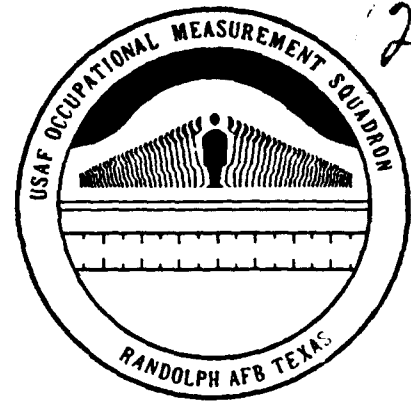


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UNITED STATES
AIR FORCE



OCCUPATIONAL SURVEY REPORT

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OCT. 12 1993

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AIR LAUNCHED MISSILE SYSTEMS

AFSC 466X0

AFPT 90-466-965

JULY 1993

93-23916

2/12/93

OCCUPATIONAL ANALYSIS PROGRAM
USAF OCCUPATIONAL MEASUREMENT SQUADRON
AIR EDUCATION and TRAINING COMMAND
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PREFACE

This report presents the results of an Air Force Occupational Survey of the Air Launched Missile Systems career ladder (AFSC 466X0). Authority for conducting occupational surveys is contained in AFR 35-2. Computer products used in this report are available for use by operations and training officials. Chief Master Sergeant Wendell L. Beaty, Inventory Development Specialist, developed the survey instrument; Second Lieutenant Blair W. Conroy, Occupational Analyst, analyzed the data and wrote the final report. Ms Rebecca R. Hernandez provided computer programming support and Mr Richard G. Ramos provided administrative support. Major Randall C. Agee, Chief, Airman Analysis Section, Occupational Analysis Flight, USAF Occupational Measurement Squadron, reviewed and approved this report for release.

Copies of this report are distributed to Air Staff sections, major commands, and other interested training and management personnel. Additional copies are available upon request to the USAF Occupational Measurement Squadron, 1550 5th Street East, Attention: Chief, Occupational Analysis Flight (OMY), Randolph Air Force Base, Texas 78150-4449 (DSN 487-6623).

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SUMMARY OF RESULTS

1. Survey Coverage: Survey results are based on 588 respondents from AFSC 466X0, representing 74 percent of the eligible population. This is the first Occupational Survey Report (OSR) for this newly renamed AFSC. It was created under the auspices of Rivet Workforce, when AFSC 411X0B/C was renamed and AFSC 411X0C was deleted with the retirement of the Ground Launched Cruise Missile System. The latest study prior to the 31 October 1989 restructure is the OSR of the Air Launched Missile Systems Maintenance career ladder, AFSC 411X0B/C, published in April 1988.
2. Career Ladder Structure: Structure analysis identified two job clusters and five independent job types. Personnel in the Missile Maintenance cluster comprise 51 percent of the sample and perform a wide variety of technical tasks. The five independent jobs identified vary from administrative support and management to highly technical electronics maintenance.
3. Career Ladder Progression: Personnel in the Air Launched Missile Systems career ladder show a typical pattern of career ladder progression. Three-skill level personnel perform essentially technical tasks; 5-skill levels show a moderate shift toward supervisory functions with members still spending more than half of their job time performing technical duties. Seven-skill level personnel spend the majority of their duty time performing managerial and supervisory functions, with a smaller percentage of time dedicated to technical duties. The 9-skill levels and chief enlisted managers are the top level managers performing supervisory and administrative tasks almost exclusively. Specialty descriptions in AFR 39-1 provide a broad and accurate overview of tasks and duties performed within the career ladder.
4. Training Analysis: A match of survey data to the AFSC 466X0 Specialty Training Standard (STS) identified 70 line items on the STS not supported by survey data. A similar match of data to the Plan of Instruction (POI) for the C3ABR46630 000 course revealed that eight POI learning objectives are not supported. Career ladder functional managers and training personnel should carefully review these unsupported STS and POI items to justify their continued inclusion in the training documents.
5. Job Satisfaction Analysis: Overall, AFSC 466X0 respondents are satisfied with their jobs. When compared to other mission equipment maintenance personnel surveyed in 1992, AFSC 466X0 personnel show relatively lower job satisfaction. When compared to the 1988 (AFSC 411X0B/C) OSR, survey data reveal little or no change in job satisfaction among AFSC 466X0 career ladder respondents. A comparison between major jobs identified in the current sample reveals that members in the Munitions Controller job have the highest level of job satisfaction, while personnel in the Support Equipment Maintenance job are the least satisfied.
6. Implications: The AFSC 466X0 career ladder structure identified in this report is similar to that found in the previous 1988 (AFSC 411X0B/C) OSR. The AFR 39-1 job descriptions accurately describe the jobs and tasks performed by personnel at all skill levels, and overall satisfaction was positive for the

jobs identified. Analysis of the training documents indicates that both the STS and POI contain a number of unsupported areas which should be reviewed to determine if inclusion in future revisions of these documents is warranted.

OCCUPATIONAL SURVEY REPORT (OSR)
AIR LAUNCHED MISSILE SYSTEMS CAREER LADDER
(AFSC 466X0)

INTRODUCTION

This is a report of an occupational survey of the Air Launched Missile Systems career ladder conducted by the Occupational Analysis Flight, USAF Occupational Measurement Squadron. The Technical Training Operations Directorate of Headquarters, Air Education Training Command, Randolph AFB TX, requested this survey to review the classification, training, and personnel utilization of this career ladder subsequent to its creation under Rivet Workforce. Previous surveys pertaining to this career ladder were published prior to the retirement of the Ground Launched Cruise Missile System (AFSC 411X0C). The last OSR was dated April 1988. This survey is the first for the newly renamed AFSC.

Background

As described in the AFR 39-1 Specialty Descriptions for AFSC 466X0, 3- and 5-skill level members perform on- and off-equipment maintenance on strategic bomber-launched missiles, missile subsystems, missile integration systems, and related test, support, and handling equipment. They also operate, maintain, and calibrate automatic and manual test equipment. Seven-skill level members supervise on- and off-equipment maintenance on strategic bomber-launched missiles, missile subsystems, and related test, support, and handling equipment. They also maintain inspection and maintenance records while supervising maintenance activities. Nine-skill level members and chief enlisted managers (CEMs) superintend maintenance activities engaged in on- and off-equipment of air launched missile systems and support or test equipment. They plan, direct, and inspect maintenance functions.

Initial 3-skill level training for AFSC 466X0 personnel is provided through courses at Chanute AFB IL. Entry into the career ladder currently requires an Armed Forces Vocational Aptitude Battery (ASVAB) Electrical 67 and a strength factor of G or 40 lbs.

SURVEY METHODOLOGY

Inventory Development

The data collection instrument for this occupational survey was USAF Job Inventory (JI) AFPT 90-466-965, dated November 1991. A tentative task list was prepared after reviewing pertinent career ladder publications and

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directives, and tasks from the Specialty Training Standard (STS) dated April 1991. The preliminary task list was refined and validated through personal interviews with 24 subject-matter experts (SMEs) at the following units:

<u>BASE</u>	<u>UNIT VISITED</u>
Chanute AFB IL	3340th Technical Training Group
Carswell AFB TX	7th Missile Maintenance Squadron
Dyess AFB TX	96th Field Maintenance Squadron
K.I. Sawyer AFB MI	410th Missile Maintenance Squadron
Offutt AFB NE	HQ Strategic Air Command

The units selected were recommended by MAJCOM Functional Managers for visit based on their particular missile maintenance activities.

The resulting JI contained a listing of 608 tasks grouped under 12 duty headings. A background section requested information such as grade, job title, time in present job, time in service, job satisfaction, and equipment maintained in performance of the incumbent's job.

Survey Administration

From February through July 1992, Military Personnel Flights (formerly CBPOs) at operational bases nationwide administered the inventory to all eligible DAFSC 466X0 personnel. Members eligible for the survey consisted of the total assigned population, excluding the following: (1) hospitalized personnel; (2) personnel in transition for a permanent change of station; (3) personnel retiring during the time inventories were administered to the field; and (4) personnel in their jobs less than 6 weeks. Participants were selected from a computer-generated mailing list obtained from personnel data tapes maintained by the Human Resources Directorate, Armstrong Laboratory, Brooks AFB TX.

Each individual who completed the inventory first filled in an identification and biographical information section, then identified each task they performed in their current job by placing a check mark by those tasks. After identifying all tasks performed, each individual rated each task on a 9-point scale showing relative time spent on that task compared to all other tasks identified. Ratings ranged from 1 (very small amount time spent) through 5 (about average time spent) to 9 (very large amount spent).

To determine relative time spent for each task identified by a respondent, all the incumbent's ratings are assumed to account for 100 percent of that member's time spent on the job and are summed. Each task rating is then divided by the total number of task ratings and multiplied by 100 to

provide a relative percentage of time for each task. This procedure provides a basis for comparing tasks in terms of both percent members performing and average percentage of time spent on a particular task.

Survey Sample

Personnel participating in this survey were selected to ensure an accurate representation across bases and paygrades. The 588 respondents in the final sample represent 74 percent of all eligible AFSC 466X0 personnel. Tables 1 and 2 reflect the distribution of the sample across paygrades. As shown by this table, the survey sample accurately reflects an overall AFSC 466X0 population.

Task Factor Administration

Job descriptions alone may not provide sufficient data for making decisions concerning career ladder documents or training programs. Task factor information is routinely collected as part of an occupational survey to provide a more complete analysis of the career ladder. To obtain required task factor data, selected senior AFSC 466X0 personnel (generally E-6 or E-7 technicians) also completed a second booklet for either training emphasis or task difficulty. These booklets were processed separately from the job inventories. This information is used in a number of analyses discussed in more detail within this report.

Task Difficulty (TD). TD is defined as an estimate of the length of time the average airman takes to learn how to perform a task. Thirty-eight experienced NCOs rated the difficulty of the inventory tasks on a 9-point scale ranging from 1 (easy to learn) to 9 (difficult to learn). Interrater agreement was acceptable. TD ratings are normally adjusted so tasks of average difficulty have a value of 5.0, with a standard deviation of 1.0. Thus, any task with a TD rating of 6.00 or above is considered difficult to learn.

Training Emphasis (TE). TE is defined as the amount of structured training first-enlistment personnel need to perform tasks successfully. Structured training is defined as training provided by resident technical schools, field training detachments (FTD), mobile training teams (MTT), formal on-the-job training (OJT), or any other organized training method. Fifty-one experienced AFSC 466X0 NCOs rated the tasks in the inventory on a 10-point scale ranging from 0 (no training required) to 9 (extremely high amount of training required). The interrater agreement for these 51 raters was acceptable. The average TE rating is 1.83, with a standard deviation of 1.34. Any task with a TE rating of 3.17 or greater is considered to have a high TE.

When used in conjunction with the primary criterion of percent members performing, TD and TE ratings can provide insight into first-term personnel training requirements. Such insights may suggest a need for lengthening or shortening portions of instruction supporting AFS entry-level jobs.

TABLE 1
SAMPLE DISTRIBUTION

TOTAL ASSIGNED = 920
 TOTAL ELIGIBLE = 796
 TOTAL IN SAMPLE = 588
 PERCENT OF ASSIGNED IN SAMPLE = 64%
 PERCENT OF ELIGIBLE IN SAMPLE = 74%

TABLE 2
PAYGRADE DISTRIBUTION OF SURVEY SAMPLE

<u>PAYGRADE</u>	<u>PERCENT OF ASSIGNED</u>	<u>PERCENT OF SAMPLE</u>
E-1 to E-3	26	25
E-4	25	30
E-5	23	24
E-6	11	10
E-7	10	7
E-8	3	3
E-9	1	1

SPECIALTY JOBS (Career Ladder Structure)

The first step in the analysis process is to identify the structure of the career ladder in terms of the jobs performed by the respondents. Comprehensive Occupational Data Analysis Programs (CODAP) assist by creating individual job descriptions for each respondent based on the tasks performed and relative amount of time spent on the tasks. The CODAP automated job clustering program then compares all the individual job descriptions, locates the two descriptions with the most similar tasks and time spent ratings, and combines them to form a composite job description. In successive stages, new members are added to this initial group, or new groups are formed based on the similarity of tasks and time spent ratings. This process continues until all respondents possible are included in a group.

The basic group used in the hierarchical clustering process is the job. When two or more jobs have a substantial degree of similarity in tasks performed and time spent on tasks, they are grouped together and identified as a cluster. The structure of the career ladder is then defined in terms of jobs and clusters of jobs.

Overview of Specialty Jobs

Based on the similarity of tasks performed and the amount of time spent performing each task, two clusters and five jobs were identified within the survey sample. Figure 1 illustrates the division of jobs performed by AFSC 466X0 personnel. A listing of these jobs is provided below. Table 3 presents the relative time spent by respondents in each duty for each job, while Table 4 shows selected background information for each job. The stage (STG) number shown beside each title references computer-printed information; the letter ("N") stands for the number of personnel in each group.

- I. MISSILE MAINTENANCE CLUSTER (STG043, N=300)
- II. SUPPLY JOB (STG058, N=26)
- III. SUPPORT EQUIPMENT MAINTENANCE JOB (STG075, N=15)
- IV. ELECTRONIC EQUIPMENT MAINTENANCE JOB (STG085, N=56)
- V. MUNITIONS CONTROLLER JOB (STG148, N=20)
- VI. MISSILE ANALYST JOB (STG073, N=17)
- VII. MISSILE MAINTENANCE MANAGEMENT CLUSTER (STG039, N=81)

AFSC 466X0
CAREER LADDER STRUCTURE

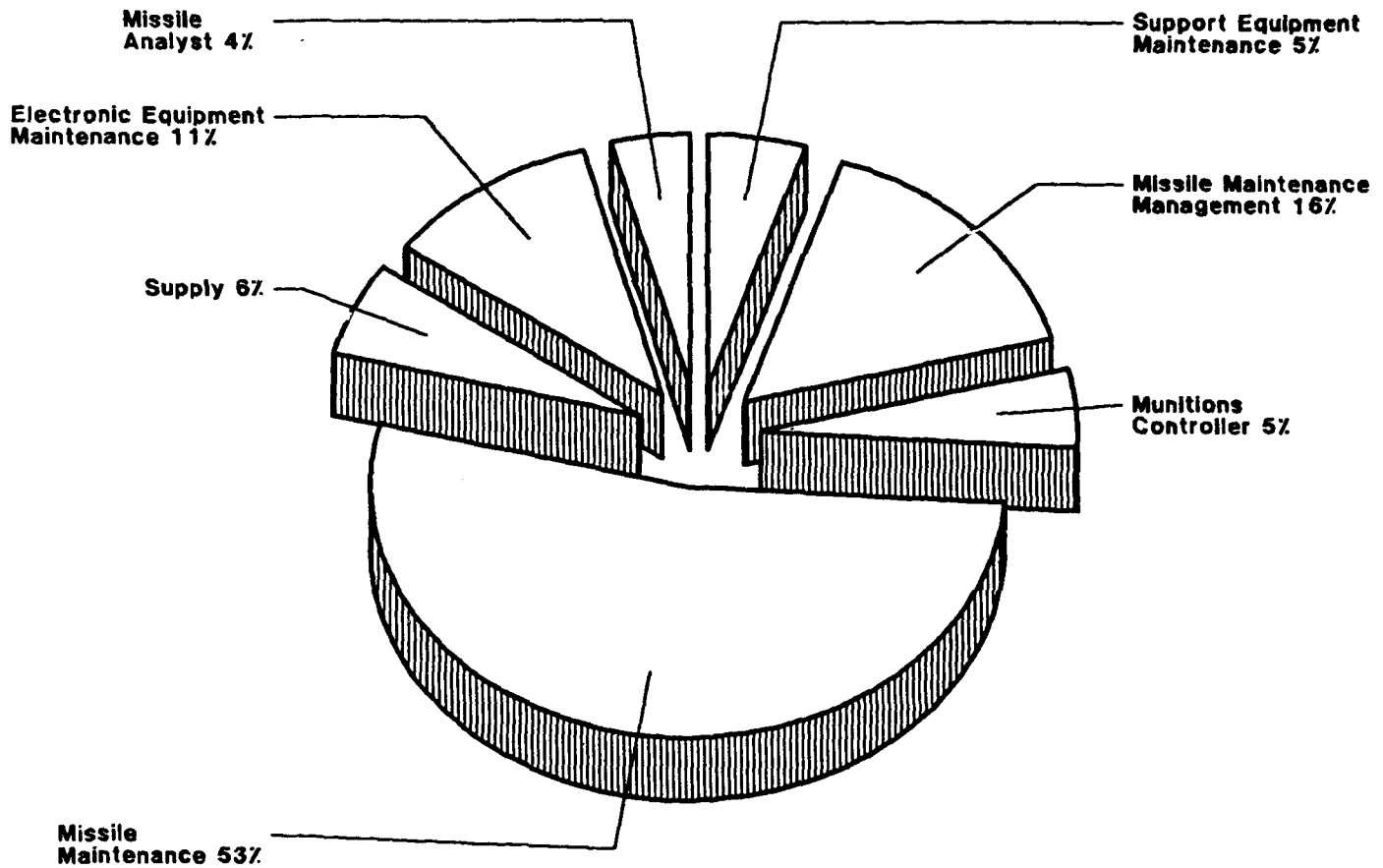


FIGURE 1

TABLE 3

DISTRIBUTION OF TIME SPENT ACROSS DUTIES BY MEMBERS IN CAREER LADDER JOBS
(RELATIVE PERCENT OF JOB TIME SPENT)

DUTIES	MISSILE MAINTENANCE CLUSTER (N=300)	SUPPLY (N=26)	SUPPORT EQUIPMENT MAINTENANCE (N=15)	ELECTRONIC EQUIPMENT MAINTENANCE (N=56)
A ORGANIZING AND PLANNING	1	6	3	2
B DIRECTING AND IMPLEMENTING	3	7	3	2
C INSPECTING AND EVALUATING	2	9	2	3
D TRAINING	2	2	*	1
E PERFORMING ADMINISTRATIVE FUNCTIONS	10	54	21	14
F PERFORMING GENERAL MISSILE MAINTENANCE ACTIVITIES	27	19	42	20
G MAINTAINING MISSILE MECHANICAL SUPPORT EQUIPMENT	5	3	26	3
H MAINTAINING MISSILE ELECTRIC OR ELECTRONIC SUPPORT EQUIPMENT	2	*	2	53
I MAINTAINING AIRCRAFT PYLONS OR ROTARY LAUNCHERS	7	0	0	*
J MAINTAINING AGM-69A MISSILES	21	0	*	*
K MAINTAINING AGM-86B MISSILES	16	0	0	*
L MAINTAINING AGM-129A MISSILES	1	0	*	*

* Denotes less than 1 percent

TABLE 3 (CONTINUED)

DISTRIBUTION OF TIME SPENT ACROSS DUTIES BY MEMBERS IN CAREER LADDER JOBS
(RELATIVE PERCENT OF JOB TIME SPENT)

DUTIES	MUNITIONS CONTROLLER (N=20)	MISSILE ANALYST (N=17)	MISSILE MAINTENANCE MANAGEMENT CLUSTER (N=81)
A ORGANIZING AND PLANNING	11	9	18
B DIRECTING AND IMPLEMENTING	36	19	21
C INSPECTING AND EVALUATING	4	13	19
D TRAINING	1	3	7
E PERFORMING ADMINISTRATIVE FUNCTIONS	47	56	29
F PERFORMING GENERAL MISSILE MAINTENANCE	*	*	3
G MAINTAINING MISSILE MECHANICAL SUPPORT EQUIPMENT	0	0	*
H MAINTAINING MISSILE ELECTRIC OR ELECTRONIC SUPPORT EQUIPMENT	0	0	*
I MAINTAINING AIRCRAFT PYLONS OR ROTARY LAUNCHERS	0	0	*
J MAINTAINING AGM-69A MISSILES	0	0	*
K MAINTAINING AGM-86B MISSILES	0	0	0
L MAINTAINING AGM-129A MISSILES	0	0	0

* Denotes less than 1 percent

TABLE 4

SELECTED BACKGROUND DATA FOR CAREER LADDER

	MISSILE MAINTENANCE CLUSTER	SUPPLY	SUPPORT EQUIPMENT MAINTENANCE	ELECTRONIC EQUIPMENT MAINTENANCE
NUMBER IN GROUP	300	26	15	56
PERCENT OF SAMPLE	51%	4%	3%	9%
PERCENT IN CONUS	97%	96%	100%	98%
DAFSC DISTRIBUTION				
46630	32%	0	20%	5%
46650	56%	81%	73%	59%
46670	12%	19%	7%	36%
46690	0	0	0	0
46600	0	0	0	0
PAYGRADE DISTRIBUTION				
E-1 to E-3	42%	0	33%	5%
E-4	33%	54%	47%	36%
E-5	21%	27%	20%	45%
E-6	4%	12%	0	13%
E-7	2%	8%	0	2%
E-8	0	0	0	0
E-9	0	0	0	0
AVERAGE NUMBER OF TASKS PERFORMED	120	55	41	172
AVERAGE MONTHS TAFMS	59	106	60	94
PERCENT IN FIRST ENLISTMENT	50%	12%	67%	8%
PERCENT SUPERVISING	36%	46%	20%	46%

* Denotes less than 1 percent

TABLE 4 (CONTINUED)
SELECTED BACKGROUND DATA FOR CAREER LADDER JOBS

	MUNITIONS CONTROLLER	MISSILE ANALYST (STG73)	MISSILE MAINTENANCE MANAGEMENT CLUSTER (STG39)
NUMBER IN GROUP	20	17	81
PERCENT OF SAMPLE	3%	3%	14%
PERCENT IN CONUS	100%	100%	99%
DAFSC DISTRIBUTION			
46630	0	0	0
46650	85%	82%	10%
46670	15%	18%	63%
46690	0	0	16%
46600	0	0	11%
PAYGRADE DISTRIBUTION			
E-1 to E-3	15%	12%	0
E-4	55%	53%	0
E-5	30%	24%	11%
E-6	0	6%	28%
E-7	0	6%	33%
E-8	0	0	20%
E-9	0	0	7%
AVERAGE NUMBER OF TASKS PERFORMED			
AVERAGE TAFMS (MOS)	35	20	74
PERCENT IN FIRST ENLISTMENT	70	86	205
PERCENT SUPERVISING	25%	24%	0
	10%	24%	79%

Respondents performing these jobs account for 87 percent of the survey sample. The remaining 13 percent were performing tasks or series of tasks which did not group with any of the defined jobs. Two examples include 5 junior respondents performing mostly guard duties and 10 respondents in the non-technical job area that only perform an average of 18 tasks. Based on the number of tasks performed, both of these jobs are limited compared to other jobs in the ladder.

Group Descriptions

The following paragraphs contain brief descriptions of the two clusters and five jobs identified through the career ladder structure analysis. Appendix A lists representative tasks for each group.

I. MISSILE MAINTENANCE CLUSTER (STG043, N=300). The jobs in this cluster deal with the major technical aspects of the career ladder. Members of this cluster are involved with cleaning, testing, transporting, and storing the missiles they support. This is shown by the amount of time they spend on duties such as General Missile Maintenance (27 percent), Maintaining AGM-69A (21 percent), and Maintaining AGM-86B (16 percent). The amount of time spent in these duties is higher than for any other job (see Table 3). These jobs are also fairly broad as members perform an average of 120 tasks that deal with maintaining specific weapons systems. The following are typical tasks members perform:

- clean missile surfaces
- inspect equipment for corrosion
- evaluate damage to missile surfaces
- perform AGM-69A missile role transfer procedures
- perform AGM-86B missile hoist transfer procedures
- safetywire equipment
- pack or unpack missile components

There are four job variations. The first deals exclusively with maintaining the AGM-69A missile. This job involves an average of 125 maintenance tasks dealing with the Short Range Attack Missile. The only tasks not performed involve calibration and testing of internal electronic components, such as the cooling control unit (CCU). While most members hold the 5- or 7-skill level, they are relatively inexperienced, as they average 4 years' time in the field. More than 75 percent are in their first enlistment.

The second job variation is AGM-86B, Maintenance. Members with this job repair missile surfaces, check engine performance, and transport the weapons. They have slightly more time in the service than those maintaining the AGM-69A missile. Total active federal military service (TAFMS) is 5 years and 3 months for this job.

The third variation, AGM-86B, Maintenance Shop Supervisor job, is performed by eight respondents, comprising little more than 1 percent of the sample. This is the broadest job in the survey, as members perform an average of 175 technical and supervisory tasks. They spend 27 percent of their time in technical duties and more than 30 percent in administration, counselling, tracking forms and reviewing forms, and completing EPRs. Members reported supervising an average of seven subordinates. Members of this job variation are predominantly E-5 with 8 years or more experience. Five members hold the 5-skill level, and three hold the 7-skill level.

The final variation of the cluster is the Pylon and Rotary Launcher Maintenance job. The 6 respondents in this job perform an average of 50 tasks, making it one of the most limited jobs in the sample. Members work with pylons for the AGM-86B almost exclusively. They perform missile transfers, as well as surface inspections and other general missile maintenance activities. All but one hold the rank of E-4, and two-thirds hold the 5-skill level. They have an average experience level of 4 years' active military service, making them the most junior respondents in the survey.

II. SUPPLY JOB (STG058, N=26). Supply is a limited job, compared to the breadth of the Missile Maintenance cluster. These 26 incumbents perform an average of 55 tasks, which entail tracking supply logs and equipment issue logs. The members of this job also fill out and track a variety of forms, such as equipment issue and supply logs. Members with this job are distinguished by the time they spend performing the following representative tasks:

- make entries on AF Forms 2005 (Issue/Turn-in Request)
- coordinate bench stock or supply requirements
- inventory equipment, tools, or supplies
- review AF Forms 2005 (Issue/Turn-in Request)
- review AFTO Forms 350 (Repair Item Processing Tag)
- make entries on AF Forms 2413 (Supply Control Log)

Fourteen of the twenty-six members of this job hold the rank of E-4. Twenty-one hold the 5-skill level. The average time in military service is 106 months.

III. SUPPORT EQUIPMENT MAINTENANCE JOB (STG075, N=15). The Support Equipment Maintenance job is also rather limited, as members perform an average of 41 tasks. Support equipment maintenance involves spending large amounts of time on general missile maintenance, support equipment maintenance, and administrative functions. Members are responsible for mechanical components of test equipment, such as missile test stands, guided-missile hydraulic fluid maintenance kits, and nitrogen charging adaptor kits. Members perform tasks such as the following:

- clean missile support equipment
- perform corrosion control procedures
- remove or replace nonelectronic support equipment
 - mechanical components
- inspect equipment on receipt
- remove or replace gaskets, seals, or packing
- inventory equipment, tools, or supplies

Eleven of the fifteen members with this job hold the 5-skill level, 7 are in paygrade E-4, and they average 60 months' TAFMS.

IV. ELECTRONIC EQUIPMENT MAINTENANCE JOB (STG085, N=56). The Electronic Equipment Maintenance job is the broadest in the ladder, involving an average of more than 170 tasks. The bulk of this job deals with maintaining electronic system test stands (ESTS) and other electronic components used in all phases of missile system testing and deployment. This includes a variety of calibrations and functional trouble shooting of cooling units, radar assemblies, and indicator lights or gauges. Typical tasks performed by members with the job include:

- clean electronic test equipment
- perform ESTS operational assurance tests
- align missile radar altimeter test assembly (MRATA) radio frequency (RF) circuits
- perform ESTS confidence tests
- perform self-tests on MRATAs
- align ESTS disc-drive adjustable parameters
- perform MRATA calibration factor loading procedures
- functionally test cooling control units (CCUs)
- calibrate MRATA power supplies
- perform fault isolations on MRATA active RF-control and
 - monitor components

Personnel with this job hold the rank of E-4 or E-5, average 94 months in military service, and hold either the 5- or 7-skill level.

V. MUNITIONS CONTROLLER JOB (STG148, N=20). The 20 AFSC 466X0 personnel with this job work essentially outside their specialty. They perform an average of 35 tasks dealing with tracking equipment and munitions, and monitoring the maintenance status of the different weapons systems and their supporting elements. They spend 47 percent of their time on duties dealing with general administrative tasks. Personnel with this focused job are distinguished by the time they spend on the following tasks:

- track equipment, weapons, or munitions movements
- monitor status of equipment, missiles, or munitions
- initiate maintenance work orders
- monitor status or work orders
- update status boards, such as items awaiting maintenance or parts
- direct movement of equipment

Eleven of the twenty respondents with this job hold the rank of E-4. The average time in service for members is 70 months, making them a somewhat experienced group. Seventeen members hold the 5-skill level, and three hold a 7-skill level.

VI. MISSILE ANALYST JOB (STG73, N=17). The Missile Analyst job is performed by the fewest respondents in the sample. This job also involves fewer tasks than any other job. Members with this job do mainly administrative duties as they record maintenance histories and analyze trends in the status of weapons systems. They are distinguished by the time they spend performing the following tasks:

- initiate or make entries on AFTO Forms 95 (Significant Historical Data)
- compile data for reports or staff studies
- monitor status of equipment, missiles, or munitions
- analyze maintenance trends
- update configuration status and accounting systems

More junior personnel perform this job. Eleven of the seventeen are in the paygrade E-4, and 14 hold the 5-skill level.

VII. MISSILE MAINTENANCE MANAGEMENT CLUSTER (STG039, N=81). The 81 incumbents in the Missile Maintenance Management cluster are grouped into three distinct job variations. All three variations share the common element of personnel management responsibilities. Seventy-nine percent reported that their jobs involve supervising others. Representative tasks performed by members of this cluster include:

- determine work priorities
- interpret directives, policies, or procedures for subordinates
- conduct briefings or meetings
- determine requirements for equipment, personnel, space, or supplies
- counsel personnel on personal or military-related matters

evaluate subordinates for compliance with performance standards
plan maintenance activities

The most senior personnel in the ladder perform these jobs, as members have an average of 14 years' TAFMS, and 63 percent hold the 7-skill level. There are subtle differences among these particular jobs. The emphasis of the jobs shifts from personnel management to program management as members move up the seniority ladder through the three jobs.

The tasks performed by members of the Shift Supervisor job, the first variation, are almost exclusively administrative in nature. Members assign maintenance tasks to personnel, review maintenance documentation, and directly supervise between 1 and 18 members. As with the other variations of this cluster, few, if any, technical tasks are performed. Members holding this job oversee the day-to-day operations of maintenance shops. Eight of the twelve members in this job hold the 7-skill level, and the predominant paygrade is E-6.

The second job variation is the Maintenance Superintendent job, which is the broadest management job variation. Maintenance Superintendents perform even more administrative tasks than the Shift Supervisors, as they spend more time interpreting regulations and maintenance directives. These respondents are also more senior, averaging 14 years' TAFMS, and more experienced, as most are in paygrade E-7.

The final job variation of the cluster is the Senior Manager job. Fifty percent of respondents' time is dedicated to planning, policy making, and resource utilization plans. The predominant paygrades are E-6 through E-8 and an average experience level of 16 years, making this the job most senior personnel perform.

Comparison of Current Job Structure to Previous Study

An OSR of the Missile Systems Maintenance (AFSC 411X0B/C) career ladder was last completed in April 1988. As mentioned previously, this AFSC was changed through Rivet Workforce in October 1989. The current sample includes AFSC 411X0B personnel; however, the C shred was deleted.

Table 5 lists the major jobs identified in the 1988 survey and current study. A review of the 1988 structure indicates that most of the jobs could be matched to similar jobs performed by current sample respondents. Overall, both clusters and all five jobs have an equivalent counterpart in the previous study. It is important to mention that the addition of the AGM-129A Advanced Cruise Missile System was in limited deployment at the time of the survey; therefore, it did not show up as a major part of these results. Conversations with Training Development personnel revealed that the limited deployment of the AGM-129A will continue, thus maintaining the low level of responses to related tasks.

TABLE 5
COMPARISON OF MAJOR JOBS BETWEEN SURVEYS

<u>CURRENT SURVEY AFSC 466X0 (N=588)</u>	<u>1988 SURVEY AFSC 411X0B/C (N=672)</u>
Missile Maintenance Cluster Support Equipment Maintenance Job	Missile Systems Checkout Cluster
Supply Job	Maintenance Supply Technicians
Electronic Equipment Maintenance Job	Verification and Checkout of Equipment (VACE)
Munitions Controller	Munitions Controller
Missile Analyst Job	Missile Maintenance Analysis
Missile Maintenance Management Cluster	AF/HQ Managers Section NCOIC Personnel
Not Identified in Current Survey	GLCM Personnel Cluster

ANALYSIS OF DAFSC GROUPS

An analysis of DAFSC groups, in conjunction with the analysis of the career ladder structure, is an important part of each occupational survey. The DAFSC analysis identifies differences in tasks performed at the various skill levels. This information may be used to evaluate how well career ladder documents, such as AFR 39-1 Specialty Descriptions and the STS, reflect what career ladder personnel are actually doing in the field.

The distribution of skill-level groups across the career ladder jobs is displayed in Table 6, while Table 7 offers another perspective by displaying percent time spent on each duty across the skill-level groups.

A typical pattern of progression is noted within the AFSC 466X0 career ladder, with personnel at the 3- and 5-skill levels spending most of their time on technical tasks. More relative time is spent on duties involving supervisory, managerial, and administrative tasks (see Table 7, Duties A, B, C, D, and E) as they move upward to the 7- and 9-skill levels.

Skill-Level Descriptions

DAFSC 46630. The 3-skill level, as an entry-level technical job, places most of its members in the Missile Maintenance cluster (see Table 6) performing general maintenance on both the AGM-69A and AGM-86B weapons systems. This is shown by the representative tasks listed in Table 8, most of which deal with repairing surfaces, inspecting equipment, and replacing components. Eighteen percent of the sample hold the 3-skill level.

DAFSC 46650. Five-skill level jobs require more experience and expertise and involve more advanced skills than the 3-levels. As Tables 6 and 7 show, over half the 5-skill levels are in the Missile Maintenance cluster. The Electronic Equipment Maintenance job holds 10 times as many 5-skill levels as 3-skill levels. In addition, the 5-skill level members begin to have Maintenance Management responsibilities. This shift in expertise is shown by representative tasks listed in Table 9. Note the administrative tasks not seen in 3-skill level tasks and the training functions. The basic difference between the 3- and 5-skill levels is that the 5-skill levels do everything the 3-skill levels do plus their supervisory tasks. This is best illustrated in the differentiating tasks list in Table 10.

DAFSC 46670. Seven-skill level jobs involve both technical and management responsibilities. Table 6 shows a greater percentage of incumbents performing Maintenance Management than general maintenance. Time spent on duties (Table 7) and representative tasks such as planning leave, conducting meetings, and writing recommendations for awards (Table 11) show the move away from purely technical responsibilities to supervisory and administrative. This shift is clearly shown by figures in Table 12, where a higher percentage of 5-skill levels perform technical tasks at the top, and a higher percentage of 7-skill levels perform supervisory and management tasks at the bottom. The 7-skill level respondents represent 25 percent of the sample.

TABLE 6

DISTRIBUTION OF SKILL-LEVEL MEMBERS
ACROSS CAREER LADDER JOB AREAS

JOBS	PERCENT MEMBERS			
	46630 (N=106)	46650 (N=307)	46670 (N=148)	46690/00 (N=27)
MISSILE MAINTENANCE CLUSTER	89	55	24	0
SUPPLY	0	7	3	0
SUPPORT EQUIPMENT MAINTENANCE	0	4	*	0
ELECTRONIC EQUIPMENT MAINTENANCE	3	11	13	0
MUNITIONS CONTROLLER	3	6	2	0
MISSILE ANALYST	0	5	2	0
MISSILE MAINTENANCE MANAGEMENT CLUSTER	0	2	34	79
NOT GROUPED (N=73)	5	10	22	21

* Denotes less than 1 percent

TABLE 7
TIME SPENT ON DUTIES BY MEMBERS OF SKILL-LEVEL GROUPS
(RELATIVE PERCENT OF JOB TIME)

DUTIES	46630 (N=106)	46650 (N=307)	46670 (N=148)	46690/00 (N=27)
A ORGANIZING AND PLANNING	*	3	11	22
B DIRECTING AND IMPLEMENTING	*	7	14	21
C INSPECTING AND EVALUATING	1	4	12	25
D TRAINING	*	3	6	4
E PERFORMING ADMINISTRATIVE FUNCTIONS	7	22	27	25
F PERFORMING GENERAL MISSILE MAINTENANCE	33	23	10	2
G MAINTAINING MISSILE MECHANICAL SUPPORT EQUIPMENT	6	4	2	*
H MAINTAINING MISSILE ELECTRIC OR ELECTRONIC SUPPORT EQUIPMENT	3	7	8	*
I MAINTAINING AIRCRAFT PYLONS OR ROTARY LAUNCHERS	6	4	2	0
J MAINTAINING AGM 69-A MISSILES	28	10	4	0
K MAINTAINING AGM 86-B MISSILES	12	10	4	0
L MAINTAINING AGM 129-A MISSILES	2	*	*	0

* Denotes less than 1 percent

TABLE 8
REPRESENTATIVE TASKS PERFORMED BY DAFSC 46630 PERSONNEL

TASKS	PERCENT MEMBERS PERFORMING (N=106)
F217 Inspect equipment or weapons for corrosion	93
F211 Clean missile surfaces	92
F207 Apply fillers, paints, sealers, or adhesives	89
F230 Perform corrosion control procedures	88
F222 Open or close alarmed facilities	88
F212 Evaluate damage to missile surfaces	79
F267 Safety-wire equipment	78
F228 Paint or stencil identifiers or instructions on equipment or weapons	76
F225 Pack or unpack missile components	76
J474 Perform AGM-69A missile roll transfer procedures	75
J470 Measure AGM-69A environmental control system (ECS) leakage rates	75
G273 Clean missile support equipment	74
F246 Remove or replace access covers, plates, panels, or raceway covers	73
J471 Perform AGM-69A level 1 checkouts	73
J478 Perform fin locking or unlocking procedures	73
J473 Perform AGM-69A missile hoist transfer procedures	71
J513 Repair silicone insulation	71
F208 Authenticate alarmed facility openings or closings	70
J493 Remove or replace electronic-section shells	70
F215 Identify safety hazards	70
J468 Check rocket motor nitrogen pressure	70
J476 Perform control-section water accumulation checks	69
F249 Remove or replace bonding materials	68
J508 Remove or replace separation-ignition switch (SIS) detent pins	68
F256 Remove or replace gaskets, seals, or packing	67
F216 Inspect equipment on receipt	66
F229 Perform area defense guard duties	66
J487 Remove or replace C&GEs	65
F209 Check electro-explosive devices	65
J510 Remove or replace SISs	66
F237 Perform missile conditioned-air leak checks	63
F232 Perform escort duties	63

TABLE 9
REPRESENTATIVE TASKS PERFORMED BY DAFSC 46650 PERSONNEL

TASKS	PERCENT MEMBERS PERFORMING (N=307)
F222 Open or close alarmed facilities	72
F217 Inspect equipment or weapons for corrosion	69
F207 Apply fillers, paints, sealers, or adhesives	68
F230 Perform corrosion control procedures	67
E136 Make entries on AF Forms 2432 (Key Issue Log)	65
E196 Update CAMS data	61
F216 Inspect equipment on receipt	60
F267 Safetywire equipment	60
F215 Identify safety hazards	59
F210 Clean electronic test equipment	58
E150 Make entries on AFTO Forms 350 (Reparable Item Processing Tag)	58
F211 Clean missile surfaces	57
E156 Make entries on DD Forms 1574 (Serviceable Tag - Materiel)	57
F212 Evaluate damage to missile surfaces	55
G273 Clean missile support equipment	54
E131 Make entries on AF Forms 2005 (Issue/Turn-in Request)	54
F228 Paint or stencil identifiers or instructions on equipment or weapons	54
F229 Perform area defense guard duties	53
F246 Remove or replace access covers, plates, panels, or raceway covers	53
F232 Perform escort duties	53
F208 Authenticate alarmed facility openings or closings	52
F256 Remove or replace gaskets, seals, or packing	52
F225 Pack or unpack missile components	51
E160 Make entries on DD Forms 1577-2 (Unserviceable (Reparable) Tag - Materiel)	51
E147 Make entries on AFTO Forms 244 (Industrial/Support Equipment Record)	46
E159 Make entries on DD Forms 1577 (Unserviceable (Condemned) Tag - Materiel)	45
E167 Monitor status of equipment, missiles, or munitions	45
F252 Remove or replace electrical cables or connectors	45
D88 Conduct QJT	43
F237 Perform missile conditioned-air leak checks	43
H336 Perform ESTS confidence tests	43
F245 Perform weapons systems time compliance technical order (TCTO) modifications	42

TABLE 10

TASKS WHICH BEST DIFFERENTIATE BETWEEN DAFSC
46630 AND DAFSC 46650 PERSONNEL
(PERCENT MEMBERS PERFORMING)

TASKS	46630 (N=106)	46650 (N=307)	DIFFERENCE
J470 Measure AGM-69A environmental control system (ECS) leakage rates	75	32	43
J513 Repair silicone insulation	71	30	41
J471 Perform AGM-69A level 1 checkouts	73	32	41
J478 Perform fin locking or unlocking procedures	73	32	41
J474 Perform AGM-69A missile roll transfer procedures	75	35	40
J493 Remove or replace electronic-section shells	70	31	39
J473 Perform AGM-69A missile hoist transfer procedures	71	32	39
J510 Remove or replace SISs	66	28	38
D88 Conduct QJT	8	43	-36
C55 Conduct performance feedback worksheet (PFW) sessions	0	35	-35
C80 Write EPRs	0	35	-35
B24 Assign maintenance tasks to personnel	1	35	-34
B31 Counsel personnel on personal or military-related matters	1	33	-32
D92 Counsel trainees on training progress	0	28	-28
A5 Determine work priorities	6	34	-28
D86 Certify personnel for task performance	0	27	-27

TABLE 11

REPRESENTATIVE TASKS PERFORMED BY DAFSC 46670 PERSONNEL

TASKS	PERCENT MEMBERS PERFORMING
A5 Determine work priorities	70
C80 Write EPRs	69
C55 Conduct performance feedback worksheet (PFW) sessions	66
E167 Monitor status of equipment, missiles, or munitions	64
B31 Counsel personnel on personal or military-related matters	62
C81 Write recommendations for awards or decorations	59
E196 Update CAMS data	59
B42 Interpret directives, policies, or procedures for subordinates	58
C67 Evaluate subordinates for compliance with performance standards	57
B25 Assign maintenance tasks to personnel	54
A11 Establish performance standards for subordinates	53
B45 Supervise Air Launched Missile Systems Specialists (AFSC 46650)	52
E168 Monitor status of work orders	50
C56 Conduct self-inspection programs	50
E131 Make entries on AF Forms 2005 (Issue/Turn-in Request)	50
A4 Determine requirements for equipment, personnel, space, or supplies	49
E136 Make entries on AF Forms 2432 (Key Issue Log)	49
E156 Make entries on DD Forms 1574 (Serviceable Tag - Materiel)	49
E150 Make entries on AFTO Forms 350 (Reparable Item Processing Tag)	49
B41 Initiate maintenance work orders	48
A24 Schedule leaves or passes	48
F217 Inspect equipment or weapons for corrosion	47
A9 Develop work methods or procedures	47
F215 Identify safety hazards	46
B52 Write recommendations for changes in procedures	45
E178 Review AFTO Forms 244 (Industrial/Support Equipment Record)	45
E130 Make entries on AF Forms 1800 (Operator's Inspection Guide and Trouble Report (General Purpose Vehicles))	45
E129 Make entries on AF Forms 1297 (Temporary Issue Receipt)	45
D88 Conduct OJT	45
E147 Make entries on AFTO Forms 244 (Industrial/Support Equipment Record)	45
C73 Inventory equipment, tools, or supplies	43
B27 Conduct briefings or meetings	43

TABLE 12

TASKS WHICH BEST DIFFERENTIATE BETWEEN DAFSC
46650 AND DAFSC 46670 PERSONNEL
(PERCENT MEMBERS PERFORMING)

TASKS	46650 (N=307)	46670 (N=148)	DIFFERENCE
F207 Apply fillers, paints, sealers, or adhesives	68	33	35
F222 Open or close alarmed facilities	72	39	32
F230 Perform corrosion control procedures	67	35	32
F228 Paint or stencil identifiers or instructions on equipment or weapons	54	24	31
F211 Clean missile surfaces	57	27	30
F229 Perform area defense guard duties	53	24	29
F267 Safetywire equipment	60	31	29
F246 Remove or replace access covers, plates, panels, or raceway covers	53	26	27
A24 Schedule leaves or passes	7	48	-41
C81 Write recommendations for awards or decorations	21	59	-39
A5 Determine work priorities	34	70	-37
C80 Write EPRs	35	69	-34
C56 Conduct self-inspection programs	16	50	-34
B27 Conduct briefings or meetings	11	44	-33
A16 Plan meetings or briefings	4	36	-32
A19 Plan work assignments	18	50	-32

DAFSC 46690/CEM. The job of the more senior members requires almost no technical involvement, but focuses on management activities. Nine-skill level and CEM respondents reported spending nearly 70 percent of their time on duties involving directing, organizing, and inspecting of maintenance programs and personnel (see Table 7). This is shown by their representative tasks performed, such as planning layouts of facilities and writing staff studies (Table 13) and by distinguishing tasks listed in Table 14. At this high skill level, members are separated from the 7-skill level mainly by an increase in planning and policy-making responsibilities. Also, the 7-skill levels are more involved with direct supervision of maintenance technicians.

Summary

Normal career ladder progression within the AFSC 466X0 career ladder is evident, with personnel at the 3-skill level spending the vast majority of their job time performing technical tasks. A moderate shift towards supervisory functions occurs at the 5-skill level, with members still spending more than 50 percent of their duty time performing technical functions. Personnel at the 7-skill level primarily perform supervisory functions, although they still spend nearly a third of their time on technical duties. The 9-skill level members and CEMs spend 95 percent of their time on the nontechnical duties such as planning, organizing, directing, and inspecting.

ANALYSIS OF AFR 39-1 SPECIALTY DESCRIPTIONS

Survey data were compared to the AFR 39-1 Specialty Descriptions for Missile Systems Maintenance Specialists and Technicians, dated 15 March 1991, effective 30 April 1991. The descriptions for the 3-, 5-, 7-, and 9-/CEM-skill levels were generally accurate, depicting the highly technical aspects of the job, as well as the increase in supervisory responsibilities previously described in the DAFSC analysis. The descriptions also capture the primary responsibilities of members in the five jobs identified by the job structure analysis process.

TRAINING ANALYSIS

Occupational survey data are sources of information which can be used to assist in the development of relevant training programs for military personnel. Factors used to evaluate entry-level Missile Systems Maintenance training include jobs being performed by first-enlistment personnel, overall distribution of first-enlistment personnel across career ladder jobs, percent of first-job (1-24 month TAFMS) and first-enlistment (1-48 months TAFMS) members performing specific tasks or using specific equipment items, ratings of how much TE tasks should receive in formal training, and ratings of relative TD.

TABLE 13
REPRESENTATIVE TASKS
PERFORMED BY DAFSC 46690/CEM PERSONNEL

TASKS	PERCENT MEMBERS PERFORMING
A16 Plan meetings or briefings	85
A10 Establish organizational policies, operating instructions (OIs), or standing operating procedures (SOPs)	85
E204 Write messages or correspondences	81
B27 Conduct briefings or meetings	81
B26 Compile data for reports or staff studies	78
A4 Determine requirements for equipment, personnel, space, or supplies	74
E120 Edit reports or correspondence	74
B52 Write recommendations for changes in procedures	74
A5 Determine work priorities	74
C78 Review inspection reports	74
A20 Establish performance standards for subordinates	74
A14 Plan layouts of facilities	70
A9 Develop work methods or procedures	70
B29 Coordinate munitions maintenance activities with other units or agencies	70
C69 Evaluate technical data	67
E167 Monitor status of equipment, missiles, or munitions	67
A13 Establish publication or technical order (TO) requirements	67
B42 Interpret directives, policies, or procedures for subordinates	67
C53 Analyze maintenance trends	67
A15 Plan maintenance activities	67
C68 Evaluate suggestions	67
B32 Direct administrative functions	67
C60 Evaluate equipment modification data	63
C57 Evaluate contractor services or products	63
E206 Write staff studies or surveys	63
A3 Determine budget or financial requirements	63
C62 Evaluate inspection procedures	63
C59 Evaluate equipment development data	59
B35 Direct movement of equipment	59
C67 Evaluate subordinates for compliance with performance standards	59
A12 Establish procedures for control or access to facilities, munitions, or munitions storage areas	59
C81 Write recommendations for awards or decorations	56

TABLE 14

TASKS WHICH BEST DIFFERENTIATE BETWEEN DAFSC
46670 AND DAFSC 46690/CEM PERSONNEL
(PERCENT MEMBERS PERFORMING)

TASKS	46670 (N=148)	46690/CEM (N=27)	DIFFERENCE
E196 Update CAMS data	59	7	52
E136 Make entries on AF Forms 2432 (Key Issue Log)	49	7	42
E150 Make entries on AFTO Forms 350 (Reparable Item Processing Tag)	49	7	41
E156 Make entries on DD Forms 1574 (Serviceable Tag - Materiel)	49	7	41
E131 Make entries on AF Forms 2005 (Issue/Turn in Request)	50	11	39
B45 Supervise Air Launched Missile Systems Specialists (AFSC 46650)	52	15	37
D88 Conduct OJT	45	7	37
F217 Inspect equipment or weapons for corrosion	47	11	36
A14 Plan layouts of facilities	10	74	-64
A10 Establish organizational policies, operating instructions (OIs), or standing operating procedures (SOPs)	31	85	-54
A20 Review equipment or personnel utilization policy changes	21	74	-53
E206 Write staff studies or surveys	13	63	-50
E120 Edit reports or correspondence	24	74	-50
A16 Plan meetings or briefings	36	85	-49
C59 Evaluate equipment development data	11	59	-48
A13 Establish publication or technical order (TO) requirements	18	67	-48

First-Enlistment Personnel

In this study, there are 189 members in their first enlistment (1-48 months TAFMS), representing 32 percent of the survey sample. As displayed in Table 15, approximately 94 percent of their duty time is devoted to technical or administrative task performance, the majority of which is contained in four duties: performing general missile maintenance functions (30 percent); maintaining AGM-69A missiles (22 percent); administrative and supply functions (13 percent); and maintaining AGM-86B missiles (13 percent). The vast majority of first-enlistment personnel are involved in day-to-day missile systems maintenance activities. Included are inspecting weapons for corrosion, evaluating missile surface damage, and performing AGM-69A missile hoist transfer procedures. Table 16 displays the tasks performed by first-enlistment personnel. Table 17 displays equipment items used by 30 percent or more of first-job and first-enlistment personnel.

Within the clusters and jobs identified in the SPECIALTY JOBS section of this report, first-term personnel were present in all five jobs and one of the clusters. As shown in Figure 2, 79 percent of first-term personnel surveyed are grouped in the Missile Maintenance cluster.

TE and TD Data

TE and TD data are secondary factors that can help technical school personnel decide which entry-level training tasks to emphasize. These ratings, based on the judgments of senior career ladder NCOs at operational units, provide training personnel with a rank-ordering of those tasks considered important for first enlistment training (TE) and a measure of the difficulty of those tasks (TD). When combined with data on the percentages of first-enlistment personnel performing tasks, comparisons can be made to determine if training adjustments are necessary. For example, tasks receiving high ratings on both task factors (TE and TD), accompanied by moderate to high percentages performing, may warrant resident training. Those tasks receiving high task factor ratings, but low percentages performing, may be more appropriately planned for OJT programs within the career ladder. Low task factor ratings may highlight tasks best omitted from training for first-term personnel, but this decision must be weighed against percentages of personnel performing the tasks, command concerns, and criticality of the tasks.

To assist technical school personnel, USAFOMS has developed a computer program that incorporates these secondary factors and the percentage of first-enlistment personnel performing each task into a value identified as an Automated Training Indicator (ATI). These ATI values correspond to training decisions listed and defined in the Training Decision Logic Table found in Attachment 1, ACR 52-22. These values allow course personnel to quickly focus their attention on those tasks which are most likely to qualify for ABR course consideration.

TABLE 15

RELATIVE PERCENT OF TIME SPENT ACROSS DUTIES BY
FIRST-ENLISTMENT AFSC 466X0 PERSONNEL

<u>DUTIES</u>	<u>466X0 1-48 MOS TAFMS (N=189)</u>
A ORGANIZING AND PLANNING	1
B DIRECTING AND IMPLEMENTING	2
C INSPECTING AND EVALUATING	1
D TRAINING	*
E PERFORMING ADMINISTRATIVE FUNCTIONS	13
F PERFORMING GENERAL MISSILE MAINTENANCE	30
G MAINTAINING MISSILE MECHANICAL SUPPORT EQUIPMENT	6
H MAINTAINING MISSILE ELECTRIC/ELECTRONIC SUPPORT EQUIPMENT	3
I MAINTAINING AIRCRAFT PYLONS OR ROTARY LAUNCHERS	6
J MAINTAINING AGM-69A MISSILES	22
K MAINTAINING AGM-86B MISSILES	13
L MAINTAINING AGM-129A MISSILES	1

* Denotes less than 1 percent

TABLE 16
REPRESENTATIVE TASKS PERFORMED BY
FIRST-ENLISTMENT AFSC 466X0 PERSONNEL

TASKS	PERCENT MEMBERS PERFORMING (N=189)
F217 Inspect equipment or weapons for corrosion	85
F222 Open or close alarmed facilities	83
F211 Clean missile surfaces	81
F207 Apply fillers, paints, sealers, or adhesives	81
F230 Perform corrosion control procedures	80
F267 Safetywire equipment	73
F212 Evaluate damage to missile surfaces	72
F228 Paint or stencil identifiers or instructions on equipment or weapons	70
F225 Pack or unpack missile components	68
G273 Clean missile support equipment	68
F246 Remove or replace access covers, plates, panels, or raceway covers	67
F210 Clean electronic test equipment	67
F215 Identify safety hazards	64
F229 Perform area defense guard duties	63
F216 Inspect equipment on receipt	63
F256 Remove or replace gaskets, seals, or packing	62
F208 Authenticate alarmed facility openings or closings	60
J474 Perform AGM-69A missile roll transfer procedures	59
F237 Perform missile conditioned-air leak checks	59
E136 Make entries on AF Forms 2432 (Key Issue Log)	58
F249 Remove or replace bonding materials	58
F232 Perform escort duties	58
J470 Measure AGM-69A environmental control system (ECS) leakage rates	58
J478 Perform fin locking or unlocking procedures	57
J471 Perform AGM-69A level 1 checkouts	57
F209 Check electro-explosive devices	56
J473 Perform AGM-69A missile host transfer procedures	56
J468 Check rocket motor nitrogen pressure	55
J513 Repair silicone insulation	55
J493 Remove or replace electronic-section shells	54
J476 Perform control-section water accumulation checks	54
J487 Remove or replace C&GEs	52

TABLE 17

EQUIPMENT ITEMS USED BY MORE THAN 30 PERCENT OF
FIRST-ENLISTMENT AFSC 466X0 PERSONNEL

<u>EQUIPMENT ITEMS</u>	<u>PERCENT MEMBERS USING (N=189)</u>
Torque Wrenches	88
Hoists, Electric Overhead or Monorail Systems	84
Shorting Plugs	80
Missile Radar Alt Test Assemblies (MRATA)	78
Nitrogen Charging Adapter Sets	78
Nitrogen Servicing Cart	76
Torque Screwdrivers	72
Umbilical Spanner Wrenches	71
Static Grounds	70
Digital Multimeters	66
Test Sets, Electronic System (ESTS)	62
Pneumatic Tools	60
Sling Beams	59
Multimeters	58
Trailers	57
Pressure Gauges, Air	55
Crimping Tools	54
Balance Weight Sets	53
Templates	53
Test Sets, Igniter Circuit	53
Lift Trailers, ETU-77	52
Air Data Test Sets, AN/GSM-291	52
Test Adapter Groups	52
Missile Restraint Fixt (Saddle), MMU-124/E	50
Cradles, Adjust Missile Handling, MHU-70A/E	49
Generators, Facility	48
Guided Missile Maint. Stands, MHU-159/E	48
Oscilloscopes	48
Engine Leak Detectors, MXU-720/E	47
Barometers	45
Rail Sets	45
Test Sets, Squib, AN/GSM-267	42
Test Stands, MSU-179/E	41
Umbilical Cover Restraint Kits	41
Air Compressors	39
Breakout Boxes	39
Desiccant Assembly Restraints, MSU-727/E	38
Fuel Priming Sets, GSU-288/E	38
Voltmeters, Digital	38
Trucks, 1-ton through 5-ton	36
Covers, Elec. Sect. Protective, CVU-114/E	34
Engine Handling Trucks, ETU-102/E	34
Tugs, MB4 Coleman	33
Launcher Rotation Tools	31
Wing Lock Pin Release Tools	30

AFSC 466X0
FIRST ENLISTMENT

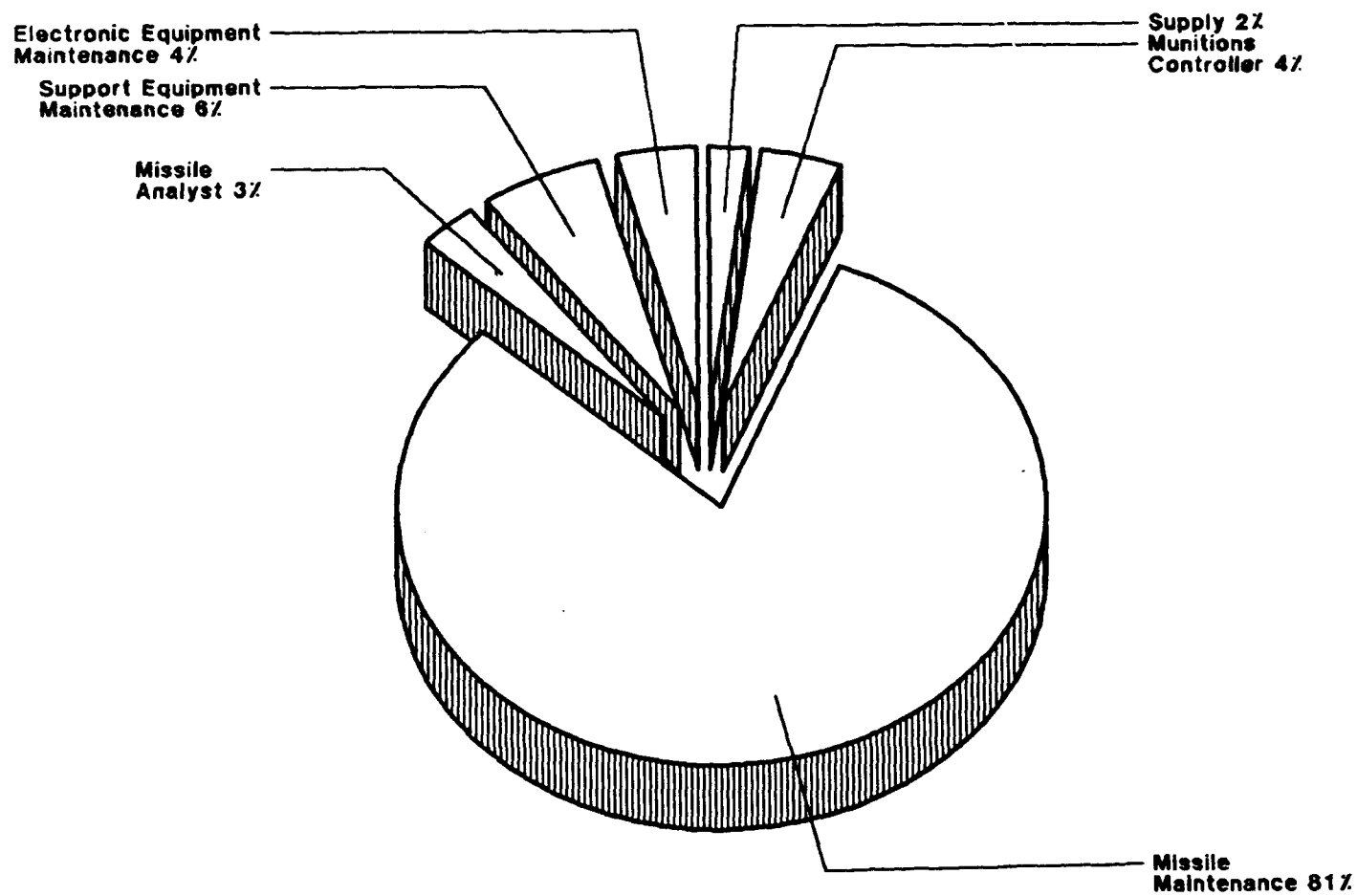


FIGURE 2

Tasks having the highest TE ratings are listed in Table 18. Included for each task are the percentage of first-job and first-enlistment personnel performing and the TD rating. As illustrated in Table 18, most of these tasks pertain to general missile maintenance functions.

Table 19 lists the tasks having the highest TD ratings. The percentage of first-enlistment, 5- and 7-skill level personnel performing, and TE rating are also included for each task. Most of the tasks listed in Table 19 fall into the electronic equipment maintenance duty. This explains the low percent members performing numbers, since only one job spends significant amounts of time in the duty. In addition to this minimal percent time spent factor, most of these tasks have a low TE rating.

Various lists of tasks, accompanied by TE and TD ratings, are contained in the TRAINING EXTRACT package and should be reviewed in detail by technical school personnel. For a more detailed explanation of TE and TD ratings, see Task Factor Administration in the SURVEY METHODOLOGY section of this report.

Specialty Training Standard (STS)

A review of STS 466X0 was made by comparing survey data to STS elements. Technical school personnel from the Chanute Training Center matched job inventory tasks to appropriate STS sections and subsections. A complete computer listing displaying the percent members performing tasks, TE and TD ratings for each task, along with the STS matchings, has been forwarded to the technical school for their further review of training documents. STS elements were reviewed for TE, TD, and percent members performing information, as stipulated in ATCR 52-22, dated February 1989. STS paragraphs containing general knowledge information, subject-matter knowledge requirements, or supervisory responsibilities were not reviewed. Typically, STS elements matched to tasks performed by 20 percent or more personnel in appropriate experience or skill-level groups (such as first-job (1-24 months TAFMS), first-enlistment (1-48 months TAFMS), and 5- and 7-skill level groups), should be considered for inclusion in the STS. Likewise, elements matched to tasks performed by less than 20 percent of these groups should be considered for deletion from the STS. Approximately 76 line items on the STS were found to be unsupported by occupational survey data. Most of paragraphs 14, 15, and 17, dealing with the AGM-86B weapons system, the AGM-129A weapons system, and support equipment, are not supported.

There are several other paragraphs which require attention, among them are paragraph 9, Forms, Records, and Reports; paragraph 19, Aircraft Launcher Systems; and paragraph 20, Aircraft Pylon Systems. Training personnel and SMEs should review the unsupported line items to determine if inclusion in future revisions to the STS is warranted.

Tasks not matched to any element of the STS were reviewed to determine if there were any tasks concentrated around any particular functions or jobs. Examples of technical tasks performed by at least 20 percent of STS criteria groups, but which are not referenced to any STS element, are displayed in Table 20. These tasks deal with routine maintenance such as replacing bonding

TABLE 18

SELECTED TASKS RATED HIGHEST IN TRAINING EMPHASIS

TASKS	TOT TE	1ST JOB	1ST ENL	TOT TD
F207 Apply fillers, paints, sealers, or adhesives	6.31	85	81	4.15
F231 Perform emergency shutdowns of test equipment	5.94	47	47	3.32
F212 Evaluate damage to missile surfaces	5.80	77	72	5.38
J471 Perform AGM-69A level 1 checkouts	5.73	77	57	6.19
J472 Perform AGM-69A level 2 checkouts	5.47	62	49	6.40
F217 Inspect equipment or weapons for corrosion	5.45	94	85	4.70
F230 Perform corrosion control procedures	5.20	83	80	4.44
F215 Identify safety hazards	5.20	67	64	4.29
F267 Safetywire equipment	5.18	77	73	4.10
F211 Clean missile surfaces	5.14	91	81	3.14
F246 Remove or replace access covers, plates, panels, or raceway covers				
J468 Check rocket motor nitrogen pressure	5.06	72	67	4.11
J513 Repair silicone insulation	5.02	75	55	3.95
J474 Perform AGM-69A missile roll transfer procedures	5.02	75	54	4.42
J478 Perform fin locking or unlocking procedures	4.98	80	59	4.22
I433 Perform decoder-receiver level 3 checkouts	4.90	78	57	3.74
J496 Remove or replace guidance sections	4.90	46	50	5.58
F210 Clean electronic test equipment	4.86	59	47	6.07
E196 Update CAMS data	4.82	68	67	3.34
J470 Measure AGM-69A environmental control system (ECS) leakage rates	4.82	40	42	5.06
	4.82	80	58	4.50

TE MEAN = 1.83, S.D. = 1.34

TD MEAN = 5.00, S.D. = 1.00

TABLE 19

SELECTED TASKS RATED HIGHEST IN TASK DIFFICULTY

TASKS	TOT ID	1ST JOB	1ST ENL	5- LVL	7- LVL	TOT TE
H303 Align missile radar altimeter test assembly (MRATA) radio frequency (RF) circuits	8.22	1	3	12	15	1.86
H349 Perform fault isolations on MRATA active RF-control and monitor components	7.95	0	2	11	16	1.82
H354 Perform fault isolations on MRATA RF-receiver assemblies	7.73	0	1	10	14	1.45
H352 Perform fault isolations on MRATA quartz- and passive-delay assemblies	7.72	0	1	9	14	1.31
H353 Perform fault isolations on MRATA RF-generating components	7.70	0	1	11	15	1.45
H351 Perform fault isolations on MRATA fixed- and stepped-attenuator assemblies	7.53	0	1	10	14	1.51
L594 Remove or replace AGM-129A wings	7.48	0	0	1	2	1.16
H350 Perform fault isolations on MRATA coaxial switch assemblies	7.42	0	2	10	15	1.67
H302 Align ESTS disc-drive adjustable parameters	7.41	1	2	11	15	1.84
D95 Develop resident course or career development course (CDC) curriculum materials	7.17	0	0	1	1	.06
H341 Perform fault isolations on ESTS disc drives or controllers using diagnostic tapes	7.16	1	2	10	14	1.78
A3 Determine budget or financial requirements	7.15	2	2	4	20	.08
H396 Remove or replace ESTS disc-drive fixed lower discs	7.12	0	2	9	14	1.35
H345 Perform fault isolations on ESTS IEEE-488 data buses using diagnostic tapes	6.93	0	1	7	9	1.49
H400 Remove or replace ESTS disc-drive spindle motor assemblies	6.92	0	1	7	7	.96
A10 Establish organizational policies, operating instructions (OIs), or standing operating procedures (SOPs)	6.92	2	2	7	31	.10
H346 Perform fault isolations on ESTSs using circuit card extenders	6.91	0	1	9	11	1.55
H304 Calibrate air data test systems (ADTSs)	6.90	1	3	7	9	1.57
B38 Implement emergency war order (EWO) plans	6.86	1	2	4	11	.24
J501 Remove or replace raceway wire harnesses	6.86	48	40	27	14	4.10

TE MEAN = 1.83, S.D. = 1.34

TD MEAN = 5.00, S.D. = 1.00

TABLE 20

REPRESENTATIVE TASKS NOT REFERENCED TO STS 466X0

<u>TASKS</u>	<u>TNG</u> <u>EMP</u>	<u>ATI</u>	<u>1ST</u> <u>JOB</u>	<u>1ST</u> <u>ENL</u>	<u>5-</u> <u>LVL</u>	<u>7-</u> <u>LVL</u>	<u>TSK</u> <u>DIF</u>
F217 Inspect equipment or weapons for corrosion	5.45	18	94	85	69	47	4.70
F215 Identify safety hazards	5.20	18	67	64	59	46	4.29
F246 Remove or replace access covers, plates, panels, or raceway covers	5.06	18	72	67	53	26	4.11
J478 Perform fin locking and unlocking procedures	4.90	18	78	57	32	17	3.74
J493 Remove or replace electronic-section shells	4.76	18	74	54	31	17	3.99
F237 Perform missile conditioned-air leak checks	4.43	18	63	59	43	18	4.53
F249 Remove or replace bonding materials	4.29	18	62	58	43	23	4.19
J508 Remove or replace separation-ignition switch (SIS) detent pins	4.18	13	70	53	31	15	2.71
E150 Make entries on AFTO Forms 350 (Reparable Item Processing Tag)	4.02	18	48	52	58	49	3.74
J504 Remove or replace rate gyros	3.88	18	65	51	30	16	3.92
F219 Inspect safety devices, such as pins, chocks, or flags	3.49	18	52	51	41	26	3.51
F208 Authenticate alarmed facility openings or closings	3.33	18	60	60	52	32	3.70

materials and inspection tasks such as identifying safety hazards. Training personnel and SMEs should review these and other unreferenced tasks to consider STS inclusion.

Plan of Instruction (POI)

Job inventory tasks were matched to related training objectives in POI C3ABR46630 000, dated 1 October 1991, with assistance from technical school SMEs. The method employed was similar to that of the STS analysis. A computer printout was created listing learning objectives, percent members performing data for first job (1-24 months TAFMS) and first-enlistment (1-48 months TAFMS) personnel, and TE, TD, and ATI ratings.

Tasks matched to POI learning objectives were compared to the standard set forth in Attachment 1, ATCR 52-22, dated 17 February 1989 (30 percent or more of the criterion groups performing tasks matched, along with sufficiently high TE and TD ratings on those tasks). Through this guidance, learning objectives taught in the course which are not supported by survey data should be considered for elimination from the formal course, if not justified on some other acceptable basis.

A review of survey data shows that eight learning objectives are not supported by OSR data. These objectives are listed in Table 21, along with the accompanying and survey data. The unsupported learning objectives are related to blocks which focus specifically on support equipment and the AGM-86B missile system. A comparison of the unsupported learning objectives to their respective STS line item references reveals a strong similarity between unsupported areas in both documents.

Many technical tasks performed by over 30 percent of first-enlistment personnel were not matched to the POI. Examples of these tasks with survey data are listed in Table 22. These tasks deal with the same routine maintenance as those listed in the STS section above. In addition to numbers of members performing these functions, several of these tasks are rated high in TE and TD. Training personnel and SMEs should review these and other unreferenced tasks to determine if training should be provided in the formal course.

JOB SATISFACTION ANALYSIS

An examination of job satisfaction indicators can give career ladder managers a better understanding of factors that may affect the job performance of career ladder airmen. Therefore, the survey booklet included attitude questions covering job interest, perceived utilization of talents and training, sense of accomplishment from work, and reenlistment intentions. The responses of the current survey sample were then analyzed by making several comparisons: (1) among TAFMS groups of the AFSC 466X0 career ladder and a comparative sample of personnel from other Mission Equipment Maintenance career ladders surveyed in 1992 (AFSCs 305X4, 404X0, 411X0A, 452X5, 454X5,

TABLE 21

ELEMENTS OF POI C3ABR46630 000 NOT SUPPORTED BY
SURVEY DATA

	TNG EMP	ATI	1ST JOB	1ST ENL	TSK DIF
I 5g. Using a description of a simulated hazard and a blank AF Form 457, complete the hazard by correctly documenting at least 7 of 10 entries					
E139 Make entries on AF Forms 457 (USAF Hazard Report)	3.57	11	21	24	3.17
V 5d. Using an AGM-86B maintenance laboratory, technical data, and working as a team member, replace missile radar altimeter with no more than two minor errors					
K533 Remove or replace AGM-86B missile radar altimeters (MRAs)	3.07	7	26	28	4.53
VI 2b. Given technical data, determine the correct loaded AGM-86B pylon checkout procedures by selecting the correct response to at least two of three questions					
I431 Perform AGM-86B loaded pylon inertial navigation element (INE) autocalibration checkouts	3.39	11	26	25	4.74
VI 2g. Given technical data, determine the correct decoder-receiver repair procedures by selecting the correct response to at least two of three questions					
I455 Remove or replace decoder-receiver components	4.00	11	19	29	5.15

TABLE 21 (CONTINUED)

ELEMENTS OF POI C3ABR46630 000 NOT SUPPORTED BY
SURVEY DATA

	<u>TNG</u> <u>EMP</u>	<u>ATI</u>	<u>1ST</u> <u>JOB</u>	<u>1ST</u> <u>ENL</u>	<u>TSK</u> <u>DIF</u>
VI 2h. Given technical data, determine the correct power control assembly replacement procedures by selecting the correct response to at least two of three questions					
I464 Remove or replace 180-inch multipurpose-launcher power-control assemblies	1.80	2	7	8	4.98
VI 2i. Given technical data, determine the correct transformer rectifier replacement procedures by selecting the correct response to at least two of three questions					
I465 Remove or replace 180-inch multipurpose-launcher transformer rectifiers	1.47	2	6	7	4.95
VI 2j. Given technical data, determine the correct power supply replacement procedures by selecting the correct response to at least two of three questions					
I463 Remove or replace 180-inch multipurpose-launcher power supplies	1.71	2	9	11	4.93
Vi 3a. Given technical data, determine the correct stores management panel checkout procedures by selecting the correct response to at least two of three questions					
F223 Operationally check B-1B control and display panels	1.90	7	17	17	5.24

TABLE 22

REPRESENTATIVE TASKS NOT REFERENCED TO
POI C3ABR46630 000

TASKS	TNG EMP	ATI	1ST JOB	1ST ENL	TSK DIF
F217 Inspect equipment or weapons for corrosion	5.45	18	94	85	4.70
F215 Identify safety hazards	5.20	18	67	64	4.29
F246 Remove or replace access covers, plates, panels, or raceway covers	5.06	18	72	67	4.11
J478 Perform fin locking and unlocking procedures	4.90	18	78	57	3.74
J493 Remove or replace electronic-section shells	4.76	18	74	54	3.99
F237 Perform missile conditioned-air leak checks	4.43	18	63	59	4.53
F249 Remove or replace bonding materials	4.29	18	62	58	4.19
J508 Remove or replace separation-ignition switch (SIS) detent pins	4.18	13	70	53	2.71
E150 Make entries on AFTO Forms 350 (Reparable Item Processing Tag)	4.02	18	48	52	3.74
J504 Remove or replace rate gyros	3.88	18	65	51	3.92
F219 Inspect safety devices, such as pins, chocks, or flags	3.49	18	52	51	3.51
F208 Authenticate alarmed facility openings or closings	3.33	18	60	60	3.70

454X6, 463X0) (see Table 23); (2) across jobs identified in the specialty jobs section of the report (see Table 24); (3) between current and previous survey TAFMS groups (see Table 25). These comparative data give a relative measure of how the job satisfaction of AFSC 466X0 personnel compares with similar Air Force specialties. Air Launched Missile Systems personnel reported similar job satisfaction responses to members of the comparative sample. The first-enlistment AFSC 466X0 group, however, rated their job interest and sense of accomplishment lower than their counterparts. In addition, the career group rated their perceived use of talents higher than that of the comparative sample career group. Overall, satisfaction for all three TAFMS groups is still relatively high. The percentages of positive responses in these comparisons reflect a career ladder where personnel appear to be quite satisfied with their jobs.

An indication of changes in job satisfaction perceptions within the career ladder is provided in Table 25, which presents TAFMS group data for 1992 survey respondents and data from respondents to the last OSR of the career ladder in 1987 (AFSC 411X0B). Generally, perceptions associated with job satisfaction have changed very little when compared to the AFSC 411X0B sample. The first of two noteworthy changes is increase in perceived accomplishments across the board, as well as increase in the reenlistment indicator. The second is a decrease in perceived use of talents and training for all three TAFMS groups.

Table 24 presents job satisfaction data for the major jobs identified in the career ladder structure for AFSC 466X0. Examination of these data can reveal the influences of performing certain jobs on overall job satisfaction. Job satisfaction indicators for the specialty job groups suggest that members of the Electronic Equipment Maintenance and Munitions Controllers jobs are most satisfied. Only two of the seven specialty jobs indicated a low degree of satisfaction: Supply and the least satisfied group, Support Equipment Maintenance. It should be noted that these two jobs constitute less than 7 percent of the total survey sample.

SPECIAL ANALYSIS

As requested by the MAJCOM and functional manager, an analysis of SEI 809 qualified personnel and former AFSC 316X2T personnel was performed. As shown in Table 26, members holding the SEI 809 Electronics credential are spread across most jobs in the ladder, although their usage is primarily in Electronic Equipment Maintenance job. These data shows little or no cross-utilization of SEI 809 qualified members exists. We also find former AFSC 316X2T personnel in jobs besides electronics. However, there are few respondents (22 of 588) who held the former AFSC.

TABLE 23

COMPARISON OF JOB SATISFACTION INDICATORS FOR AFSC 466X0
TAFMS GROUPS IN CURRENT STUDY TO A COMPARATIVE SAMPLE
(PERCENT MEMBERS RESPONDING)

	<u>1-48 MONTHS TAFMS</u>		<u>49-96 MONTHS TAFMS</u>		<u>97+ MONTHS TAFMS</u>	
	466X0 (N=189)	COMP SAMPLE (N=3,272)	466X0 (N=182)	COMP SAMPLE (N=2,917)	466X0 (N=215)	COMP SAMPLE (N=6,421)
<u>EXPRESSED JOB INTEREST:</u>						
INTERESTING	64	74	59	72	73	75
SO-SO	23	16	25	17	17	16
DULL	13	10	16	11	10	9
<u>PERCEIVED USE OF TALENTS:</u>						
FAIRLY WELL TO PERFECTLY LITTLE OR NOT AT ALL	71 29	75 20	72 27	71 20	82 18	75 18
<u>PERCEIVED USE OF TRAINING:</u>						
FAIRLY WELL TO PERFECTLY LITTLE OR NOT AT ALL	75 25	85 14	75 25	81 19	71 28	79 21
<u>SENSE OF WORK ACCOMPLISHMENT:</u>						
SATISFIED	68	73	69	71	72	72
NEUTRAL	15	12	13	11	11	10
DISSATISFIED	17	14	19	17	17	17
<u>REENLISTMENT INTENTIONS:</u>						
YES, OR PROBABLY YES	66	58	75	70	72	75
NO, OR PROBABLY NO	34	41	25	30	6	7
PLAN TO RETIRE	0	*	0	*	22	18

* Denotes less than 1 percent

Comparative data are from AFSCs 305X4, 404X0, 411X0A, 452X5, 454X5, Mission Equipment Maintenance career ladders surveyed in 1992

TABLE 24

COMPARISON OF JOB SATISFACTION INDICATORS FOR MEMBERS OF
THE AFSC 466X0 CAREER LADDER JOBS
(PERCENT MEMBERS RESPONDING)

	MISSILE MAINT CLUSTER (N=300)	SUPPLY (N=26)	SUPPORT EQUIP MAINT (N=15)	ELEC EQUIP MAINT (N=56)	MUNITIONS CONTROLLER (N=20)	MISSILE ANALYST (N=17)	MISSILE MAINT MGT CLUSTER (N=81)
<u>EXPRESSED JOB INTEREST:</u>							
INTERESTING	61	62	33	75	95	59	86
SO-SO	22	27	47	18	5	29	12
DULL	17	11	20	5	0	12	1
<u>PERCEIVED USE OF TALENTS:</u>							
FAIRLY WELL TO PERFECTLY	73	65	40	82	85	83	92
LITTLE OR NOT AT ALL	27	35	60	16	15	17	7
<u>PERCEIVED USE OF TRAINING:</u>							
FAIRLY WELL TO PERFECTLY	80	50	27	89	65	59	77
LITTLE TO NOT AT ALL	20	50	73	9	35	41	23
<u>SENSE OF WORK ACCOMPLISHMENT:</u>							
SATISFIED	63	73	60	82	85	82	83
NEUTRAL	15	15	13	9	15	6	7
DISSATISFIED	22	12	27	9	0	12	10
<u>REENLISTMENT INTENTIONS:</u>							
YES, OR PROBABLY YES	72	85	67	80	70	71	56
NO, OR PROBABLY NO	26	8	33	16	30	24	6
PLAN TO RETIRE	1	8	0	4	0	6	38

TABLE 25

COMPARISON OF JOB SATISFACTION INDICATORS FOR AFSC 466X0 TAFMS
GROUPS TO PREVIOUS SURVEY OF AFSC 411X0B
(PERCENT MEMBERS RESPONDING)

	<u>1-48 MONTHS TAFMS</u>		<u>49-96 MONTHS TAFMS</u>		<u>97+ MONTHS TAFMS</u>	
	466X0 (N=189)	1987 411X0B (N=239)	466X0 (N=182)	1987 411X0B (N=153)	466X0 (N=215)	1987 411X0B (N=188)
<u>EXPRESSED JOB INTEREST:</u>						
INTERESTING	64	63	59	67	73	74
SO-SO	23	18	25	21	17	14
DULL	13	18	16	11	10	11
<u>PERCEIVED USE OF TALENTS:</u>						
FAIRLY WELL TO PERFECTLY LITTLE OR NOT AT ALL	71 29	69 30	72 27	72 28	82 18	79 21
<u>PERCEIVED USE OF TRAINING:</u>						
FAIRLY WELL TO PERFECTLY LITTLE OR NOT AT ALL	75 25	75 24	75 25	71 28	71 28	71 29
<u>SENSE OF WORK ACCOMPLISHMENT:</u>						
SATISFIED	68	58	69	63	72	66
NEUTRAL	15	18	13	8	11	9
DISSATISFIED	17	23	19	28	17	24
<u>REENLISTMENT INTENTIONS:</u>						
YES, OR PROBABLY YES	66	52	75	59	72	77
NO, OR PROBABLY NO	34	46	25	41	6	14
PLAN TO RETIRE	0	0	0	0	22	8

TABLE 26

UTILIZATION OF SEI 809 CERTIFIED MEMBERS AND
FORMER AFSC 316X2T
(NUMBER RESPONDING)

<u>SPECIALTY JOB</u>	<u>COURSE COMPLETION C3AZR46650 ALMSS</u>	<u>AWARDED SEI 809</u>	<u>FORMER 316X2T</u>
MISSILE MAINTENANCE CLUSTER (N=300)	81	12	3
SUPPLY JOB (N=26)	9	5	3
SUPPORT EQUIPMENT MAINTENANCE JOB (N=15)	3	0	0
ELECTRONIC EQUIPMENT MAINTENANCE JOB (N=56)	40	46	12
MUNITIONS CONTROLLER JOB (N=20)	7	1	0
MISSILE ANALYST JOB (N=17)	2	2	0
MISSILE MAINTENANCE MANAGEMENT CLUSTER (N=81)	4	15	4

ELECTRONIC PRINCIPLES TRAINING

As requested by Technical Training, an analysis of the electronics portion of the STS was performed. Incumbents were asked to answer background questions concerning their use of electronic principles on the job. Appendix C lists the results displayed by year groups and the Electronics Equipment Maintenance job. First-enlistment personnel only reported using a few of the electronics principles: assembling crimp connectors and using multimeters and oscilloscopes. Electronic equipment maintenance job incumbents had a high response rate for all electronic principles; most principles drew responses above 80 percent. This shows how little the electronic principles are used by junior members and how extensively the principles are used by electronic equipment maintenance personnel.

IMPLICATIONS

As explained in the INTRODUCTION, this survey was conducted primarily to provide training personnel with current information on the Air Launched Missile Systems career ladder since its reorganization following Rivet Workforce. The present classification structure, as described by the AFR 39-1 Specialty Descriptions, accurately portrays the jobs in this study.

Analysis of career ladder documents indicates both the STS and POI contain a number of unsupported items and learning objectives. The unsupported areas in both documents appear to be closely related and should be reviewed to determine if their inclusion in future revisions of these documents is warranted.

No serious job satisfaction problems appear to exist within this specialty. Overall, job satisfaction responses have remained stable and are similar to the comparative sample of similar Air Force personnel surveyed in 1992.

APPENDIX A

SELECTED REPRESENTATIVE TASKS PERFORMED BY
MEMBERS OF CAREER LADDER JOBS

TABLE A1
MISSILE MAINTENANCE CLUSTER
(STG043)

GROUP SIZE: 300
PERCENT OF SAMPLE: 51
PREDOMINANT PAYGRADE: E-3/E-4

AVERAGE TICF: 53 MONTHS
AVERAGE TAFMS: 59 MONTHS

THE FOLLOWING ARE IN DESCENDING ORDER BY PERCENT MEMBERS PERFORMING:

TASKS	PERCENT MEMBERS PERFORMING
F211 Clean missile surfaces	99
F217 Inspect equipment or weapons for corrosion	95
F207 Apply fillers, paints, sealers, or adhesives	92
F230 Perform corrosion control procedures	91
F212 Evaluate damage to missile surfaces	90
F222 Open or close alarmed facilities	90
F267 Safetywire equipment	88
F225 Pack or unpack missile components	87
F246 Remove or replace access covers, plates, panels, or raceway covers	86
F210 Clean electronic test equipment	76
G273 Clean missile support equipment	75
F215 Identify safety hazards	75
F237 Perform missile conditioned-air leak checks	73
F228 Paint or stencil identifiers or instructions on equipment or weapons	73
F208 Authenticate alarmed facility openings or closings	72
F216 Inspect equipment on receipt	72
I433 Perform decoder-receiver level 3 checkouts	71
F229 Perform area defense guard duties	69
F256 Remove or replace gaskets, seals, or packing	69
E136 Make entries on AF Forms 2432 (Key Issue Log)	68
F249 Remove or replace bonding materials	67
J468 Check rocket motor nitrogen pressure	66
J474 Perform AGM-69A missile roll transfer procedures	66
E150 Make entries on AFTO Forms 350 (Reparable Item Processing Tag)	66
F232 Perform escort duties	64
J471 Perform AGM-69A level 1 checkouts	64
J478 Perform fin locking or unlocking procedures	64
J470 Measure AGM-69A environmental control system (ECS) leakage rates	64
F209 Check electro-explosive devices	63
F270 Transport missiles on other than pylons or launchers	63
J476 Perform control-section water accumulation checks	62

TABLE A2

AGM-69A MAINTENANCE
(STG081)

GROUP SIZE: 185
 PERCENT OF SAMPLE: 31
 PREDOMINANT PAYGRADE: E-3/E-4

AVERAGE TICF: 49 MONTHS
 AVERAGE TAFMS: 53 MONTHS

THE FOLLOWING ARE IN DESCENDING ORDER BY PERCENT MEMBERS PERFORMING:

TASKS	PERCENT MEMBERS PERFORMING
J470 Measure AGM-69A environmental control system (ECS) leakage rates	99
F211 Clean missile surfaces	98
J474 Perform AGM-69A missile roll transfer procedures	98
J471 Perform AGM-69A level 1 checkouts	98
J478 Perform fin locking or unlocking procedures	98
J513 Repair silicone insulation	97
J476 Perform control-section water accumulation checks	96
J487 Remove or replace C&GEs	96
J473 Perform AGM-69A missile hoist transfer procedures	95
J493 Remove or replace electronic-section shells	95
F217 Inspect equipment or weapons for corrosion	95
J508 Remove or replace separation-ignition switch (SIS) detent pins	95
F212 Evaluate damage to missile surfaces	94
J468 Check rocket motor nitrogen pressure	94
F207 Apply fillers, paints, sealers, or adhesives	93
F222 Open or close alarmed facilities	93
J491 Remove or replace DPCs	92
J475 Perform control and guidance electronics (C&GE) level 3 checkouts	92
J504 Remove or replace rate gyros	92
J483 Remove or replace AGM-69A power supplies	91
F230 Perform corrosion control procedures	91
J472 Perform AGM-69A level 2 checkouts	91
J480 Perform radar set level 3 checkouts	90
J510 Remove or replace SISs	90
F246 Remove or replace access covers, plates, panels, or raceway covers	90
J503 Remove or replace radar sets	90
F225 Pack or unpack missile components	89
J497 Remove or replace gyro-stabilized platforms (GSPs)	89
F267 Safetywire equipment	89
J512 Repair phenolic surfaces	89

TABLE A3

AGM-86B MAINTENANCE
(STG087)

GROUP SIZE: 94
 PERCENT OF SAMPLE: 16
 PREDOMINANT PAYGRADE: E-4

AVERAGE TICF: 53 MONTHS
 AVERAGE TAFMS: 63 MONTHS

THE FOLLOWING ARE IN DESCENDING ORDER BY PERCENT MEMBERS PERFORMING:

TASKS	PERCENT MEMBERS PERFORMING
K516 Deploy AGM-86B aerosurfaces	100
F211 Clean missile surfaces	99
K524 Perform AGM-86B missile hoist transfer procedures	99
K545 Remove or replace engine desiccant assemblies	99
K522 Perform AGM-86B level 1 checkouts	99
K567 Stow AGM-86B aerosurfaces	98
K555 Remove or replace INEs	98
K531 Remove or replace AGM-86B engines	97
F217 Inspect equipment or weapons for corrosion	96
K564 Repair engine desiccant assemblies	96
K560 Remove or replace rotary switches	95
K557 Remove or replace nose caps	95
F207 Apply fillers, paints, sealers, or adhesives	94
K526 Perform INE autocalibrations on test stands	93
F230 Perform corrosion control procedures	93
K521 Perform AGM-86B engine fuel primings	93
K518 Leak check AGM-86B engines	91
K538 Remove or replace boattails	91
K549 Remove or replace fin housings	89
F212 Evaluate damage to missile surfaces	89
F222 Open or close alarmed facilities	89
K523 Perform AGM-86B level 2 checkouts	88
K519 Measure AGM-86B ECS leakage rates	87
F225 Pack or unpack missile components	86
F267 Safetywire equipment	86
F246 Remove or replace access covers, plates, panels, or raceway covers	86
K553 Remove or replace guided-missile flight controllers (GMFCs)	86
K525 Perform AGM-86B radar absorbing material (RAM) repairs	85
K533 Remove or replace AGM-86B missile radar altimeters	84
K550 Remove or replace flight data transmitters	82
I436 Perform empty pylon checkouts	80
I441 Perform loaded AGM-86B pylon checkouts	79

TABLE A4

AGM-86B SHOP SUPERVISOR
(STG072)

GROUP SIZE: 8
 PERCENT OF SAMPLE: 1
 PREDOMINANT PAYGRADE: E-5

AVERAGE TICF: 126 MONTHS
 AVERAGE TAFMS: 130 MONTHS

THE FOLLOWING ARE IN DESCENDING ORDER BY PERCENT MEMBERS PERFORMING:

TASKS	PERCENT MEMBERS PERFORMING
B25 Assign maintenance tasks to personnel	100
B34 Direct maintenance activities	100
E196 Update CAMS data	100
C55 Conduct performance feedback worksheet (PFW) sessions	100
F217 Inspect equipment or weapons for corrosion	100
D88 Conduct OJT	100
G273 Clean missile support equipment	100
F215 Identify safety hazards	100
F267 Safetywire equipment	100
A5 Determine work priorities	88
A11 Establish performance standards for subordinates	88
B45 Supervise Air Launched Missile Systems Specialists (AFSC 46650)	88
B42 Interpret directives, policies, or procedures for subordinates	88
A15 Plan maintenance activities	88
F212 Evaluate damage to missile surfaces	88
B31 Counsel personnel on personal or military-related matters	88
C80 Write EPRs	88
D92 Counsel trainees on training progress	88
F207 Apply fillers, paints, sealers, or adhesives	88
F219 Inspect safety devices, such as pins, chocks, or flags	88
G279 Inspect MSU-179/E missile test stands	88
F211 Clean missile surfaces	88
F216 Inspect equipment on receipt	88
C67 Evaluate subordinates for compliance with performance standards	88
F230 Perform corrosion control procedures	88
E156 Make entries on DD Forms 1574 (Serviceable Tag-Material)	88
F237 Perform missile conditioned-air leak checks	88
G289 Remove or replace compressed-gas cylinders	88
F225 Pack or unpack missile components	88
F227 Pack supply turn-ins	88
I431 Perform AGM-86B loaded pylon inertial navigational element (INE) autocalibration checkouts	88

TABLE A5

PYLON AND ROTARY LAUNCHER MAINTENANCE
(STG179)

GROUP SIZE: 6
PERCENT OF SAMPLE: 1
PREDOMINANT PAYGRADE: E-4

AVERAGE TICF: 47 MONTHS
AVERAGE TAFMS: 49 MONTHS

THE FOLLOWING ARE IN DESCENDING ORDER BY PERCENT MEMBERS PERFORMING:

TASKS	PERCENT MEMBERS PERFORMING
K524 Perform AGM-86B missile hoist transfer procedures	100
I447 Perform post download inspections on AGM-86B loaded pylons	100
F243 Perform pylon transfer procedures	100
F211 Clean missile surfaces	100
I441 Perform loaded AGM-86B pylon checkouts	100
I436 Perform empty pylon checkouts	100
F217 Inspect equipment or weapons for corrosion	100
F222 Open or close alarmed facilities	100
F267 Safetywire equipment	100
F229 Perform area defense guard duties	100
F230 Perform corrosion control procedures	100
F228 Paint or stencil identifiers or instructions on equipment or weapons	100
G276 Inspect MHU-159/E missile-handling units	100
F216 Inspect equipment on receipt	100
I458 Remove or replace pylon decoder-receivers	100
F212 Evaluate damage to missile surfaces	100
I459 Remove or replace pylon relay assemblies	100
E136 Make entries on AF Forms 2432 (Key Issue Log)	83
F271 Transport pylons	83
E165 Make entries on SF 702 (Security Container Check Sheet)	83
K545 Remove or replace engine desiccant assemblies	83
F244 Perform weapons storage area security checks	83
F207 Apply fillers, paints, sealers, or adhesives	67
F208 Authenticate alarmed facility openings or closings	67
G273 Clean missile support equipment	67
F219 Inspect safety devices, such as pins, chocks, or flags	67
G281 Inspect rail sets	67
F268 Transport equipment	67
F246 Remove or replace access covers, plates, panels, or raceway covers	67
F242 Perform pretow inspections on weapon systems	67
F240 Perform post-tow inspections on weapon systems	67
F238 Perform munitions convoy duties	50

TABLE A6

SUPPLY
(STG058)GROUP SIZE: 26
PERCENT OF SAMPLE: 4
PREDOMINANT PAYGRADE: E-4AVERAGE TICF: 84 MONTHS
AVERAGE TAFMS: 106 MONTHS

THE FOLLOWING ARE IN DESCENDING ORDER BY PERCENT MEMBERS PERFORMING:

TASKS	PERCENT MEMBERS PERFORMING
E131 Make entries on AF Forms 2005 (Issue/Turn-in Request)	96
E172 Review AF Forms 2005 (Issue/Turn-in Request)	88
E156 Make entries on DD Forms 1574 (Serviceable Tag - Materiel)	88
E181 Review AFTO Forms 350 (Repair Item Processing Tag)	85
E129 Make entries on AF Forms 1297 (Temporary Issue Receipt)	85
E187 Review DD Forms 1577 (Unserviceable (Condemned) Tag Materiel)	81
E159 Make entries on DD Forms 1577 (Unserviceable (Condemned) Tag Materiel)	81
E136 Make entries on AF Forms 2432 (Key Issue Log)	81
E116 Coordinate bench stock or supply requirements with base supply	77
E132 Make entries on AF Forms 2413 (Supply Control Log)	77
E184 Review DD Forms 1574 (Serviceable Tag - Materiel)	77
E150 Make entries on AFTO Forms 350 (Reparable Item Processing Tag)	77
E160 Make entries on DD Forms 1577-2 (Unserviceable (Reparable) Tag Materiel)	73
E196 Update CAMS data	73
C73 Inventory equipment, tools, or supplies	73
E154 Make entries on DD Forms 1348-6 (DOD Single Line Item Requisition System Document (Manual - Long Form))	73
E170 Research information in supply publications	69
E153 Make entries on DD Forms 1348-1 (DOD Single Line Item Release/Receipt Document)	69
E188 Review DD Forms 1577-2 (Unserviceable (Reparable) Tag Materiel)	69
E130 Make entries on AF Forms 1800 (Operator's Inspection Guide and Trouble Report (General Purpose Vehicles))	69
F227 Pack supply turn-ins	65
E134 Make entries on AF forms 2427 (Lock and Key Control Register)	65
E171 Research information in technical publications	62
A5 Determine work priorities	58

TABLE A7
SUPPORT EQUIPMENT MAINTENANCE
(STG075)

GROUP SIZE: 15
PERCENT OF SAMPLE: 2.5
PREDOMINANT PAYGRADE: E-4

AVERAGE TICF: 56 MONTHS
AVERAGE TAFMS: 60 MONTHS

THE FOLLOWING ARE IN DESCENDING ORDER BY PERCENT MEMBERS PERFORMING:

TASKS	PERCENT MEMBERS PERFORMING
G273 Clean missile support equipment	100
F217 Inspect equipment or weapons for corrosion	100
F230 Perform corrosion control procedures	93
F207 Apply fillers, paints, sealers, or adhesives	93
F228 Paint or stencil identifiers or instructions on equipment or weapons	93
F216 Inspect equipment on receipt	93
F222 Open or close alarmed facilities	93
E136 Make entries on AF Forms 2432 (Key Issue Log)	87
G289 Remove or replace compressed-gas cylinders	80
G281 Inspect rail sets	73
F221 Issue equipment or tools	73
E196 Update CAMS data	73
G279 Remove or replace nonelectronic support equipment mechanical components	73
E147 Make entries on AFTO Forms 244 (Industrial/Support Equipment Record)	67
E167 Monitor status of equipment, missiles, or munitions	67
F256 Remove or replace gaskets, seals, or packing	67
G279 Inspect MSU-179/E missile test stands	67
F210 Clean electronic test equipment	67
G275 Inspect KMU-415/A guided-missile hydraulic-fluid maintenance kits	67
C73 Inventory equipment, tools, or supplies	60
G282 Leak test nitrogen-charging adapter sets	60
F235 Perform hazardous materials storage or disposal actions	60
F219 Inspect safety devices, such as pins, chocks, or flags	53
F215 Identify safety hazards	53
E150 Make entries on AFTO Forms 350 (Reparable Item Processing Tag)	53
F226 Pack or unpack test equipment	53
E131 Make entries on AF Forms 2005 (Issue/Turn-in Request)	53
G277 Inspect MHU-200/E missile-handling units	47
G278 Inspect missile fuel-defuel equipment	47
G280 Inspect MSU-202/E missile maintenance stands	47

TABLE A8
ELECTRONIC EQUIPMENT MAINTENANCE
(STG085)

GROUP SIZE: 56
PERCENT OF SAMPLE: 9.5
PREDOMINANT PAYGRADE: E-5

AVERAGE TICF: 87 MONTHS
AVERAGE TAFMS: 94 MONTHS

THE FOLLOWING ARE IN DESCENDING ORDER BY PERCENT MEMBERS PERFORMING:

TASKS	PERCENT MEMBERS PERFORMING
H337 Perform ESTSs operational assurance tests	100
H303 Align missile radar altimeter test assembly (MRATA) radio frequency (RF) circuits	100
F266 Repair electrical cables or connectors	98
H336 Perform ESTS confidence tests	98
H367 Perform periodic inspections on CCUs	98
H335 Perform ESTS calibration certification tests	96
H334 Perform ESTS autocalibrations (ACALs)	96
H428 Service ESTS air filters	96
F252 Remove or replace electrical cables or connectors	96
H379 Perform self-tests on MRATAs	96
H301 Align electronic system test set (ESTS) patchboard- receiver contacts	96
H325 Functionally test CCUs	96
H311 Calibrate MRATA power supplies	96
H394 Remove or replace ESTS disc drives	96
F210 Clean electronic test equipment	95
H322 Clean ESTS line-printer printheads	95
F264 Remove or replace solderless wire connections	95
H360 Perform MRATA calibration factor-loading procedures	95
H369 Perform periodic inspections on MRATAs	93
H302 Align ESTS disc-drive adjustable parameters	93
H309 Calibrate ESTS power supplies	93
H308 Calibrate cooling control units (CCUs)	93
H349 Perform fault isolations on MRATA active RF-control and monitor components	93
H341 Perform fault isolations on ESTS disc drives or controllers using diagnostic tapes	93
F226 Pack or unpack test equipment	93
H347 Perform fault isolations on interconnecting groups	91
F255 Remove or replace fuses	91
F257 Remove or replace gauges	91
H350 Perform fault isolations on MRATA coaxial switch assemblies	91
H353 Perform fault isolations on MRATA RF-generating components	91

TABLE A9
MUNITIONS CONTROLLER
(STG148)

GROUP SIZE: 20
PERCENT OF SAMPLE: 3.4
PREDOMINANT PAYGRADE: E-4

AVERAGE TICF: 63 MONTHS
AVERAGE TAFMS: 70 MONTHS

THE FOLLOWING ARE IN DESCENDING ORDER BY PERCENT MEMBERS PERFORMING:

TASKS	PERCENT MEMBERS PERFORMING
B50 Track equipment, weapons, or munitions movements	100
B41 Initiate maintenance work orders	100
B29 Coordinate munitions maintenance activities with other units or agencies	100
E167 Monitor status of equipment, missiles, or munitions	95
E168 Monitor status of work orders	95
B30 Coordinate munitions movements with control or emergency organizations	95
E200 Update status boards, such as items awaiting maintenance or parts	90
B35 Direct movement of equipment	90
B37 Direct weapons movements	90
E195 Secure classified items, such as tapes, mission scoring data, or computer discs	90
E196 Update CAMS data	85
B34 Direct maintenance activities	85
B28 Coordinate aircraft repair activities with other agencies, AFSSs, or units	80
A5 Determine work priorities	80
E119 Coordinate weapons or aircraft status changes with appropriate agencies	75
E165 Make entries on SF 702 (Security Container Check Sheet)	75
E129 Make entries on AF Forms 1297 (Temporary Issue Receipt)	70
E136 Make entries on AF Forms 2432 (Key Issue Log)	65
E125 Maintain classified document files	65
E164 Make entries on SF 701 (Activity Security Checklist)	65
E166 Monitor personnel availability status	60
B25 Assign maintenance tasks to personnel	55
E198 Update configuration status and accounting systems	50
A15 Plan maintenance activities	45
E183 Review core automated maintenance system (CAMS) products	45
A23 Schedule equipment utilizations	45
B38 Implement emergency war order (EWO) plans	45
E194 Review SF 702 (Security Container Check Sheet)	45
E189 Review generation maintenance plan checklists	45

TABLE A10
MISSILE ANALYST
(STG073)

GROUP SIZE: 17
PERCENT OF SAMPLE: 3
PREDOMINANT PAYGRADE: E-4

AVERAGE TICF: 80 MONTHS
AVERAGE TAFMS: 86 MONTHS

THE FOLLOWING ARE IN DESCENDING ORDER BY PERCENT MEMBERS PERFORMING:

<u>TASKS</u>	<u>PERCENT MEMBERS PERFORMING</u>
E122 Initiate or make entries on AFTO Forms 95 (Significant Historical Data)	94
B26 Compile data for reports or staff studies	94
E167 Monitor status of equipment, missiles, or munitions	94
C53 Analyze maintenance trends	88
E124 Initiate retest OK (RTOK) reports	82
E198 Update configuration status and accounting systems	76
E196 Update CAMS data	65
E120 Edit reports or correspondence	59
E168 Monitor status of work orders	59
E183 Review core automated maintenance system (CAMS) products	53
B33 Direct analysis functions	53
A5 Determine work priorities	53
B50 Track equipment, weapons, or munitions movements	47
C56 Conduct self-inspection programs	47
A9 Develop work methods or procedures	41
E127 Maintain publication or TO libraries	41
E119 Coordinate weapons or aircraft status changes with appropriate agencies	35
E204 Write messages or correspondences	35
A21 Review unit disaster plans	29
E203 Write inspection or maintenance reports	29

TABLE A11

MISSILE MAINTENANCE MANAGEMENT CLUSTER
(STG039)

GROUP SIZE: 81
PERCENT OF SAMPLE: 14
PREDOMINANT PAYGRADE: E-7

AVERAGE TICF: 168 MONTHS
AVERAGE TAFMS: 205 MONTHS

THE FOLLOWING ARE IN DESCENDING ORDER BY PERCENT MEMBERS PERFORMING:

TASKS	PERCENT MEMBERS PERFORMING
A5 Determine work priorities	88
B42 Interpret directives, policies, or procedures for subordinates	81
A4 Determine requirements for equipment, personnel, space, or supplies	81
B31 Counsel personnel on personal or military-related matters	81
C55 Conduct performance feedback worksheet (PFW) sessions	77
E204 Write messages or correspondences	74
B27 Conduct briefings or meetings	74
E167 Monitor status of equipment, missiles, or munitions	74
A9 Develop work methods or procedures	73
B26 Compile data for reports or staff studies	72
C67 Evaluate subordinates for compliance with performance standards	72
C80 Write EPRs	72
C81 Write recommendations for awards or decorations	72
A24 Schedule leaves or passes	72
A11 Establish performance standards for subordinates	69
C56 Conduct self-inspection programs	69
A10 Establish organizational policies, operating instructions (OIs), or standing operating procedures (SOPs)	67
C78 Review inspection reports	67
A16 Plan meetings or briefings	67
B52 Write recommendations for changes in procedures	65
A15 Plan maintenance activities	62
B29 Coordinate munitions maintenance activities with other units or agencies	62
B32 Direct administrative functions	62
A6 Develop job descriptions	60
A19 Plan work assignments	59
C70 Evaluate work schedules	59
B34 Direct maintenance activities	59
A1 Assign personnel to duty positions	59
B25 Assign maintenance tasks to personnel	57
E168 Monitor status of work orders	57

TABLE A12

SHIFT SUPERVISOR
(STG071)

GROUP SIZE: 12
 PERCENT OF SAMPLE: 2
 PREDOMINANT PAYGRADE: E-6

AVERAGE TICE: 124 MONTHS
 AVERAGE TAFMS: 171 MONTHS

THE FOLLOWING ARE IN DESCENDING ORDER BY PERCENT MEMBERS PERFORMING:

TASKS	PERCENT MEMBERS PERFORMING
B25 Assign maintenance tasks to personnel	100
C80 Write EPRs	100
E150 Make entries on AFTO Forms 350 (Reparable Item Processing Tag)	100
B31 Counsel personnel on personal or military-related matters	92
C55 Conduct performance feedback worksheet (PFW) sessions	92
A5 Determine work priorities	83
B45 Supervise Air Launched Missile Systems Specialists (AFSC 46650)	83
E167 Monitor status of equipment, missiles, or munitions	83
E183 Review core automated maintenance system (CAMS) products	83
E131 Make entries on AF Forms 2005 (Issue/Turn in Request)	83
E168 Monitor status of work orders	75
B41 Initiate maintenance work orders	75
E166 Monitor personnel availability status	75
A11 Establish performance standards for subordinates	75
E156 Make entries on DD Forms 1574 (Serviceable Tag - Materiel)	75
E160 Make entries on DD Forms 1577-2 (Unserviceable (Reparable) Tag Materiel)	75
E181 Review AFTO Forms 350 (Repair Item Processing Tag)	75
E196 Update CAMS data	67
B46 Supervise Air Launched Missile Systems Technicians (AFSC 46670)	67
C67 Evaluate subordinates for compliance with performance standards	67
B42 Interpret directives, policies, or procedures for subordinates	67
A19 Plan work assignments	58
F217 Inspect equipment or weapons for corrosion	58
E200 Update status boards, such as items awaiting maintenance or parts	58
A24 Schedule leaves or passes	58
B27 Conduct briefings or meetings	58
E172 Review AF Forms 2005 (Issue/Turn-in Request)	58
F232 Perform escort duties	58

TABLE A13
MAINTENANCE SUPERINTENDENT
(STG082)

GROUP SIZE: 46
PERCENT OF SAMPLE: 8
PREDOMINANT PAYGRADE: E-7

AVERAGE TICF: 164 MONTHS
AVERAGE TAFMS: 202 MONTHS

THE FOLLOWING ARE IN DESCENDING ORDER BY PERCENT MEMBERS PERFORMING:

TASKS	PERCENT MEMBERS PERFORMING
B31 Counsel personnel on personal or military-related matters	100
A5 Determine work priorities	98
A4 Determine requirements for equipment, personnel, space, or supplies	98
B42 Interpret directives, policies, or procedures for subordinates	93
C80 Write EPRs	93
C81 Write recommendations for awards or decorations	93
C55 Conduct performance feedback worksheet (PFW) sessions	93
A24 Schedule leaves or passes	93
A9 Develop work methods or procedures	93
C56 Conduct self-inspection programs	91
E167 Monitor status of equipment, missiles, or munitions	89
C67 Evaluate subordinates for compliance with performance standards	87
A11 Establish performance standards for subordinates	87
A1 Assign personnel to duty positions	87
E204 Write messages or correspondences	85
C70 Evaluate work schedules	83
B26 Compile data for reports or staff studies	83
C78 Review inspection reports	80
B34 Direct maintenance activities	80
A19 Plan work assignments	78
A15 Plan maintenance activities	78
A6 Develop job descriptions	78
B32 Direct administrative functions	76
E168 Monitor status of work orders	76
B29 Coordinate munitions maintenance activities with other units or agencies	76
E166 Monitor personnel availability status	74
A16 Plan meetings or briefings	74
A10 Establish organizational policies, operating instructions (OIs), or standing operating procedures	74
E123 Initiate personnel action requests, such as skill upgrade actions or duty title changes	74

TABLE A14

SENIOR MANAGER
(STG083)

GROUP SIZE: 18
 PERCENT OF SAMPLE: 3
 PREDOMINANT PAYGRADE: E-8

AVERAGE TICF: 201 MONTHS
 AVERAGE TAFMS: 232 MONTHS

THE FOLLOWING ARE IN DESCENDING ORDER BY PERCENT MEMBERS PERFORMING:

TASKS	PERCENT MEMBERS PERFORMING
B26 Compile data for reports or staff studies	100
A13 Establish publication or technical order (TO) requirements	100
B27 Conduct briefings or meetings	94
C69 Evaluate technical data	89
E204 Write messages or correspondences	89
C60 Evaluate equipment modification data	89
A16 Plan meetings or briefings	89
B52 Write recommendations for changes in procedures	89
A10 Establish organizational policies, operating instructions (OIs), or standing operating procedures (SOPs)	83
C57 Evaluate contractor services or products	78
C59 Evaluate equipment development data	78
E120 Edit reports or correspondence	78
E206 Write staff studies or surveys	78
A4 Determine requirements for equipment, personnel, space, or supplies	78
E171 Research information in technical publications	72
A9 Develop work methods or procedures	72
E179 Review AFTO Forms 27 (Technical Order System, Publication Change Request)	67
E177 Review AFTO Forms 22 (Technical Order System Publication Improvement Report and Reply)	67
A5 Determine work priorities	67
C78 Review inspection reports	67
C53 Analyze maintenance trends	67
E117 Coordinate contractor modifications for weapons systems with appropriate agencies	61
B51 Write recommendations for changes in equipment	61
C62 Evaluate inspection procedures	61
A20 Review equipment or personnel utilization policy changes	61
B42 Interpret directives, policies, or procedures for subordinates	61
B33 Direct analysis functions	61
A3 Determine budget or financial requirements	61
C68 Evaluate suggestions	56

APPENDIX B
UNSUPPORTED AFSC 466X0 STS ELEMENTS

APPENDIX B

UNSUPPORTED AFSC 466X0 STS ELEMENTS

	TNG EMP	PERCENT MEMBERS PERFORMING					TSK DIF
		ATI	1ST JOB	1ST ENL	5- LVL	7- LVL	
6a. DETERMINE WHICH PERSONNEL NEED TRAINING							
D114 Select individuals for specialized training	.29	*	0	0	3	17	4.76
8d. USE THE COMBAT AMMUNITION SYSTEM, BASE LEVEL (CAS-B)							
E182 Review base-level combat ammunition system (CAS-B) products	.12	*	0	0	0	3	4.91
E197 Update CAS-B data	.67	2	0	1	2	2	4.87
9b. INITIATE ACCIDENT/INCIDENT/DEFICIENCY REPORTS							
E205 Write special reports, such as bent spear, broken arrow, or dull sword reports	.82	2	1	2	11	16	5.56
9e(6). AFTO FORM 95, SIGNIFICANT HISTORICAL DATA							
E122 Initiate or make entries on AFTO Forms (Significant Historical Data)	1.45	2	1	4	11	16	3.90

* No ATI value calculated

APPENDIX B (CONTINUED)

UNSUPPORTED AFSC 466X0 STS ELEMENTS

	TNG EMP	PERCENT MEMBERS PERFORMING					TSK DIF
		ATI	1ST JOB	1ST ENL	5- LVL	7- LVL	
9e(8). AFTO FORM 108, TEST, MEASUREMENT, AND DIAGNOSTIC EQUIPMENT CERTIFICATION TAG							
E128 Maintain TMDE processing records	.84	2	1	1	5	7	4.70
E144 Make entries on AFTO Forms 108 (TMDE certification)	.80	2	0	1	11	16	3.44
E201 Validate TMDE equipment processing records	.57	2	0	1	4	5	4.21
10b(3). RETEST OK (RTOK) REPORTING AND TRACKING							
E124 Initiate retest OK (RTOK) reports	1.27	2	1	2	14	13	4.60
14c(4). IMPACT FUZE							
K554 Remove or replace impact fuzes	2.02	7	16	15	14	6	4.48
14c(5). ELECTRICAL RESISTANCE TEMPERATURE TRANSMITTER							
K542 Remove or replace electrical resistance temperature transmitter (ERTT) temperature probes	2.78	7	14	17	16	10	5.43
14c(6). PITOT-STATIC TUBE							
K558 Remove or replace pitot-static tubes	2.80	7	15	19	18	7	4.97

APPENDIX B (CONTINUED)

UNSUPPORTED AFSC 466X0 STS ELEMENTS

		<u>PERCENT MEMBERS PERFORMING</u>						
	<u>TNG</u>	<u>ATI</u>	<u>1ST</u>	<u>1ST</u>	<u>5-</u>	<u>7-</u>	<u>TSK</u>	
	<u>EMP</u>		<u>JOB</u>	<u>ENL</u>	<u>LVL</u>	<u>LVL</u>	<u>DIF</u>	
14c(11). AIR CYCLE MACHINE								
K537 Remove or replace air-cycle machines	2.22	7	6	8	13	8	5.10	
14c(14). HEAT EXCHANGER								
K556 Remove or replace missile heat exchangers	2.00	7	10	15	19	8	5.19	
14c(15). DEPLOYMENT ACTUATOR CARTRIDGES								
K539 Remove or replace deployment actuator cartridges	2.76	7	15	16	19	9	5.15	
14c(17). CONTROL SURFACES								
K532 Remove or replace AGM-86B fins	2.59	7	7	11	13	8	6.11	
K536 Remove or replace AGM-86B wings	2.12	7	1	3	5	3	6.66	
K544 Remove or replace elevons	2.82	7	0	5	11	5	5.89	
14c(18). THERMAL BATTERY								
K535 Remove or replace AGM-86B thermal batteries	2.20	7	1	8	9	3	5.19	

APPENDIX B (CONTINUED)

UNSUPPORTED AFSC 466X0 STS ELEMENTS

	TNG EMP	PERCENT MEMBERS PERFORMING						TSK DIF
		ATI	1ST JOB	1ST ENL	5- LVL	7- LVL		
14c(19). ENGINE AIR INLET								
K546 Remove or replace engine inlet flexible ducts	2.10	7	6	7	9	6	4.79	
14c(20). FUEL PUMP ELECTRONIC UNITS								
K552 Remove or replace fuel-pump electronic units	2.67	7	9	14	18	9	5.11	
14c(21). ELECTRICAL J-BOX								
K541 Remove or replace electrical J-boxes	2.37	7	10	17	19	7	4.95	
14d(6). MISSILE FUEL/DEFUEL								
K517 Fuel or defuel AGM-86B missiles	3.12	7	6	11	11	5	6.79	
15c(1). CONTROL SURFACES								
L587 Remove or replace AGM-129A fins	2.02	7	5	5	4	4	6.17	
L594 Remove or replace AGM-129A wings	1.16	*	0	0	1	2	7.48	

* No ATI value calculated

APPENDIX B (CONTINUED)

UNSUPPORTED AFSC 466X0 STS ELEMENTS

	TNG EMP	PERCENT MEMBERS PERFORMING						TSK DIF
		ATI	1ST JOB	1ST ENL	5- LVL	7- LVL		
15c(2). ENGINE								
L585 Remove or replace AGM-129A engines	2.18	*	0	0	2	3	6.57	
15c(3). ELECTRICAL EQUIPMENT COOLING UNIT								
L600 Remove or replace electrical-equipment cooling equipment	1.80	*	0	0	2	3	5.38	
15c(4). THERMAL BATTERIES								
L593 Remove or replace AGM-129A thermal batteries	1.45	*	0	0	1	2	5.83	
15c(5). FORWARD AVIONICS UNIT								
L588 Remove or replace AGM-129A forward avionics units	2.29	7	2	3	3	4	6.23	
15c(6). SEPARATION SWITCH								
L592 Remove or replace AGM-129A separation switches	1.57	2	1	1	1	3	5.75	

* No ATI value calculated

APPENDIX B (CONTINUED)

UNSUPPORTED AFSC 466X0 STS ELEMENTS

	TNG EMP	PERCENT MEMBERS PERFORMING					
		ATI	1ST JOB	1ST ENL	5- LVL	7- LVL	TSK DIF
15c(7). CABLE ASSEMBLIES							
L584 Remove or replace AGM-129A cable assemblies	1.45	2	0	1	1	3	6.73
15c(8). ELECTRICAL/PNEUMATIC DISTRIBUTION							
L601 Remove or replace electrical-pneumatic distribution boxes	1.73	*	0	0	2	3	5.93
15c(9). ARM/DISARM DEVICE							
L598 Remove or replace arm-disarm devices	1.90	7	0	1	2	3	5.62
15c(10). IMPACT SENSOR ASSEMBLY							
L589 Remove or replace AGM-129A impact sensor assembly	1.08	2	0	1	1	3	5.78
15c(11). AFT AVIONICS UNIT							
L583 Remove or replace AGM-129A aft avionics unit	2.18	7	2	2	4	4	6.53

* No ATI value calculated

APPENDIX B (CONTINUED)

UNSUPPORTED AFSC 466X0 STS ELEMENTS

	TNG EMP	PERCENT MEMBERS PERFORMING					
		ATI	1ST JOB	1ST ENL	5- LVL	7- LVL	TSK DIF
15c(12). NAVIGATION CONTROL SET							
L603 Remove or replace navigation control sets	2.45	7	2	3	3	4	5.97
15c(13). SENSOR SET							
L605 Remove or replace sensor sets	2.04	7	2	2	3	4	5.61
15c(14). RADAR ALTIMETER							
L591 Remove or replace AGM-129A MRAs	1.96	7	2	3	3	3	5.97
15c(15). PRESSURE TRANSMITTER							
L604 Remove or replace pressure transmitters	1.75	*	0	0	1	3	5.87
15c(16). AIR DATA PILOT ASSEMBLY							
L596 Remove or replace air-data pitot assemblies	1.43	*	0	0	1	3	6.30

* No ATI value calculated

APPENDIX B (CONTINUED)

UNSUPPORTED AFSC 466X0 STS ELEMENTS

	TNG EMP	PERCENT MEMBERS PERFORMING					
		ATI	1ST JOB	1ST ENL	5- LVL	7- LVL	TSK DIF
15c(17). ALTIMETER ANTENNAS							
L597 Remove or replace altimeter antennae	1.61	2	0	1	2	3	5.99
15c(18). GAS PRESSURE GENERATOR							
L602 Remove or replace gas pressure generators	1.12	*	0	0	2	3	5.66
15c(19). DESICCANT ASSEMBLIES							
L599 Remove or replace desiccant assemblies	2.39	7	2	3	4	3	5.01
15c(20). EXPLOSIVE ACTUATORS							
L586 Remove or replace AGM-129A explosive actuators	1.57	*	0	0	1	3	5.94
15c(21). AIR SHUTOFF VALVE							
L595 Remove or replace air shutoff valves	1.39	*	0	0	2	3	5.75

* No ATI value calculated

APPENDIX B (CONTINUED)

UNSUPPORTED AFSC 466X0 STS ELEMENTS

	TNG EMP	PERCENT MEMBERS PERFORMING					
		ATI	1ST JOB	1ST ENL	5- LVL	7- LVL	TSK DIF
15c(22). LINEAR ELECTROMECHANICAL ACTUATOR							
L590 Remove or replace AGM-129A linear electro-mechanical actuators	1.45	*	0	0	1	3	6.19
15d(1). FUEL/DEFUEL							
K570 Fuel or defuel AGM-129A missiles	2.22	7	1	2	1	3	5.93
15d(2). EMERGENCY DEFUEL							
L574 Perform AGM-129A emergency defuels	2.55	7	0	1	1	1	5.74
15d(3). TRANSFER							
L580 Perform AGM-129A missile hoist transfer procedures	2.27	7	16	12	7	4	4.71
15d(4). MISSILE LEAK CHECK							
L581 Perform AGM-129A missile leak tests	2.71	7	14	10	6	4	5.53

* No ATI value calculated

APPENDIX B (CONTINUED)

UNSUPPORTED AFSC 466X0 STS ELEMENTS

	TNG EMP	PERCENT MEMBERS PERFORMING						TSK DIF
		ATI	1ST JOB	1ST ENL	5- LVL	7- LVL		
15e(2). ISOLATE MISSILE MALFUNCTIONS								
L579 Perform AGM-129A missile fault isolations	2.45	7	9	6	4	5	5.96	
15f. PERFORM GUIDANCE SET AUTOCALIBRATION								
L576 Perform AGM-129A guidance set autocalibration	1.82	*	0	0	0	2	5.43	
17b(4). FUEL/DEFUEL EQUIPMENT								
G278 Inspect missile fuel-defuel equipment	3.14	7	15	16	15	17	5.38	
G293 Remove or replace missile fuel-defuel equipment components	1.88	7	4	7	9	8	5.42	
17b(8). GUIDED MISSILE HANDLING UNIT (MHU-200/E)								
G277 Inspect MHU-200/E missile-handling units	2.33	7	11	12	8	7	3.87	
17b(9). MISSILE NITROGEN CHARGING ADAPTER SET								
G294 Remove or replace missile nitrogen charging adapter set components	1.63	2	14	13	12	11	4.31	

* No ATI value calculated

APPENDIX B (CONTINUED)

UNSUPPORTED AFSC 466X0 STS ELEMENTS

	TNG EMP	PERCENT MEMBERS PERFORMING						TSK DIF
		ATI	1ST JOB	1ST ENL	5- LVL	7- LVL		
17b(10). GENIE MIX-N-MATCH PORTABLE LIFT								
G286 Perform periodic inspections on Genie portable lifts	1.37	2	4	5	13	15	4.10	
G291 Remove or replace Genie portable lift components	1.14	2	0	3	10	11	4.11	
17b(11). LAUNCHER ROTATION TOOL								
H324 Electrically check launcher rotation tools	1.18	2	0	1	3	7	5.51	
H330 Operationally check launcher rotation tools	1.45	2	0	1	3	8	4.99	
H348 Perform fault isolations on launcher rotation tools	1.53	2	0	1	2	6	5.76	
H362 Perform periodic inspections on AGM-69A launcher rotation tools	1.49	2	1	1	2	8	5.00	
H412 Remove or replace launcher rotation tool components	1.33	2	0	1	1	7	5.46	
17b(12). MODIFIED NITROGEN CHARGING ADAPTER SET								
G288 Remove or replace B-52 nitrogen charging adapter set components	1.24	2	0	1	3	5	4.17	
17b(14). GUIDED MISSILE MAINTENANCE STAND, MSU-202/E								
G280 Inspect MSU-202/E missile maintenance stands	2.49	7	11	13	8	6	3.79	
G295 Remove or replace nonelectronic support equipment mechanical components	1.14	2	12	13	14	10	4.19	

APPENDIX B (CONTINUED)

UNSUPPORTED AFSC 466X0 STS ELEMENTS

	TNG EMP	PERCENT MEMBERS PERFORMING						TSK DIF
		ATI	1ST JOB	1ST LNL	5- LVL	7- LVL		
17d(1). AGM-69A MISSILE TEST STAND, A/F32AT-1A								
H299 Adjust AGM-69A missile test stand potentiometers	1.59	2	0	1	8	12	5.48	
H300 Adjust AGM-69A missile test stand snubbers	1.82	2	6	4	9	13	4.96	
H317 Change oil in AGM-69A missile test stands	1.06	2	0	1	8	12	4.42	
H328 Operationally check AGM-69A missile test stands	2.14	7	7	6	10	14	5.65	
17d(2). ELECTRONIC SYSTEM TEST SET (ESTS) AN/GSM-263, AN/GSM-263A, and AN/GSM-263C								
H301 Align electronic system test set (ESTS) patch-board- receiver contacts	1.80	2	6	8	16	16	5.17	
17d(3). AIR DATA TEST SET, AN/GSM-291								
H304 Calibrate air data test systems (ADTs)	1.57	2	1	3	7	9	6.90	
17d(5). SIGNAL DATA CONVERTER CV-364/GSM-263								
H315 Calibrate signal data converters	1.12	2	1	2	6	7	5.80	
17d(7). ELECTRONIC COMPONENTS COOLING EQUIPMENT (MXU-690/E) (MXU-690/F)								
H308 Calibrate cooling control units (CCUs)	1.57	2	1	2	11	14	5.80	

APPENDIX B (CONTINUED)

UNSUPPORTED AFSC 466X0 STS ELEMENTS

	TNG EMP	PERCENT MEMBERS PERFORMING						TSK DIF
		ATI	1ST JOB	1ST ENL	5- LVL	7- LVL		
17d(8). AIRFLOW COOLING MONITOR								
H305 Calibrate airflow cooling monitors	.90	*	0	0	7	9	5.94	
17d(9). ELECTRICAL CIRCUITS TEST SET, AN/AWM-41A								
H306 Calibrate AN/AWM-41A electrical circuit test sets	1.25	2	1	2	5	10	6.06	
17d(10). PYLON AND LAUNCHER/MISSILE SIMULATOR								
H371 Perform periodic inspections on PLMSs	1.16	*	0	0	5	3	4.81	
17d(11). REMOTE SWITCHING CONTROL ASSEMBLY								
H313 Calibrate remote-switching control assemblies	.86	*	0	0	3	3	6.50	
17d(12). SENSOR TEST SET								
H314 Calibrate sensor test sets	.86	*	0	0	2	3	6.40	

* No ATI value calculated

APPENDIX B (CONTINUED)

UNSUPPORTED AFSC 466X0 STS ELEMENTS

	TNG EMP	PERCENT MEMBERS PERFORMING							TSK DIF
		ATI	1ST JOB	1ST ENL	5- LVL	7- LVL			
17d(13). PROXIMITY SENSOR INSTALLATION/RIGGING AND MONITOR/ISOLATION TEST SET, OSE 10A59									
H312 Calibrate OSE-10A59 proximity sensor installation/ rigging and monitor/isolation test sets	.63	*	0	0	1	1	1	6.51	
17d(14). EXCM DIODE MATRIX TEST SET									
H329 Operationally check EXCM diode-matrix test sets	.84	*	0	0	5	3	3	5.45	
17e(2). OPERATIONAL ASSURANCE TEST									
H337 Perform ESTs operational assurance tests	2.43	7	5	5	16	16	16	5.28	
19c(2). NUCLEAR STATION LOGIC UNIT									
I453 Remove or replace CSRL nuclear-station logic units	1.96	7	11	13	12	6	6	5.11	
19c(3). RELAY ASSEMBLIES									
I454 Remove or replace CSRL relay assemblies	2.06	7	9	11	12	5	5	5.22	

* No ATI value calculated

APPENDIX B (CONTINUED)

UNSUPPORTED AFSC 466X0 STS ELEMENTS

	TNG EMP	PERCENT MEMBERS PERFORMING						TSK DIF
		ATI	1ST JOB	1ST ENL	5- LVL	7- LVL		
19c(4). POWER CONTROL ASSEMBLY								
I464 Remove or replace 180-inch multipurpose-launcher power-control assemblies	1.80	2	7	8	8	5	4.98	
19c(5). TRANSFORMER RECTIFIER								
I465 Remove or replace 180-inch multipurpose-launcher transformer rectifiers	1.47	2	6	7	6	5	4.95	
19c(6). POWER SUPPLY								
I463 Remove or replace 180-inch multipurpose-launcher power supplies	1.71	2	9	11	8	5	4.93	
20d(2). RELAY ASSEMBLY								
I459 Remove or replace pylon relay assemblies	2.98	7	4	10	18	9	5.03	
21a(1). STORES MANAGEMENT PANEL								
F223 Operationally check B-1B control and display panels	1.90	7	17	17	12	8	5.24	

APPENDIX B (CONTINUED)

UNSUPPORTED AFSC 466X0 STS ELEMENTS

	TNG EMP	PERCENT MEMBERS PERFORMING					7- LVL	TSK DIF
		ATI	1ST JOB	1ST ENL	5- LVL			
21a(2). STORES JETTISON PANEL								
F233 Perform fault isolations on B-1B control and display panels	1.80	2	16	16	11	7	5.44	
21a(3). PILOT STORES PANEL								
F223 Operationally check B-1B control and display panels	1.90	7	17	17	12	8	5.24	
21c. PERFORM B-52G/H MISSILE CONSENT PANEL CHECKOUT								
F224 Operationally check B-52 control and display panels, such as missile consent panels	1.65	2	4	3	3	3	4.99	

APPENDIX C
SUMMARY OF STS 466X0 ELECTRONIC PRINCIPLES
USED ON THE JOB

ELECTRONIC PRINCIPLES RESPONSES FOR TAFMS GROUPS
AND ELECTRONIC EQUIPMENT MAINTENANCE JOB PERSONNEL

STS PARAGRAPH	PERCENT MEMBERS RESPONDING			
	1-48 MOS TAFMS	48-96 MOS TAFMS	97+ MOS TAFMS	ELEC EQUIP MAINT
4b. Isolate faulty resistors	12	26	19	88
5b. Isolate faulty relays	22	30	20	82
5d. Isolate faulty solenoids	8	15	13	61
6b. Isolate faulty inductors	7	10	6	30
7b. Isolate faulty capacitors	9	19	14	70
8b. Isolate faulty transformers	8	15	13	63
19b. Isolate faulty solid state diodes	11	21	14	75
20b. Isolate faulty transistors	9	16	9	59
22b. Isolate faulty special purpose devices	7	16	10	52
26a. Assemble crimp connectors	48	55	38	98

ELECTRONIC PRINCIPLES RESPONSES FOR TAFMS GROUPS
AND ELECTRONIC EQUIPMENT MAINTENANCE JOB PERSONNEL
(CONTINUED)

<u>STS PARAGRAPH</u>	<u>PERCENT MEMBERS RESPONDING</u>			
	<u>1-48 MOS TAFMS</u>	<u>48-96 MOS TAFMS</u>	<u>97+ MOS TAFMS</u>	<u>ELEC EQUIP MAINT</u>
26b. Assemble coaxial connectors	17	24	21	93
26c. Assemble multipin connectors	16	27	21	84
27a. Use multimeter, analog	58	61	39	95
27b. Use oscilloscope	48	49	32	98
27c. Use signal generator	6	16	11	79
27g. Use multimeter, digital	66	65	42	96
33b. Isolate faulty power supplies	23	30	22	89
33c. Troubleshoot power supply circuits	10	15	12	55