
Standard Dining Hall	30.0	3.5	10.6
New Services	9.4	0.7	3.0
Weekends			
All Meals	24.1	2.3	8.1
Standard Dining Hall	13.5	1.6	4.8
New Services	10.6	0.7	3.3

Although the weekday to weekend attendance rate for standard dining hall meals decreased for both RIK and BAS customers during the experiment, for neither customer group was the absolute decrease as large as for the pre-experiment period. Additionally and more importantly, the overall weekday to weekend attendance rate for the new services meals actually increased from 3.0% to 3.3%. The RIK new services attendance rate increased from 9.4% on weekdays to 10.6% on weekends while the BAS attendance rate remained the same at 0.7%.

At this point it is of interest to compare the three month experimental picture, with respect to attendance and utilization, to the same period from the previous calendar year. In this way the seasonal effects, which were imbedded in the above analysis, can be eliminated. These data are indicated in Table 2 following.

For all three of the month comparisons there was an absolute increase in total headcount attendance and in total attendance rate from the 1972-1973 to the 1973-1974 period. It should be noted, however, that although there was an overall increase in the total attendance rate from 8.7 to 11.5 percent, the BAS attendance rate did decrease from 4.1 to 3.6 percent. The dramatic 66.7 percent increase in RIK attendance more than compensated for the BAS attendance rate decline.

TABLE 2

Seasonal Attendance and Utilization Comparisons

	72-73	73-74	
November - Total	65006	82860	+27.5
RIK	39296	62077	+60.0
BAS	25710	20783	-19.2
December - Total	58374	77196	+32.2
RIK	36478	57943	+58.8
BAS	21896	19253	-12.1
January - Total	66729	91949	+37.8
RIK	40779*	74142	+81.8
BAS	25950*	17807	-31.4
Weighted Average ¹ - Total	63353	83689	+32.1
RIK	38847	64750**	+66.7
BAS	24506	18939**	-22.7

	72-73	73-74	
	Present for Duty Strength	Attendance Rate	Meals/Person per day
N - Total	7901	9.1	0.27
RIK	1294	33.7	1.01
BAS	6607	4.3	0.13
D - Total	7894	8.0	0.24
RIK	1378	28.5	0.85
BAS	6516	3.6	0.11
J - Total	8001	9.0	0.27
RIK	1533	28.6	0.86
BAS	6468	4.3	0.13
WA ¹ - Total	7933	8.7	0.26
RIK	1403	30.1	0.90
BAS	6530	4.1	0.12
	Present for Duty Strength	Attendance Rate	Meals/Person per day
N - Total	7156	12.9	0.39
RIK	2077	33.2	1.00
BAS	5079	4.5	0.14
D - Total	8239	10.1	0.30
RIK	1891	32.9	0.99
BAS	6348	3.3	0.10
J - Total	8220	12.0	0.36
RIK	2314	34.4	1.03
BAS	5906	3.2	0.10
WA ¹ - Total	7880	11.5	0.35
RIK	2094	33.6	1.01
BAS	5786	3.6	0.11

*Estimated

**November Modular headcount not excluded

¹Weighted with respect to the number of days in each month

B. Utilization

A tabulation of the attendance records for 50 of the 100 days during the experimental period is presented following with respect to the number of meals consumed by the various ration status/residence location groups.

	RIK		BAS		TOTAL	
	N	%	N	%	N	%
On Post In Dormitories	77881	97.5	8528	43.9	86409	87.0
On Post Not In Dormitories	1921	2.4	2719	14.0	4640	4.7
Off Post	113	0.1	8192	42.1	8305	8.3
Subtotal	79915	100.0	19439	100.0	99354	100.0
Residence Unknown	4573		648		5221	
Total	84488		20087		104575	

It is of interest to compare these data with the meal card issuance data presented earlier. Of significance is the fact that BAS personnel living on post and in dormitories, while receiving only 20.5% of the BAS cards issued, consumed 43.9% of all BAS meals.

These data are also presented for the different types of meals and the various ration status/residence categories in Table 3. A meal schedule for weekday and weekend operation in each dining facility is noted in Appendix I. In essence, Table 3 indicates how the individual ration status/residence groups utilized the various food service system meals and facilities when they actually attended. For example, of the meals attended by RIK customers living on post and in the dormitories, 17.2% were breakfasts, 38.5% were dinners, and so forth. A number of important observations can be derived from the results contained in this Table. The utilization rates for the two different groups of RIK customers were not substantially different with the exception of the specialty meal and the modular facility. This, however, is not unexpected since these two services were specifically designed and operated for maximum convenience to dormitory customers (see references 2 and 3).

Not surprisingly, the utilization rates of BAS personnel living off the Base were lowest for all meals except the noon meal when it was most inconvenient for them to eat elsewhere. For somewhat the same reason, the utilization rates of individuals receiving BAS and residing on the Base, but not in the dormitories, were also relatively higher at the noon meal than at most of the other meals. Composite utilization for those persons on BAS and in the dormitories was significantly higher (30.5% as compared to 13.1% and 11.3%) than for the other two BAS groups at those meals served at other than regular duty hours (i.e., supper, specialty meal, and midnight meal). An exception was the flight line facility which was a unique service provided for a selected segment of the consumer population comprised of different proportions of BAS and RIK customers than the total population. Consequently, the utilization rates only appear to be distorted when compared to the other meals; in fact, they are actually quite consistent given the specific function the facility provides.

TABLE 3

MEAL UTILIZATION RATES BY RATION STATUS AND RESIDENCE

	Breakfast	Dinner	Supper	Specialty Meal	Midnight Meal	Flight ¹ Line	Modular ² Facility	Total
RIK								
On Post In Dormitories	17.2	38.5	19.5	6.9	3.8	5.7	8.4	100.0
Others	19.3	42.9	18.1	3.2	3.7	6.0	6.8	100.0
Total	17.3	38.6	19.5	6.7	3.8	5.8	8.3	100.0
BAS								
On Post In Dormitories	24.7	34.5	18.0	6.0	6.5	8.0	2.3	100.0
On Post Not In Dormitories	23.6	37.5	6.7	1.9	4.5	23.1	2.7	100.0
Off Post	19.8	47.3	7.3	1.0	3.0	19.0	2.6	100.0
Total	22.4	40.8	11.9	3.2	4.6	14.6	2.5	100.0
RIK and BAS	18.3	39.0	18.1	6.0	3.9	7.3	7.4	100.0

¹The Flight Line Facility began operation on 30 October 1973. It was closed on 25 December, 31 December 1973 and on 1 January 1974.

²The Modular Facility began operation on 25 November 1973. It was closed on 25 December 1973 and on 1 January 1974.

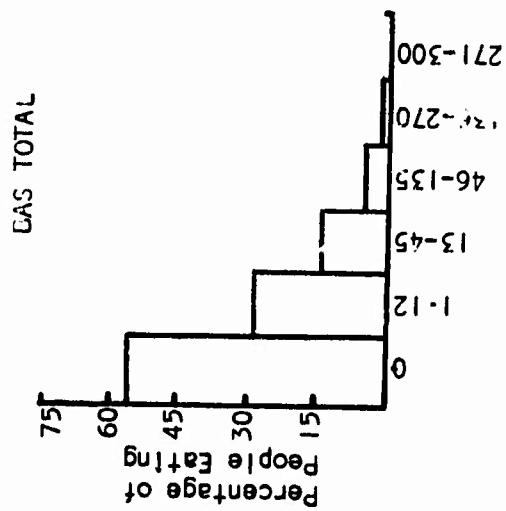
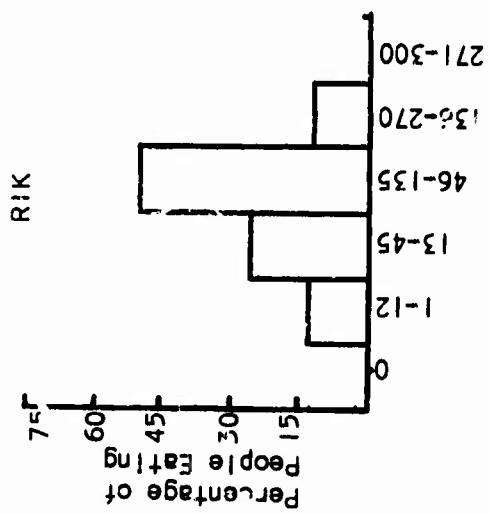
The question as to how many RIK and BAS personnel ate how many meals during the 100 days of the experiment is addressed below. Several simplifications are made here to improve clarity. Since the utilization rates for the two different groups of RIK customers have been shown not to be significantly different, a combined RIK group is used. Additionally, since the BAS residing on the Base, but not in the dormitories, and the BAS living off the Base groups are very similar, those two groups have also been combined.

The table below indicates the percentage number of meals attended by the various ration status/residence groups over the 100 days of the experiment. These data are also presented, somewhat more succinctly, in graphical form on the following page.

Meals Attended	RIK	BAS ⁽¹⁾	BAS* ⁽²⁾	BAS Total	RIK & BAS
0	0.0	42.2	58.4	55.0	38.0
1-3	3.4	7.8	15.6	14.0	10.7
4-6	3.4	5.3	6.4	6.2	5.3
7-9	2.7	4.8	4.1	4.3	3.8
10-12	2.9	3.8	2.8	3.1	3.0
13-21	4.8	9.9	5.9	6.7	6.1
22-30	9.1	7.3	3.3	4.1	5.7
31-45	12.0	9.2	2.1	3.5	6.2
46-90	29.2	8.2	1.3	2.6	10.9
91-135	21.8	1.4	0.1	0.4	7.0
136-180	9.0	0.1	0.0	0.1	2.8
181-225	1.4	0.0	0.0	0.0	0.4
226-270	0.3	0.0	0.0	0.0	0.1
270-300	0.0	0.0	0.0	0.0	0.0

(1) BAS personnel living on Base in dormitories

(2) BAS personnel living on Base not in dormitories and living off Base



Meals Attended



Figure 1. Percentage Meals Attended versus Ration Status/Residence Groups

Earlier it was noted that for a 50-day period during the experiment 84488 and 20087 meals were attended by RIK and BAS personnel, respectively. Those meals were attended by, respectively, 2054 and 2465 unique RIK and BAS individuals. Obviously, RIK personnel attended much more frequently (five times as frequently) than did BAS system users. This fact is made very clear in the preceding graphs. It should be noted that all RIK personnel utilized the food service system at least once during the course of the experiment and that 32.5% of them attended more than 30 times per month (or more than once per day).

Some comments about BAS personnel are also in order here. Some 42.2% of the BAS personnel living on Base and in dormitories (who, as a group, received only 20.5% of the BAS cards issued yet consumed 43.9% of all BAS meals) never attended a meal during this experiment. It is, hence, surprising that only 58.4% of the BAS personnel not living in dormitories (who, as a group, received 79.5% of the BAS cards issued and consumed 56.1% of all BAS meals) never attended a meal for the duration of the experimental period. These data tend to indicate that, while a substantial number of dormitory residing BAS individuals never utilized the food service system, those that did attended on a much more regular basis than did those BAS personnel not living in dormitories who seemed to have attended somewhat sporadically.

Percentage utilization in terms of meals per day for the experimental period is considered in the table below with respect to ration status and residence location. These data are derived from the meal attendance figures presented above and, therefore, tend to support the statements there with respect to system utilization by the RIK and the two BAS customer groups.

Meals per day	RIK	BAS	BAS*	BAS Total	RIK & BAS
0	0.0	42.2	58.4	55.0	38.0
0-1	72.6	56.7	41.5	44.6	53.3
1-2	26.5	1.1	0.1	0.4	8.4
2-3	0.9	0.0	0.0	0.0	0.3

At this juncture it might prove enlightening to consider attendance/utilization data for only those people that actually attended on a given day. In essence, we are considering what might be called a "daily snapshot" of the Travis AFB food service system. Such average daily percentage utilization data are presented below by ration status and residence for a 50-day sampling period.

Meals per day ⁽¹⁾	RIK	BAS	BAS*	BAS Total	RIK & BAS
1	51.6	80.7	93.3	88.1	60.7
2	35.8	18.1	6.5	11.2	29.7
3	11.3	1.2	0.2	0.7	8.6
4	1.2	0.0	0.0	0.0	0.9
5	0.1	0.0	0.0	0.0	0.1

(1) Meals per day given that the person actually attends on that day.

These data indicate that for all RIK personnel who ate at least one meal on any typical, given day 48.4% of them ate at least two meals on that same day. As would be expected, such is not nearly the case for the less frequent BAS system user; given all BAS individuals who attended at least one meal on a particular day, only 11.9% of them consumed at least one more meal on that same day.

Another interesting point should be made from these data. If one were to consider attendance at more than three meals per day as an abuse of the food service system (and I do not necessarily subscribe to such a contention), there would have been no BAS abuse and at most 1.3% RIK daily abuse during the experiment. That is, since on the average 1133 different RIK customers utilized the food service facilities on any given day, the maximum daily RIK abuse would have been the consumption of only 16 unauthorized meals. It should, however, be mentioned that it was possible to consume four meals on a given day during the experiment without the final one being unauthorized. As can be noted in Appendix 1, the midnight meal was served from 2300-0100 and the flight line facility late meal was offered from 2230-0200. Therefore, attendance at four meals on a particular day two of which, say, were at times 0030 and 2330 would not and should not be considered as an abuse of the system.

To say that an individual who attended more than three meals per day abused the system might be unfair. Perhaps it might be more just to consider attendance at more than twenty-one meals per week as system abuse. If this had been the case, then it should be noted that over the 14-week course of the experiment, only twelve individual RIK customers ever had a week when he or she attended more than twenty-one meals. That is to say, for any given week during the experiment it would have been possible to find, on the average, slightly less than one RIK system user who attended more than twenty-one meals during that week. It should be noted that the average number of RIK customers utilizing the food service system during any given week of the experiment was found to be 1848.

IV. Changing Ration Status

Because the Navy is presently considering the possible implementation of an a la carte, all BAS food service system, the effects of ration status changes on customer attendance are considered below.

A. Changing from RIK to BAS

During the experimental period it was possible to uniquely identify 84 system users who changed ration status from RIK to BAS. Their utilization rates in both ration status categories are presented below. For example, of the meals attended by these individuals while still RIK customers, 18.1% were breakfasts, 41.7% were dinners, and so forth. Of the meals attended by these same users after changing to the BAS ration status, 16.4% were breakfasts, 39.0% were dinners, and so forth.

	Breakfast	Dinner	Supper	Specialty	Midnight Meal	Flight Line	Modular Unit
RIK	18.1	41.7	26.0	6.0	2.6	4.9	0.7
BAS	16.4	39.0	19.3	3.4	3.9	14.7	3.3

The meals per person per day figures of these individuals both as RIK and BAS users are noted following as compared to similar figures for the entire Travis population.

	RIK to BAS Customers	All System Customers
RIK	0.78	1.05
BAS	0.27	0.11

The difference in average meals attended per person per day by the two RIK consumer groups is noteworthy. Since the attainment of a BAS ration status is most directly resultant from promotion to a specific rank, it could be concluded that the marked reduction in RIK attendance was caused by that anticipated promotion and hence the change to the BAS ration status. Although the "new" BAS user's average attendance was still above that of the overall BAS population, a decrease approaching the all system BAS value would be expected after a longer period of time. Of the utmost importance here, however, is the fact that when a system user changed his or her ration status from RIK to BAS, his or her attendance decreased most drastically.

B. Changing from BAS to RIK

For the experimental period it was possible to uniquely identify only seven system users who changed from the BAS to the RIK ration status. Their meals per person per day figures both as BAS and RIK users are shown following again as compared to the total Travis population.

	BAS to RIK Customers	All System Customers
BAS	0.24	0.11
RIK	0.99	1.05

Although the sample must be considered statistically insignificant, it is of interest to note the elevated level of BAS participation in the food service system immediately prior to the change to the RIK ration status. Additionally, the "new" user's average attendance approached that of the overall RIK population more rapidly than was the case for the BAS users as discussed in Section IV. A.

V. Modular Facility

A. Attendance

Total headcounts in the modular facility for each month of the experiment are noted below.

Month	RIK	BAS	TOTAL
25-30 November 1973	1850	145	1995
1-31 December 1973	9264	757	10021
1-31 January 1974	11844	648	12492
TOTAL	22958	1550	24508

The 24508 total headcount figure represents 11.4% of all meals served in all the dining facilities subsequent to the 25 November 1973 modular facility opening. An average of 372 meals per day were served for the 66 days of operation with 93.7% of those meals served to RIK personnel.

B. Utilization

An analysis of attendance data for 54 days of operation indicated that 2136 distinct individuals, 1642 RIK and 494 BAS personnel, utilized the modular facility during the period. A breakdown of these customers by residence location is noted below.

	RIK	BAS
On Post in Dormitories	1342	157
On Post Not in Dormitories	5	77
Off Post	38	197
Residence Unknown	257	63
TOTAL	1642	494

Of the 1642 distinct RIK personnel who used the modular facility, 280 of them were identified as "new customers," that is, individuals for whom there was no record of attendance at any dining facility prior to the opening of the modular facility. Of the 494 BAS modular customers, 150 were found to be "new customers."

On a meals per person, per week basis an analysis of the meals attended by the new and regular customers is shown below.

		Modular Facility	Other Facilities	All Facilities
New Customers				
BAS	150	0.27	0.62	0.89
RIK	280	1.01	3.69	4.70
TOTAL	430	0.75	2.65	3.40
Regular Customers				
BAS	344	0.33	1.81	2.14
RIK	1362	1.22	6.68	7.90
TOTAL	1706	1.04	5.66	6.70
GRAND TOTAL	2136	0.98	5.05	6.03

The 430 new customers attended an average of 0.75 meals per week in the modular facility and additionally began eating 2.65 meals per week in the other dining facilities. The 1706 regular customers, who had attended an average of 5.88 meals per person per week prior to the opening of the facility, increased their overall attendance to 6.70 meals per person per week after the modular unit began operation. Hence, it can be said that the modular facility attracted new customers to the food service system and also substantially increased the attendance of regular customers.

A determination as to the utilization of the different dining facility meals by the regular customers before and after the modular facility opened is indicated below.

	Breakfast	Dinner	Supper	Specialty	Mid- night Meal	Flight Line	Modular Unit
BAS							
Pre Modular	22.1	39.4	17.9	4.1	7.6	8.9	0.0
Post Modular	17.6	32.4	15.8	4.5	4.3	8.0	17.4
RIK							
Pre Modular	19.8	42.0	23.2	6.8	3.8	4.4	0.0
Post Modular	14.7	34.4	16.8	5.8	3.9	6.4	18.0

As would be expected, the RIK customers, who consumed 93.7% of all modular unit meals, utilized the modular facility primarily at the expense of those other dining facility meals served during the time period when the modular was open (i.e., dinner, supper, and specialty meal).

Of all the meals served in the modular unit, only 47.8% were served to personnel in units housed in dormitories in the immediate vicinity of the facility.

Unit	% of Total Meals Served
60 SUPSq*	31.6
60 FMSq	14.0
60 CESq*	9.3
60 APSq	8.6
916 ARSq*	5.5
60 ABGp	5.1
60 OMSq	4.5
60 AMSq	3.5
60 SPSq	3.0
602 OMSq	2.9
DGMC	2.8
60 TSq	2.5
60 MAWq	2.3
1901 st	2.2
22 AF*	1.4
Ot' ers	0.8

*Units housed in dormitories located near to the modular facility.

This suggests that the modular facility was also popular with units housed in areas not in close proximity to the facility and that, therefore, it was capable of functioning as a drive-in service.

It is interesting to note that after the modular facility opened overall system attendance for the 60th Supply Squadron, the facility's largest unit customer, increased by 17.5% from 143 to 168 meals per day. In addition, after the facility opened that squadron attended 45.2% of its meals at the modular facility.

VI. Flight Line Facility

A. Attendance

The total headcounts at the flight line facility for each month of the experiment are indicated below:

Month	RIK	BAS	Total
1-30 November 1973	2859	2609	5468
1-31 December 1973	3450	2747	6197
1-31 January 1974	4459	1832	6291
TOTAL	10768	7188	17956

The 17956 total flight line facility headcount represents 6.5% of all meals served in all dining facilities after the facility was opened. The flight line facility operated for 89 days serving an average of 202 meals per day, 40.0% of which were served to BAS personnel. Attendance at the facility was equally divided between the early meal, served from 1630 to 1900 hours, and the late meal, served from 2230 to 0200 hours.

B. Utilization

An analysis was made for a 50-day period of all individual daily attendance patterns that included at least one meal in the flight line facility. Taken in total those patterns indicate the following utilization rates of all different dining facility meals by RIK and BAS customers:

	Breakfast	Dinner	Supper	Specialty	Mid-night Meal	Flight Line	Modular Unit
RIK	6.4	17.5	6.0	1.6	4.8	60.8	2.9
BAS	1.3	2.0	1.2	0.1	0.9	94.4	0.1
TOTAL	5.0	13.2	4.6	1.0	3.7	70.4	2.1

The above chart indicates that 94.4% of these meals attended by the BAS customers were in the flight line facility. This would tend to indicate that the facility itself brought a considerable number of new BAS users into the dining facility system. This is explainable given that the facility provided its service primarily to night shift personnel, who would not have had the opportunity to attend other dining facility meals. Additionally, in June 1973, box meals were discontinued to BAS personnel by direction of HQ MAC causing many of them to discontinue using the dining facility system. When the flight line facility opened and they were allowed to attend, these BAS individuals began to again use the system.

A further analysis of flight line facility meals and customers as a segment of the entire dining facility system for the 50-day period being considered is presented following.

	TOTAL		FLIGHT LINE		FLIGHT LINE		Meals/person per week
	Meals	Customers	Meals	Customers	% Meals	% Customers	
RIK	84488	2054	4736	624	5.6	30.4	1.06
BAS	20087	2465	2923	647	14.6	26.2	0.63
TOTAL	104575	4519	7659	1271	7.3	28.1	0.84

For the time period in question BAS dining facility customers, while attending only 19.2% of all meals during the period, attended 38.2% of the meals served in the flight line facility. This fact tends to further substantiate the earlier contention that the flight line facility did, in fact, bring new BAS customers into the food service system. As later analysis will show, the average BAS customer attended at a rate of 2.60 meals per week; the BAS meals per person per week value of 0.63 for the flight line facility was the largest component of that total considering the three new services introduced during the experiment.

Of all meals attended in the flight line facility, 73.8% were by the maintenance squadrons located near the facility.

Unit	% of Total Meals Served
60 FMSq*	30.8
60 OMSq*	29.6
60 MAWq	8.0
60 AMSq*	7.3
60 SPSq	7.3
60 SUPSq	4.8
602 OMSq*	4.7
60 APSq	4.5
604 OMSq*	1.4
Others	1.6

*Maintenance squadrons located near to the flight line facility.

VII. Specialty Meal

A. Attendance

The total headcounts at the specialty meal for each month of the experiment are noted below. Because the dining hall included specialty headcount as part of the supper figure, it was not possible to determine the RIK and BAS portions of the total headcounts. However, an analysis of 50 days of specialty meal data indicates that approximately 90% of all meals attended were by RIK personnel.

MONTH	TOTAL
26, 29, 31 October 1973	331
1 - 30 November 1973	5360
1 - 31 December 1973	4477
1 - 31 January 1974	<u>592</u>
TOTAL	15760

The 15760 total specialty meal headcount represents 5.8% of all meals served in all dining facilities for the period during which the meal was served. The specialty meal operated on 90 days (not on 23 November, 24, 25, 31 December 1973, and 1 January 1974) serving an average of 175 meals per day, approximately 157 of which were to RIK personnel.

B. Utilization

An analysis for a 50-day period of all individual daily attendance patterns that included at least one specialty meal indicates the following utilization rates for all different meal services by RIK and BAS personnel:

	Breakfast	Dinner	Supper	Specialty	Mid-night Meal	Flight Line	Modular Unit
RIK	12.0	27.0	5.2	51.7	1.7	1.1	1.3
BAS	9.8	16.5	0.7	71.0	1.3	0.1	0.6
TOTAL	11.8	26.2	4.9	53.2	1.6	1.0	1.3

It is of importance to note here the low percentages of suppers attended in attendance patterns that included a specialty meal. These figures indicate, when considered in relation to the overall meal utilization figures presented earlier (see Section III), that in most instances the specialty meal was attended as an alternative to the supper meal and not in addition to it.

A further analysis of specialty meals and customers as a segment of the total dining facility system for the 50-day period under consideration is presented below.

	TOTAL		SPECIALTY		SPECIALTY		Meals per person per week
	Meals	Customers	Meals	Customer	% Meals	% Customers	
RIK	84488	2054	5670	1026	6.7	50.0	0.77
BAS	20087	2465	642	256	3.2	10.4	0.35
TOTAL	104575	4519	6312	1282	6.0	28.4	0.69

These data indicate that the RIK customers, who attended 80.8% of all system meals during the period under consideration, attended 89.8% of all specialty meals. As earlier noted, of all meal cards used by RIK personnel 97.5% were by individuals residing in dormitories; only 43.9% of all the BAS personnel using meal cards lived in dormitories. Hence, it can again be concluded that the specialty meal, which was designed and operated for the maximum convenience of the dormitory customer, fulfilled that specified purpose.

Of all meals attended at the specialty service 90.4% were by squadrons whose residence dormitories were in close proximity to the dining facility that provided the specialty service.

UNIT	% OF TOTAL MEALS SERVED
60 FMSq*	25.6
60 APSq*	15.7
60 ABGp*	10.4
DGMC*	9.4
60 OMSq	8.1
1901 st*	7.0
602 OMSq*	6.3
60 AMSq*	4.5
60 MAWg*	4.3
60 TSq*	4.0
604 OMSq*	1.3
7 MASq*	1.1
86 MASq*	0.5
75 MASq*	0.2
22 MASq*	0.1
Others	1.5

*Squadrons with dormitory residences located near the specialty service.

VIII. Dining Hall Facilities

A. Attendance

The total headcounts at the dining hall meals (excluding the specialty meal) for each month of the experiment are presented below.

MONTH	RIK	BAS	TOTAL
24 - 31 October 1973	18018	6551	24569
1 - 30 November 1973	52544	17493	70037
1 - 31 December 1973	41199	15302	56501
1 - 31 January 1974	52806	14768	67574
TOTAL	164567	54114	218681

This 218681 total represents 79.0% of all RIK and BAS meals served in all dining facilities during the 100-day period from 24 October 1973 to 31 January 1974. The standard dining hall operations served an average of 2187 meals per day, only 24.8% of which were served to the BAS personnel who represented some 73.2% of the average present for duty enlisted strength for the period.

B. Utilization

An analysis for a 50-day period was made of all daily attendance patterns that included only the standard dining hall meals. As a whole those patterns indicate the following utilization rates of the dining hall meals under consideration by RIK and BAS customers:

RIK	Breakfast	Dinner	Supper	Mid- night Meal
RIK	21.5	42.6	31.5	4.4
BAS	28.1	47.9	18.3	5.7
TOTAL	22.9	43.8	28.6	4.7

In comparing the above chart with overall system utilization rates in Table III, it should be noted that for RIK customers the supper utilization rate increases from 19.5% for the total system to 31.5% here. This is directly attributable to the fact that (1) specialty and modular unit meals are excluded in the present analysis, (2) both of those services are, to some extent, competing for the supper customer, and (3) RIK meals represent 90.4% of all specialty and 93.7% of all modular facility meals.

A further analysis of dining hall meals and customers as a segment of the entire dining facility system for the 50-day period being considered is presented following.

	TOTAL		DINING HALL		DINING HALL		Meals per Person per week
	Meals	Customers	Meals	Customers	% Meals	% Customers	
RIK	84488	2054	55648	2028	65.9	98.7	3.84
BAS	20087	2465	15551	2151	77.4	87.3	1.01
TOTAL	104575	4519	71199	4179	68.1	92.5	2.39

As noted earlier, these data do not include the attendance and utilization figures for those dining hall meals attended via daily attendance patterns that included some combination of regular dining hall meals and at least one of the three dining service meals introduced during the experiment. That information is noted below.

	TOTAL		DINING HALL		DINING HALL		Meals per Person per Week
	Meals	Customers	Meals	Customers	% Meals	% Customers	
RIK	84488	2054	11160	1528	13.2	74.4	1.02
BAS	20087	2465	471	200	2.3	8.1	0.33
TOTAL	104575	4519	11631	1728	11.1	38.2	0.94

Taken compositely the data in these two charts indicate that the BAS system customers, who attended 19.2% of all meals during the 50-day period, attended 19.3% of the regular dining hall meals. As a percentage of all meals attended by BAS personnel during the period, BAS dining hall meals represented 79.8%; the corresponding RIK percentage was 79.1%. Given as discussed previously, however, that the specialty and modular services were attended almost exclusively by RIK personnel, such a result might seem surprising. The counterbalancing factor was BAS flight line facility attendance which represented 38.2% of the total. A comparison of these dining hall meal attendance data with those presented in Section III for the entire experimental period shows no significant differences thereby corroborating the results presented here.

At this juncture, it would be instructive to summarize the meals per person per week utilization data that have been calculated for the various dining facility services.

	RIK	BAS
Modular Facility	1.24	0.28
Flight Line Facility	1.06	0.63
Specialty Meal	0.77	0.35
Dining Hall Meals	3.84	1.01
Dining Hall Meals*	1.02	0.33
TOTAL	7.93	2.60

*Dining hall meal attendance in combination with attendance at a new dining facility service.

During the course of the experiment, the number of individual RIK and BAS customers varied from week to week. For the three month period from November 1973 - January 1974, the average number of individuals utilizing the food service system was determined to be 1848 RIK customers per week and 1322 BAS customers per week. From this information a determination can be made as to the average meals attended per week and, consequently, total meals attended for the entire experiment. Below these figures are noted as are the actual headcounts for the three month period.

ATTENDANCE	RIK	BAS	TOTAL
Calculated	192609	45172	237781
Actual	194162	57843	252005

The calculated attendance for the experimental period represents 94.4% of the actual reported headcount. In addition to normal sampling induced error, the minor discrepancies can be attributed to numerous other factors including (1) meal cards improperly inserted into the badge reader, (2) unreadable meal cards, (3) badge reader malfunctions, and (4) data lost in conversion from magnetic tape cassettes to keypunched data cards.

IX. Results and Conclusions

1. Total headcount attendance for the 100-day period from 24 October 1973 to 31 January 1974 was 302927 meals attended. The component parts of this total by ration status are shown following:

RIK	212478	70.1%
BAS	64427	21.3
Other	26022	8.6
TOTAL	302927	100.0%

2. A comparison of the average monthly attendance data for the February - August 1973 period and the November 1973 - January 1974 experimental period indicated an overall 22.2% increase (33.7% on weekends and 19.8% on weekdays) in combined RIK and BAS headcount attendance. Because of a 2.1% decline in the present for duty strengths during that time, an increase of 23.3% (34.9% on weekends and 20.8% on weekdays) in the attendance rate was realized. Although the overall weekday to weekend attendance rate for the standard dining hall meals decreased from 10.6% to 4.8%, the same rate for the three new food service operations increased from 3.0% to 3.3%.

3. As the following data indicate, during the experiment the three new food service operations served 25.7% of all RIK and BAS meals attended. Since the before experimental operation at Travis AFB was generally typical of the three other Air Force bases studied (Minot, Homestead, and Nellis), it is concluded that an increase of 20% in attendance in Air Force food service can be achieved if the regular dining hall operations are improved and a reasonable level of implementation of the new types of food service is realized. An increase of 30% in attendance should not usually be expected unless outside influences such as food quantity decreases and/or meal price increases at other competing food service outlets are realized in the future. These data are summarized below:

	Monthly-pre Experiment			Monthly-Experiment		
Headcount	Total	RIK	BAS	Total	RIK	BAS
Dining Halls	71252	52230	19022	64705	48850	15855
New Services				22376	18763	3613
TOTAL	71252	52230	19022	87081	67613	19468
% Increase				22.2	29.5	2.3
Attendance Rate	9.7	31.4	3.4	12.0	35.1	3.7
% Increase				23.3	11.7	8.6

4. A comparison of the average monthly attendance data for the November 1972 - January 1973 and the November 1973 - January 1974 experimental period (to eliminate the possibility of any seasonal effects) indicated a 32.1% increase in combined RIK and BAS headcount attendance. Due to a 0.7% decrease in the present for duty strength during that time, the attendance rate increased by 33.0%. These data are noted following:

	Monthly-pre Experiment			Monthly-Experiment		
	TOTAL	RIK	BAS	TOTAL	RIK	BAS
Headcount	63353	38847	24506	83689	64750	18939
% Change				+32.1	+66.7	-22.7
Attendance Rate	8.7	30.1	4.1	11.5	33.6	3.6
% Change				+33.0	+11.7	-12.8

5. As the following table indicates for BAS system users, residence location was a most important factor in determining the frequency of dining facility usage.

	Percent of Population	Percent of Actual BAS Attendance
On Post In Dormitories	20.5	45.9
On Post Not In Dormitories	24.2	14.0
Off Post	55.3	42.1
	100.0	100.0

6. Table 3 of the report indicates that a BAS system user's residence location was also a very significant factor in determining his or her meal utilization rates. Utilization rates for BAS personnel not residing in dormitories were lowest for all meals except dinner (i.e., when it was most inconvenient for them to eat elsewhere). Utilization rates for those BAS individuals living in dormitories were higher than for the non-dormitory groups at meals served at other than the regular duty hours (i.e., supper, specialty meal, and midnight meal).

7. Below are noted the percentages of zero-users (first column) and users who attended no more than twenty-one meals (second column) by ration status and residence location for the duration of the experiment.

RIK	0.0	17.2
BAS In Dormitories	42.2	73.8
BAS Not In Dormitories	58.4	93.2
BAS Total	55.0	89.3
RIK and BAS	38.0	66.9

Of those that utilized the system at least once during the experiment, RIK personnel attended five times as frequently as the BAS personnel. Those BAS dormitory residents who used the system attended on a much more regular basis than did those BAS non-dormitory residents who utilized the system.

The data conclusively show that the capital and operational expenditures associated with the food service system at Travis AFB are not significantly contributing to the welfare or benefit of the BAS customers except on an infrequent basis. Before this study and experiment subjective considerations speculated that the BAS group living in dormitories would utilize the system perhaps as frequently as the RIK customer group. However, it is clearly shown above that, even though this barracks BAS group used the system significantly more than the non-barrack BAS personnel, their utilization rate

was still low enough that most of the benefits they derived from food service were very predominantly received outside the military system of food service.

This fact is especially interesting and significant in relation to the experimental food service system implemented at Travis. Considerable effort was expended to institute high preference food item menus, to modify and renovate dining halls, and to make available three new food operations. In spite of these improvements BAS utilization, even though 8.6% higher than before the experiment, was definitely not high enough to imply that the typical BAS customer was deriving significant and/or sustained benefits from the military system of food service. It appears that the only benefit provided to the average BAS customer was to have the military food service system available to him or her when he or she had the infrequent desire and/or need to use it.

8. Of all RIK and BAS customers that ate once on a given day, 48.4% and 11.9% of them, respectively, ate at least twice on that same day.

9. When a system user changed ration status from RIK to BAS his or her utilization rate decreased some threefold from 0.78 to 0.27 meals per person per day.

10. The modular facility served 11.4% of all meals attended in all dining facilities after the facility's opening. Approximately 93.7% of all modular unit meals were served to RIK personnel. For a 54-day sampling period, 20.1% of the facility's users were new customers, individuals for whom there was no record of attendance in any dining facility prior to the opening of the unit. The modular facility increased the attendance of regular system customers who utilized the modular service by 13.9%.

11. The flight line facility served 6.5% of all meals attended in all dining facilities after the service was begun. Some 40.0% of all flight line meals were attended by BAS personnel, who after the facility opened attended only 23.0% of all RIK and BAS meals served. The facility brought into the dining facility system a considerable number of new BAS customers because it was utilized primarily by night shift personnel, who would not have had the opportunity to attend other dining facility meals.

12. The specialty meal service served 5.8% of all meals attended in all dining facilities after the service began. Approximately 90% of all specialty meals were attended by RIK customers, the primary dormitory residents for whom the service was designed and operated. For the most part, the specialty meal was attended not in addition to the supper meal but as an alternative to it.

13. For a specific 50-day sampling period during the experiment 79.2% of all meals attended were the regular dining hall meals. The corresponding percentages for the individual RIK and BAS user groups were, respectively, 79.1% and 79.8%. The near equality of these two percentages might at first seem incorrect given that the modular unit and specialty meal were attended primarily by the RIK users. This factor, however, must be balanced by the 38.2% BAS headcount attendance at the flight line facility during that period.

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APPENDIX I

DINING FACILITY MEAL SCHEDULE

	Weekdays	Weekends
Dining Hall 1		
Breakfast	0630 - 0830	0600 - 1000
Dinner	1100 - 1300	1400 - 2000
Supper	1700 - 2000	
Midnight Meal	2300 - 0100	2300 - 0100
Dining Hall 3		
Breakfast	0600 - 0800	0700 - 1000
Dinner	1100 - 1300	1100 - 1500
Supper	1500 - 1800	
Dining Hall 7		
Breakfast	0600 - 0800	0700 - 1000
Dinner	1100 - 1300	1100 - 1500
Supper	1600 - 1800	
Specialty	1900 - 2100	1700 - 2000
Flight Line		
Early	1630 - 1900	1630 - 1900
Late	2230 - 0200	2230 - 0200
Modular Unit	1100 - 2130	1100 - 2130