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MANPOWER PLANNING HANDBOOK

Volume I: NavCommSta Transmitter Site

August 1975

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1. Enclosure (1) is forwarded as a matter of possible interest. It describes the planning logic and the 1975 planning factors needed to calculate billet requirements for a transmitter site whose communications services have been specified.

2. The remaining volumes of the Manpower Planning Handbook, Volumes II, III, and IV, deal with analysis of the electronics maintenance division, receiver site, and fleet center division. These volumes are now in preparation and will be distribution to the facilities listed on the distribution list in the near future.

3. Research Contributions are distributed for their potential value in other studies and analyses. They do not necessarily represent the opinion of the Department of the Navy.

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FOREWORD

This volume presents the final results of the transmitter site manpower planning analysis done for ComNavTelComm by the Operations Evaluation Group (OEG) of the Center for Naval Analyses. The objective of the work described here is to systematically relate billet requirements of each Naval communications station (NavCommSta, or NCS) to the communications services it provides.

Volumes II, III, and IV cover similar analyses of the electronics maintenance divisions, receiver sites, and fleet center divisions at the same NavCommStas considered here.

The authors gratefully acknowledge the help of Diego R. Roque of OEG, particularly his work in obtaining work measurements at NCS Norfolk.

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INTRODUCTION

To relate manpower requirements to communications services provided by a Naval communications station, representative NavCommSta sites were asked a number of questions concerning their work during calendar year 1974 and the personnel used to do it:

- What jobs were done at the site within the scope of operations, maintenance, and support?
- How often were these jobs done?
- How many man-hours were needed to do each job?
- When a job was not done properly (that is, according to acceptability standards) because of a manpower shortage, how many man-hours would have been required to do so?
- How many people are now "on board," and how many were there during the past year?

Communications functions analyzed were: the transmitter site, the receiver site, the electronics maintenance division, and the fleet center division. These functions were the ones that would be most affected by the transition from high-frequency (HF) equipment to satellites. To reduce the amount of data obtained to some reasonable size, only the 4 automated NavCommStas participated in the project: Honolulu, Guam, Norfolk, and Italy.

The data obtained from the 4 sites was structured so that the number of man-hours required to do identical work could be compared and a consensus arrived at to perhaps serve as a reasonable manpower standard for this unit of work. By determining the units of each type of work associated with a particular site, the manpower units required could then be calculated. Such calculations are needed when:

- The annual manpower budget at each station is being prepared.

- Realignment options are prepared as the communications system is changed.

Based on the data gathered from the 4 participating transmitter sites, we were able to construct a 1975 ComNavTelComm Transmitter Site Planning Guide containing:

Planning Factors Data Base

- A set of all operations, maintenance, and support jobs and the manpower required during 1974.

- A set of operating hours expended for each communications system and transmitter type; this set should be useful in predicting future operating work loads.

- A set of Navy-approved work standards that can be compared with the set of jobs and operating hours and used as a basis for establishing ComNavTelComm planning standards.

Planning Logic

- A method of calculating total man-hours required in these personnel categories:

  - Operators.

  - Maintenance technicians.

  - Various support categories.

- A method of calculating billets required, based on the number of man-hours required, standard work-week characteristics, and various operational constraints.

The entire manpower planning process, including the standards recommended, has been reviewed and informally approved by Op-124.

To properly use the planning system, ComNavTelComm must make these policy decisions.

- Validate the planning factors data base and make certain that no required jobs are missing.

- Review the numerical values associated with the planning factors, particularly with the unit man-hour requirements at each site, among all 4 sites and against all Navy standards available. Then, for each work activity, decide on either one standard that will be applicable to all NavCommStas, or separate standards for each site based on factors unique to that site.

- Confirm which jobs are to be included as part of the site's work load in the planning process. There are many jobs that are not done at every site. For example, the NCS Public Works Department may service an outlying site; in other cases, the site may service itself. In the case of maintenance jobs, there is no common policy regarding which maintenance tasks are required. For example, 2 sites overhaul their transmitters, and 2 do not.

- Decide whether the difference in manpower observed among sites for doing a given job during 1974 resulted from some distinguishable difference, such as quality of manpower or environment, or from "statistical variations" and, therefore, some mean value can be assumed as a ComNavTelComm-wide standard.

- Validate the planning logic proposed. The results of this review will result in the required inputs to the planner regarding which planning factor values to use in his analyses.

STRUCTURE OF THIS HANDBOOK

The sequence of topics covered by this handbook is:

- Overview of the Planning System--describes the proposed manpower planning process in terms of the inputs the planner must provide and the

various planning factors used to convert the inputs into billet requirements.

- Summary of Planning Factors Data Base--describes each planning factor generated.

- Planning Logic--contains the procedures for calculating the number of billets needed to operate, maintain, and support a given transmitter site; this section also includes a set of work tables useful in systematically implementing the procedures.

- Appendix A--contains the details of the analysis and derivation of the planning factors; annex 1 to the appendix contains the sets of tables containing the actual data used and derived.

OVERVIEW OF THE PLANNING SYSTEM

Figure 1 is a diagram of the manpower planning process as envisioned. Inputs to the process are the characteristics describing a specific system configuration at each site being analyzed. These characteristics include:

- Numbers and types of equipment to be kept in inventory at the site.
- Maintenance policy to be implemented, including what types of noncorrective (scheduled) maintenance jobs are to be done and how often.
- Operational use of the equipment in terms of the communications system being operated, the number of hours per year each system operates, and the type and frequency of operating jobs being done.
- The type and frequency of support jobs, such as cleaning and field days.

The system characteristics are then combined with planning factors (table 1) to give the man-hours needed for the various jobs. These man-hours are then converted to billets, using Navy standards for a work week.

BASIC ASSUMPTIONS

This section describes the various assumptions underlying the results.

The planning factors (table 1) were derived from 1974 operational data and are based on the best data available from each site as well as other sources. However, each site has been asked to upgrade its record keeping (primarily with respect to maintenance) and ensure it is recording the data requested. This way, more accurate information can be obtained in the future to revalidate the planning factors and upgrade their accuracy. But it is assumed here that the planning factors are valid and that an annual revalidation of the factors, based on 1975 work experience, will amend the data base as needed.

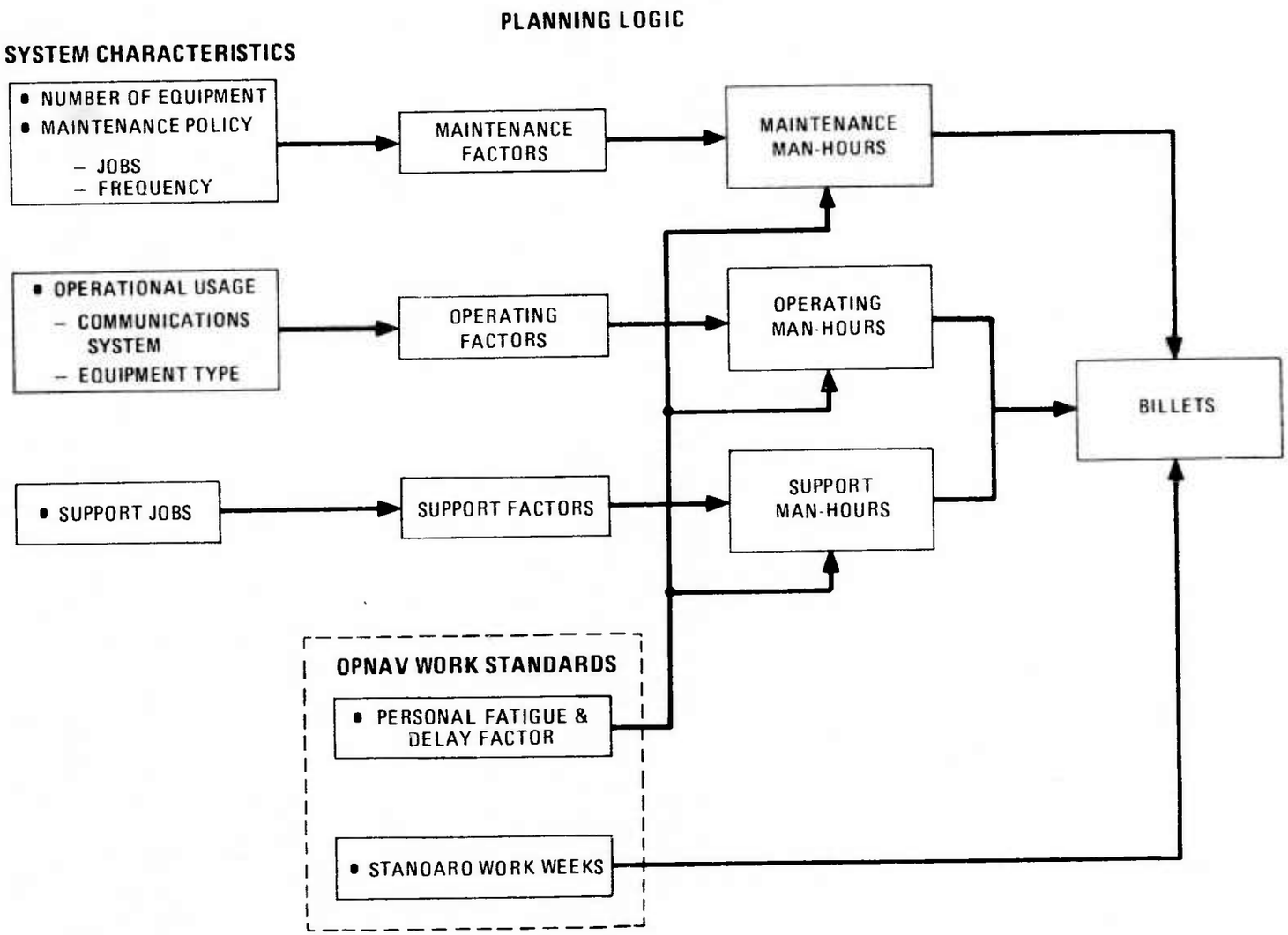

FIG. 1: MANPOWER PLANNING LOGIC

TABLE 1

TRANSMITTER PLANNING FACTORS

Maintenance

1. Conventional operator planned maintenance subsystem (PMS) factors

2. Conventional technician PMS factors

3. Make-ready, put-away time factor

4. Other noncorrective maintenance (non-CM) factors

5. CM factors

Operations

6. Operational usage factors

7. Tunings/retunings to usage factors

8. Tuning/retuning unit time factors

10. Quality control (QC) checks factors

11. Other operational activities factors

Support

12. Support primary duty factors

13. Support collatoral duty factors

14. Supervisory factors

OpNav work standards

15. Personal fatigue and delay (PF&D) factor

16. Standard work week

The planning factors derived in this report consist of localized factors; in other words, the manpower required to do the same job may differ from station to station. Unfortunately, the data collected does not show whether differences can be accounted for by factors such as environment, personnel quality in terms of training and experience, or age of equipment. These factors can be used when a specific NavCommSta (or one similar to it) is undergoing realignment.

From each set of four local factors, ComNavTelComm can generate one command-wide planning factor that relates to an "average environment," rather than a specific NCS. The ComNavTelComm factors can be used to ease calculations where environmental differences need not be taken into account. Since a number of different sites are being included in the realignment effort, individual deviations will tend to compensate for one another.

The objective of this analysis was to develop some rational basis for ComNavTelComm planning standards. Thus, when a Navy standard is greater than the actual work time needed, the standard is listed here as the requirement, recognizing that its use permits some slack in the system. Such a cushion may be used one of two ways:

- To do more than the minimum work--for instance, more equipment overhauls or quality-control checks, at the discretion of the officer-in-charge.

- Not to man some billets depending on budget constraints.

USE OF PLANNING FACTORS

The context in which the planning factors are to be used can be summarized this way. The systems planner performs a set of preliminary analyses. He examines the need for communications services of various types, including geographical coverage, number of messages per unit time to be handled by each communications system (such as full-period termination vs. broadcast), division of responsibilities among NavCommStas, operating loads to be accommodated for both peak operations and the entire year, and the division of these loads between satellite and HF equipment. Further system design considerations are then made, culminating in the configuration of alternative designs.

For each alternative being considered, this kind of information must be specified as inputs to the manpower planning system:

- The set of equipment to be in inventory at the station being considered.

- Total maintenance policy to be followed; that is, whether the prescribed PMS schedule is being followed for each unit of equipment, frequency of equipment overhaul, and the like.

- Specific operating procedures, as selected from the set of operational jobs listed in the data base.

- Operational use of the equipment.

- All support jobs required, as selected from the set of support jobs listed in the data base.

To help the planner estimate the number of equipment hours expected, he may use the operational planning factors provided, which include the number of transmitter operating hours for each communications system/transmitter type combination at each transmitter site.

The basic question is: For each system configuration being analyzed, how many billets of what type are required at each site for operation, maintenance, and support? The procedure followed is similar to the approach used by Op-124 and the Navy Manpower and Material Center (NavMMaC) in calculating billets required as a function of the average weekly work load at the site. Work loads that deviate from the average are accommodated this way:

- Using peak loaders for predictable peaks.

- Using the electronic technician to help the operator when needed.

- Having the maintenance man do CM work before he does PM work.

- Bringing support personnel into operations and maintenance (O&M) activities if they can be trained to take on some of the simpler jobs during a peak.

- Working longer than the average standard shift or work week.

Overtime should be repaid with compensatory time off. This policy is implicitly included in calculating billets based on the total annual work load because peaks are included in that total. All other assumptions are noted in appendix A.

SUMMARY OF PLANNING FACTORS DATA BASE

This section describes the planning factors derived. The values of these factors and the method used in deriving them appear in appendix A.

MAINTENANCE MANPOWER REQUIREMENTS

These planning factors consist of the man-hours per year needed to do various kinds of maintenance for each type of equipment at each site. There are two types of maintenance manpower requirements:

- Site requirements--the number of maintenance man-hours that each site states it needs to achieve an acceptable performance level.

- Navy requirements--the number of maintenance man-hours that OpNav allows as acceptable for budgeting manpower.

Fortunately, all sites can do the work with the allowable Navy requirements.

PLANNING FACTORS

Specific planning factors have been generated for all the maintenance jobs.

Conventional PMS Factors

The allowable Navy requirement is to do the PMS actions specified on the Maintenance Requirement Cards (MRC) within the man-hours also specified on the cards. The man-hours do not include make-ready and put-away time or personal fatigue and delay. The PMS man-hours for each equipment type are given in table II-2.[1]

Make-Ready, Put-Away Factor

The allowable Navy requirement is 30 percent of the PMS time as specified on the MRC cards.

---

[1] All tables cited in this section appear in annex 1 of appendix A.

Personal Fatigue and Delay Factor

The allowable Navy requirement is 17 percent of the PMS time.

Total Requirement for PMS

From the preceding considerations, the total allowable Navy requirement for each equipment unit is 1.47 times the PMS time. Table II-3 gives the site requirement for each equipment type. The total site requirement is considerably under the Navy requirement; it equals the PMS standard for Honolulu, Guam, and Italy, and is 1.2 times the PMS standard for Norfolk.

Conventional Operator PMS Factors

These make up that portion of the total conventional PMS actions performed by operators, rather than by technicians. These times are given in table II-2.

Conventional Technician PMS Factors

These make up that remaining portion of the total conventional PMS actions performed by technicians. These times are given in table II-2.

Other Non-CM Factors

These are the man-hours required to do all non-CM actions now being done at the various sites, but not listed on the MRC card. These jobs and the man-hours required are given in table II-5. The problem is that there is no consistency among jobs performed at the stations. Nor is there any justification (except judgment) that the work done is worth the cost. In fact, the data shows that the more man-hours used in doing extra non-CM jobs, the higher the amount of CM man-hours used.

CM Factors

The allowable Navy requirement is equal to the total conventional PMS man-hours allowed, or 1.47 times more than the times listed on the MRC cards. The CM requirement for each equipment at each site is listed in table II-4. The requirement for all sites except Norfolk is considerably under the Navy requirement. However, Norfolk indicates it can meet the Navy requirement in the future.

Total Requirement for Maintenance

From the preceding considerations, the total allowable Navy requirement for each equipment unit is 2.94 times the PMS time. The requirement for all sites except Norfolk is under the Navy requirement. However, Norfolk indicates it can meet the Navy requirement in the future.

Operations Manpower Requirements

These planning factors relate transmitter usage to the three main operational work categories of:

- Tuning/retuning.
- Quality control checks.
- Other operational actions.

Operational Usage Factors

Tables III-1a and III-1b contain the total hours of transmitter use during the past year for each communications system/transmitter type at each of the 4 sites. These factors are provided as a guide in estimating future operating workload.

Tunings/Retunings-to-Usage Factors

Tables III-1a and III-1b also contain the number of tunings and retunings per 1,000 hours of operating time for each communications system/transmitter type.

Tuning/Retuning Unit Times

Table III-2 shows the average total time required to tune or retune a particular type of transmitter, including orderwire and logging time and antenna selection as required.

Tuning/Retuning Man-Hours-to-Usage Factors

Using the previous factors, table III-1a and III-1b also give the total man-hours per year required for tuning/retuning per 1,000 hours of operating time for each communications system/transmitter type.

QC Checks Factors

Figure A-1 shows the man-hours per year required by each station for its load of full-time-equivalent transmitters operating. This curve may be used for any other transmitter load.

Other Operational Activities Factors

On-the-job training and adjustments after power outages were the only other operational jobs done at a site; these times are listed in table IV-2. Only the off-line nonproductive portion of these man-hours should be used.

Support Primary-Duty Factors

These deal with the work done by nonsupervisory personnel whose primary duty is to support the site, as opposed to "hands-on" operations and maintenance services. The billets required at each of the 4 sites for these services are shown in table IV-1.

Support Collateral Duty Factors

These are concerned with the work done by nonsupervisory personnel in addition to their other duties. The man-hours required for these services are shown in table IV-2.

Supervisory Factors

The supervisory overhead rates associated with each overall site and its subordinate components is given in tables I-3 and IV-4.

OpNav Work Standards

Personal Fatigue and Delay Factors

These total 17 percent of the working time applied to all jobs whose measurements consist only of productive work and do not include permissible breaks.

Standard Work Week

A standard work week of 40 hours and a "5-man-for-4-section"[1] watch is to be used. Taking into account service diversions, training, leave, and holidays, the hours available for work are 31.94 for military and 33.38 for civilian personnel.

---

[1]Assigning 4 men for every watch position being manned continuously constitutes a 4-duty section watch. This results in a 42-hour work week (including meal time). Assigning a fifth man for each watch position allows for service diversions, training, leave, and holidays, and results in 33.6 hours per week available for work (including meal time).

PLANNING LOGIC

Procedures for calculating the number of billets needed to operate, maintain, and support the equipment for the alternative being proposed are outlined in this section. Data used in making the calculations can be entered in the manpower planning work tables; suggested formats for these tables appear at the end of the section (work tables 1 through 5).

MAINTENANCE MANPOWER REQUIREMENTS

Work Table 1

Equipment Needs

Decide on the numbers and types of equipment needed to be kept operationally ready for peak operations, such as major fleet exercises or contingencies. This information can be obtained from the users. The number includes spares. However, such needs should be confirmed by comparing the list of stated user needs with former usage under similar conditions. Such data is not now part of the planning data base; it should be collected as exercises are conducted. List the equipment type in column 1 and the total number required in column 2.

Planning Factors

Decide which set of planning factors is to be used for the realignment alternative under consideration: either the ComNavTelComm-wide planning factors, or the set of planning factors related to a particular geographical zone as represented by one of the 4 sites.

Equipment Inventory

Decide on the equipment inventory to be maintained at full readiness. Also decide what PMS schedule to follow, including all non-CM actions such as overhauls and appropriate work schedules.[1]

---

[1] According to current policy, all site equipment is to be fully maintained for both CM and PM. However, manpower may be saved (at the cost of more time to reach full operational readiness) when all equipment is not fully maintained all year, and greater use is made of strategic warning in starting the readiness process early enough. Further analysis of such a proposed policy change is required. If current policy were changed, the calculations of PMS and CM man-hours would be modified accordingly.

PMS Man-Hours

Based on what PMS schedule is to be followed, calculate the total PMS man-hours required for each equipment type. First, calculate the sum of the unit PM man-hours[1] needed for the total PMS schedule over the full year (from the list of all PMS jobs and their unit manpower requirements as included among the maintenance planning factors). List the unit PMS factors for operating personnel in column 3, and the PMS factors for maintenance personnel in column 4. The product of columns 2 and 3 gives the PMS man-hours required of operators; this number is listed in column 5. The product of columns 2 and 4 gives the PMS man-hours required of technicians, and is listed in column 6. Find the total operator PMS man-hours (sum of column 5 entries) and total technician PMS man-hours (sum of column 6 entries).

The total operator and technician man-hours required (columns 5 and 6) should also include the appropriate "make ready and put-away" and PF&D factors. The OpNav requirement for these two factors are 30 and 17 percent, respectively. Thus, the OpNav requirement for operator and technician PMS man-hours would be 1.47 times each of the totals shown in columns 5 and 6. These totals should be listed as the last lines of columns 5 and 6.

CM Man-Hours

Calculate the CM man-hours required for each equipment type and list the total in column 8. This number consists of the product of the number of equipment units in inventory (column 2) and the CM planning factors listed in column 7. Find the total CM man-hours required (the sum of column 8 entries).

[1] Unit PM man-hours is the annual man-hours needed to do PM for one piece of this equipment.

Calculating the OpNav CM requirement is a simpler process, since the CM requirement is defined to be equal to the total PMS requirement (including the additional 47 percent factor). Thus, the separate CM factors do not have to be listed in column 7, and the total of column 8 is equal to the total of the last line of column 5 plus the last line of column 6.

TUNING/RETUNING MANPOWER REQUIREMENTS[1]

Work Table 2

Equipment Needs

List, in columns 1 and 2, each communications system and the types of equipment to be operated during the coming year.

Operating Hours

Estimate the number of operating hours for each equipment type during the coming year and enter the estimate in column 3. In this estimate, you may wish to consider operational usage factors at particular sites as a "baseline," adjusting it up or down to reflect the proposed operation.

Tuning/Retuning-to-Usage Factors

List, in column 4, the tuning/retuning man-hours-to-usage factors (man-hours per 1,000 hours of operation for each communications system/transmitter type). Note that the factors are based on a given mix of retunings to antenna selections and should be changed when the mix changes.

Tuning/Retuning Man-Hour Requirements

Calculate the total tuning/retuning man-hours required for each communications system/transmitter type as the product of columns 3 and 4, and list in column 5. Find the total operating man-hours for tuning/retuning as the sum of the entries in column 5.

ADDITIONAL MAN-HOUR REQUIREMENTS

Work Table 3

Quality Control Checks

Decide on what QC checks are to be made and how often.

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[1]Appendix A describes another procedure to compute this requirement.

Manpower for QC Checks

Estimate the total annual man-hours needed for QC checks in one of two ways. When the QC checks are the same as those listed in the planning factors data base, and the only variable is the number of transmitters in inventory, the planner may obtain the estimated QC planning factor from figure 2 which relates QC check man-hours to the number of full-time equivalent transmitters being operated. List this information in columns 1 and 4.

A more accurate (but more time-consuming) method of making this estimate is to review the list of QC checks and decide which ones are to be done, how often, and the time required for each. List this in columns 1, 2 and 3 of work table 3. Then calculate the annual man-hours required for each check by multiplying column 2 times column 3 times 52. List the man-hours required for each QC check in column 4. The sum of the entries in column 4 is the total QC man-hours required.

Power Failures

Calculate the total man-hours needed to cope with power failures the same way as QC requirements. First, list in column 1 all operational activities that must be done following each power disturbance (such as retuning/readjustment). Next, list in columns 2 and 3 the average number of work units expected each week (annual estimate divided by 52) and the man-hours associated with each disturbance. The total man-hours required will then again be the product of columns 2 and 3. Record this in column 4.

DIRECT LABOR SUPPORT

Work Tables 3 and 4

Support Needs

Decide which support jobs are needed at the site by reviewing the data base on support jobs and determining which of these the site has to do for itself, thus requiring site billets. In column 1 of work table 4, list the direct-labor support primary-duty functions (see appendix A) such as medical services, in which billets are to be provided by the NavCommSta rather than by outside organizations. The number of direct-labor support billets required for these functions is listed in

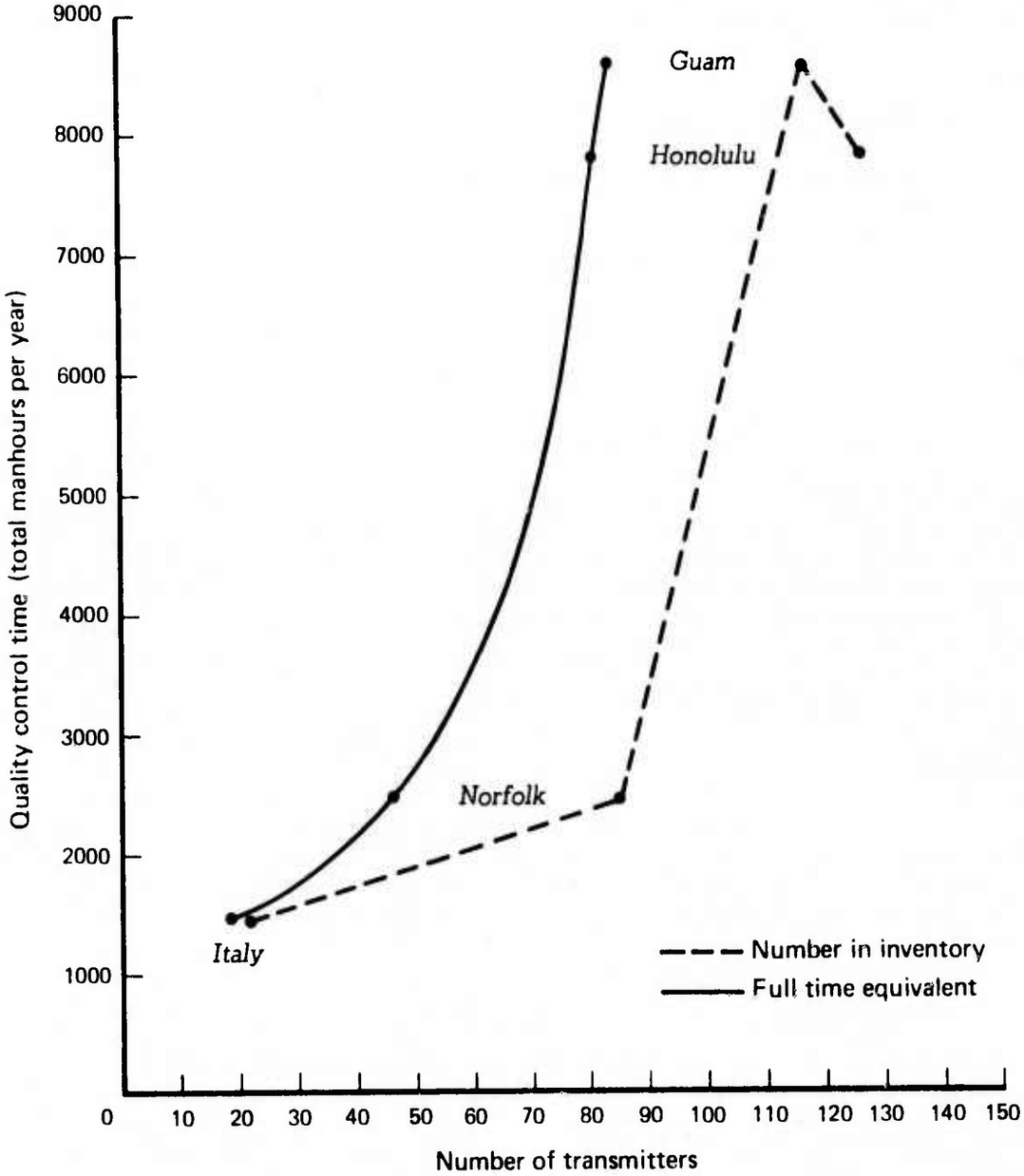

FIG. 2: TIME REQUIRED FOR QUALITY CONTROL CHECKS

column 2. The support primary-duty planning factors may be used in deciding how many billets should be allocated to these functions. List those support jobs being done as collateral duty in work table 3, along with the average number of work units done per week and the unit man-hours required for each work unit (columns 1, 2, and 3). Calculate the total man-hours per year required for each job and list this total in column 4.

Support Man-Hours

Determine who will do each job in terms of these categories:

- On watch.
- Maintenance technicians on day shift.
- Primary-duty support personnel.
- Supervisors.

Allocate the total support man-hours required among these billet categories and list in columns 5, 6, 7, and 8 of work table 3. While using O&M personnel for this purpose may not seem efficient, it does offer the advantage of having extra O&M workers available for peak operations. Add the total man-hours required for each category.

TOTAL BILLET REQUIREMENTS

Work Table 5

The remainder of this section explains how to calculate billet requirements for each class of personnel. The characteristic being calculated is given in column 1 of work table 5 and is called an "item" of this column. The data for each calculation should be listed in column 5.

Work elements

In column 1, list the various work elements done by the operator watch personnel. These elements are:

- Tuning/retuning operations.
- QC checks.

- Power failures.

- Operator PMS actions.

- Support collateral duty work load done by operator watch personnel.

Man-Hours per Work Element

In column 2, list the man-hours required for each work element. In all appropriate cases, the working man-hours must be converted into total man-hours by applying the PF&D factor appearing in column 3. Thus, the total number of man-hours for each work element is:

$$TMH = (1 + PF\&D)\ (WMH),$$

where TMH = total man-hours;
WMH = working man-hours;
and PF&D = personal fatigue and delay factor.

The PF&D factor should have been included in the operator PMS requirements calculated in work table 1. Obtain the total operating man-hours required (row 6 of the table) by adding the man-hours of the five work elements and listing the total in column 4.

Number of Watchstanders

The next step is to calculate the total number of operator watchstanders required (row 8 of the table). There are three major factors to consider in this determination:

- Average work load.

- Peak work load the system is designed for, and how flexible the system is in sharing operating work load with other watchstanders (such as maintenance and supervisory personnel).

- Constraints, such as safety.

Each factor is considered in greater detail here. The number of operator billets, B_o, based on average work load is determined first:

$$B_o = TOW/\ 52\ (TAW),$$

where TOW = total operator work load per year,

and TAW = time available for work per week.

According to the standard work week of 40 hours (where dependents are authorized), TAW equals 31.94 hours per week for military and 33.98 hours per week for civilian personnel (reference 1). An assumption here is that a watchstander assigned to a 5-man-for-4-section watch also has about 32 hours per week available for work because of time out for meals.

TAW thus is based on a weighted average of these two factors and depends on the civilian-to-military mix at the site. For example, if there were 10 civilian to 40 military direct labor personnel at a site, TAW, the weighted average would be:

$$TAW = \frac{10(33.98) + 40(31.94)}{50} = 32.35 \text{ hours per week.}$$

Enter this weighted average of TAW in row 7. Enter the results of the calculation of B_o in row 8, column 5. Carry the billet calculations to the nearest 100th of a billet until all calculations are completed and a final "round off" of fractional billets is made.

Determine the number of watch supervisors, B_{ws}, assigned to the watch:

$$B_{ws} = B_{wo} S_{rw},$$

where B_{ws} = number of watch supervisor billets required (row 10);

B_{wo} = number of watch operator billets required (row 8);

and S_{rw} = watch supervisor overhead ratio (row 9).

Enter the values for these characteristics in work table 5, column 5, in the appropriate rows.

Allocate the watch operators and supervisors among the four watches and transmitter buildings, and see that anticipated peak loads during the week are accommodated. Note that watches do not have to be manned equally, and peak loaders can be used. After the allocation is made, check to see that the safety constraint is satisfied (minimum of 2 men per watch). When either of these factors is a problem, it can be alleviated by adding maintenance technicians to the watch (plus the proportional amount of supervisors). Insert this information in rows 11 and 12. This strategy may yield two benefits simultaneously. First, the technician can satisfy the safety constraint; second, because of his flexibility, the technician can be always gainfully employed either doing CM or PM actions or aiding the operator(s) during a peak.

But this gain costs something. Recall that we have provided enough operator billets to meet the total operator work load. If the maintenance technician assists the operator during peak activities, the amount of operator work he does results in the operator's being "idle" during slow times, since the number of operators was based on total yearly work load. (Unless you assume that the operator, when he is not busy, can help the maintenance technician with some of his work.) As discussed elsewhere in this section, if this strategy is used, some additional man-hours will have to be added to the maintenance technician work load calculated previously. This planning factor will have to be estimated, since no data is available.

Finally, since the total operator work load includes PMS work, and since the PMS work can be dropped during a peak, some extra manpower is available for peak demands for tuning/retuning.

Additional Direct-Labor Maintenance Personnel

Determine the total number of additional direct-labor maintenance personnel required during the day shift by following the items listed in column 1, entering the data requested in column 5.

First, enter the PM and CM work loads to be done by technicians (either on watch or day shift) in rows 13 and 14. Enter the total in row 15. Enter the total maintenance watch man-hours available in row 16:

$$TMWM = 52B_{mw}\ TAW,$$

where $TMWM$ = total maintenance watch man-hours available;

B_{mw} = number of assigned maintenance watch billets;

and TAW = time available for work per week, as already described.

Then enter, in row 17, an estimated percentage of time to be spent by the maintenance man doing the peak operating load. As discussed, operating peaks, when they occur, are handled by a maintenance watchstander (when such an assignment exists) or watch supervisor. In either case, the individual drops his normal work and responds to the peak operating request. Thus, this time is used in operations and is not available for maintenance or supervision.

A working supervisor's time is already properly allocated between direct labor and supervision. For a maintenance technician on watch, including day shift, some fractional part of a billet needs to be added to this operating function to account for that fraction of time when he is taken off his maintenance work to keep the operator during a peak:

$$TMWMA = (TMWM)\ (1 - p/100),$$

where TMWMA = time available for maintenance work by the watch maintenance technician;

and p = percentage time on peak operating load.

Enter TMWMA in row 18.

Next, determine the resulting maintenance work load to be done by the day shift (row 19). This is equal to the total PM required of technicians plus the CM to be done (as previously calculated) minus the maintenance man-hours spent by maintenance technician watchstanders. In calculating the total maintenance man-hours, the CM planning factors have nonproductive time built in, whereas the PM planning factors do not. Hence, only the latter time must consider the PF&D factor as well as make-ready, put-away factor; these were included in work table 1. Finally the number of maintenance billets, B_m, required on the day shift (row 20) is:

$$B_m = TMW/52\ (TAW),$$

where B_m = direct labor maintenance billets required (row 20);

TMW = total maintenance work load to be performed by maintenance personnel on day shift (row 19);

and TAW = time available for work per week, as previously described.

Maintenance Supervisors

Determine the number of maintenance supervisors required (row 22):

$$B_{ms} = B_m S_{rm},$$

where B_{ms} = maintenance supervisor billets (row 22);

B_m = maintenance billets on day shift (row 20);

and S_{rm} = maintenance supervisor overhead ratio (row 21).

Support Primary-Duty Supervisors

Determine the number of support primary-duty supervisors required:

$$B_{ss} = B_{sp} S_{rs} ,$$

where B_{ss} = support primary duty supervisors (row 25);

B_{sp} = support primary duty billets (row 23);

and S_{rs} = support primary duty supervisor overhead ratio (row 24).

The service diversion work load should be examined as part of the entire service diversion requirement to ensure that the total does not exceed an average of 8 hours per week. When it does, an appropriate number of additional billets may be added.

Fractional Manning

After the number of billets for each function has been calculated to the nearest 100th of a billet, fractional manning problems may arise. In the past, this was solved by arbitrarily selecting the equivalent of one-half (0.5) as the cutoff point. Any work load that earned at least one-half space was awarded the next whole number without regard to work center size. Those that earned less than one-half did not get the extra manpower (reference 2).

Overload factors are established based on the premise that separate criteria should be applied to small and large work centers. A maximum individual work overload is established at 1/2 hour per working day, and is cumulative until reaching a maximum of 1/2 billet. The cut off point is the highest value the fractional manpower can equate to before the manpower requirement is rounded to the next higher integer. Table 2 reflects fractional manpower cutoff points for both military and civilian manpower.

Qualitative Requirements

Next, determine the qualitative requirements of each position in terms of designator, grade, rate, and series. This should be done uniformly, based on the total number of people required in each functional unit.

TABLE 2

FRACTIONAL MANPOWER CUTOFFS FOR COMPUTING STANDARDS

Manpower authorized		Fractional manpower cutoff	
		Military	Civilian
1		1.081	1.078
2		2.162	2.155
3		3.243	3.233
4		4.324	4.310
5		5.405	5.388
6		6.486	6.466
7		7.500	7.500
Over 7	Authorized manpower	+0.500	0.500

WORK TABLE 1

MAINTENANCE MAN-HOUR REQUIREMENTS

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Equipment required		Total operator PMS factors	Total technician PMS factors	PMS operator man-hours	PMS technician man-hours	CM factors	CM man-hours
Type	Number						

WORK TABLE 2

TUNING/RETUNING OPERATING MAN-HOUR REQUIREMENTS

(1)	(2)	(3)	(4)	(5)
Communications system	Equipment type	Operating hours	Tuning/retuning man-hours-to-usage factors	Tuning/retuning man-hours

WORK TABLE 3

MAN-HOUR REQUIREMENTS FOR ADDITIONAL JOBS

(1) Job Description	(2) Average work units per week	(3) Support planning factor	(4) Total man-hours per year	(5) Watch allocation	(6) Maintenance technician allocation	(7) Primary duty/support allocation	(8) Supervisor allocation

WORK TABLE 4

SUPPORT PRIMARY DUTY REQUIREMENTS

(1) Support primary duty functions required	(2) Billets required

WORK TABLE 5

CALCULATING TOTAL BILLET REQUIREMENTS

(1) Characteristic being analyzed	(2) Working man-hours required	(3) PF&D factor	(4) Total man-hours required	(5) Numerical factor
1. Tuning/retuning operations		1.17		
2. QC checks		1.17		
3. Power failures		1.17		
4. Operator PMS actions		Included		
5. Support collateral duty work load done by watch personnel		Included		
6. Total operating man-hours required				
7. Standard work week (for labor mix)				
8. Number operating billets required				
9. Watch supervisory overhead ratio				
10. Number watch supervisors required				
11. Additional maintenance workers added to watch				
12. Additional supervisors added to watch				
13. Total maintenance technician PM work load				
14. Total maintenance technician CM work load				
15. Total maintenance technician work load				
16. Total maintenance watch man-hours available				
17. Percent time watch technician does peak operating load				
18. Total maintenance watch man-hours available for maintenance				
19. Maintenance work load done by day shift				
20. Maintenance billets required for day shift				
21. Maintenance supervisory overhead ratio				
22. Number maintenance supervisors required				
23. Number support primary duty personnel				
24. Support supervisory overhead ratio				
25. Number support primary duty supervisors required				

REFERENCES

1. OpNav 12P-6, "Manpower Requirements Program," Unclassified, 29 May 1974.

2. OpNav 12P-8, "Manpower Requirements Program," Chapter IV, Unclassified, 23 Jan 1973.

APPENDIX A

ANALYSIS AND DERIVATION OF PLANNING FACTORS

This appendix describes the planning factors and how they were derived for the operations, maintenance, and support functions analyzed. As table 1 of the main text shows, 16 basic planning factors have been derived for those functions. Each factor is described here, indicating:

- Numerical values of the recommended planning factors.
- How the original data submitted by the 4 sites was converted into planning factors.
- Existence of Navy work standards and their use in this analysis.
- Organization of the planning factors data base so that the planner, following the planning logic described in the main section, can retrieve desired values from the data base.
- Other planning information derived during the analysis.

PERSONNEL INFORMATION

The main objective of this analysis was to determine the appropriate supervisory "overhead" factor now associated with each work function. However, one by-product was a list of all billet titles for all personnel at each site. A comparison of each station's billet titles with a master list that was generated, and each station's title preferences are given. This structure was generated to aid Code-01 in formulating a final, preferred set of standard billet titles.

Uniform Billet Titles

Table I-1 of annex 1 is a composite of all billets filled as of the survey date and as submitted by each of the transmitter sites. Column 1 is a master list of practically all billets commonly associated with transmitter sites. These billets are grouped into divisions--officer-in-charge, first lieutenant, supply, dispensary, public works, and operations/maintenance. The last category is also divided into operations and maintenance branches.

The billets reported at Honolulu, Guam, Norfolk, and Italy were then matched against this list, as shown in columns 2, 3, 4, and 5, respectively. As in the original data, the word "same" in place of a billet title indicates that the site uses the master position title; another title indicates the title now used there. When the site indicated a preference between the master billet title and the one it uses, the title is starred.

Billets that do not correspond to the master list are also listed in the division in which they exist, with the same letter designation used in that site's original data. Note that billet A at one site need not be the same as billet A at another site, since the original data forms were completed independently with only the master billet list as a guide.

Although all billets in the master list appear in column 1, there are billets that do not exist at any of the 4 sites.

Table I-1 was created to help in developing a set of uniform billet titles. Titles now in use can be compared with this list and a decision made by the command concerning the preferred set of billet titles.

Manning Distribution

Table I-2 of Annex 1 gives total manning used for operations, maintenance, support, and general management at the sites. The number of direct labor, functional support, and supervisory personnel are also indicated within each division, as is the military-civilian composition of each category.

Table I-3 also shows the manning distribution of labor between day workers and watchstanders. The purpose of tables I-2 and I-3 is to compare distributions of the transmitter personnel among sites, as well as provide a basis for deriving supervisory overhead rates (described under support manpower requirements.)

MAINTENANCE MANPOWER REQUIREMENTS

Initial analysis of the maintenance data showed large differences among the sites in the number of man-hours each spent in its PMS and CM functions for one unit of equipment because:

- While all sites indicated they performed the PMS work as listed on the Maintenance Requirement Cards (MRC), some of the work was done more often than indicated on the cards. They also did some other non-CM work. It is true that the MRC cards are defined as the minimum PMS work to be done. However, ComNavTelComm has never specified other work to be done (including overhauls, and needs to do so if uniform planning standards are to be derived.

- In some cases, the time taken for parts replacement during PM was originally recorded under PM time. The consensus was that, for uniformity, this time should be recorded under CM, and all sites made certain that their data reflected this definition.

For these reasons, 3 classes of maintenance work were defined:

- Conventional PMS Work. This first work category is defined as the annual man-hours required to perform the minimum PMS actions specified on the MRC card for one unit of equipment, but does not include any extra non-CM work the site does because it feels it is necessary. The conventional PMS man-hours are defined to include all maintenance man-hours, including the man-hours required for "make ready and put-away."

  Since the operator does part of the PMS actions, it it necessary to know his share so that a division of the total PMS time can be made between operator and maintenance technician.

- Other Non-CM Work. There are a number of maintenance activities (such as overhauls) that are not done at all sites, or are done differently at each site. To identify these differences and still allow the planner the choice of including those work functions he desires in his analysis, we have structured all of this nonstandard, non-CM maintenance work and the man-hours each requires as additional jobs. But to obtain official billet credit for such work as part of the PMS system, ComNavTelComm will have to make such recommendations and submit them to NavMat for approval.

- CM Work. This category is the annual man-hours required to perform all CM actions, including replacement of parts during PMS.

Data Organization

Tables II-1 through II-5 of Annex 1 deal with the maintenance planning factors and are derived from the data submitted by the 4 sites.

Table II-1 gives numbers and types of all equipment being maintained at the 4 transmitter sites. This equipment is listed alphabetically in column 6 and numbered sequentially in column 1. The numbering system is then used to identify the same equipment type in all the II-series tables. As a cross-reference to locate the data in the II-series tables, the maintenance numbers as originally given by each site are listed in columns 2, 3, 4, and 5. Column 7 describes the equipment in column 6.

Columns 8 through 11 give the number of units of equipment of each type at the sites. When the number maintained is different from the total number on hand, this is also indicated, and the latter figure is the one used in all calculations to determine unit times.

The total man-hours per year needed for both CM and conventional PMS maintenance (not including extra jobs) for one unit of each piece of equipment is given in columns 12 through 15. An "A" following the number indicates that the site has identified extra jobs (at additional man-hours). A list of these extra jobs and the man-hours required is in table II-5.

Table II-2 lists man-hours needed for different aspects of conventional planned maintenance, as specified on MRC cards. Again, columns 1 and 2 give the maintenance number and equipment type.

The rest of the table is divided into three categories. Columns 3 through 6 give the standard times reported by the sites for planned maintenance by operator personnel on one

unit of equipment (planning factor 1)[1]. Columns 7 through 10 give the equivalent standard times by maintenance technician personnel (planning factor 2). Columns 11 through 14 give the total of these two times, which is the annual man-hours required to perform minimum PMS on one unit of equipment. Locally generated standards are also reported; in those cases the standard is followed by an (L). These times do not include extra non-CM work such as overhauls, which are covered in table II-5.

Column 15 gives the official MRC standards as obtained from Code-04 Readiness Department. In some cases, the standard differs with different models of the same equipment; the range of values separated by a slash is given for those instances.

Table II-3 gives the annual man-hours the sites reported as necessary for conventional planned maintenance on one unit of equipment (not including the time required to do the extra jobs listed in table II-5). These times usually were very close to the PMS standards. This was expected, since all sites indicated they did not keep records of PM work times; instead, they based their PM requirements on the PMS standards. Thus, when the required times are noted as being different from the times specified as MRC standards in table II-2, and when the differences are not explained in the narrative or footnotes submitted, a "plus" or "minus" in the box indicates a positive or negative deviation from the PMS standard. An "A" indicates there is an extra job reported by the site and listed in table II-5.

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[1]In the case of several types of equipment, only a local standard was given; this standard exceeded the MRC standard, and no breakdown of extra time was given. In this case, the local standard was scaled down to the MRC time, and each of the two times was scaled down proportionately. In addition, Norfolk apportioned the total time between the operator and technician differently from the other sites. This should be treated as a special case when allocating Norfolk billets, and not be part of the generalized planning process.

Two other sources of maintenance manpower standards were also examined. One source consisted of the maintenance standards used by the Navy Security Group. Although the FRT-39 and the KW-7/TSEC are the only types of Navy Security Group equipment at a transmitter site, maintenance standards for that equipment are important to this project because:

- The Navy Security Group has many other kinds of equipment common to NavCommSta equipment at other sites being analyzed.

- The logic used to derive maintenance requirements correlates closely with the logic proposed in this analysis.

- The Navy Security Group's maintenance needs compare favorably with the U.S. Army and Air Force maintenance records for the same equipment; these have been officially approved as the Service Cryptologic Agencies (SCA) standard by the Director of Defense Research and Engineering (DDR&E).

The SCA standards for the two types of equipment appear in column 7 of table II-3. The logic they use is described elsewhere in this analysis.

Two other historical records analyzed for comparison deal with the 1972 NMMACLant analysis of NCS San Francisco and Washington (reference A-1). Unfortunately, the NMMACLant maintenance data (columns 8 and 9) consists of the actual CM man-hours expended and the PM man-hours required but not expended and, therefore, could not be used in the analyses.

Table II-4 is used to evaluate the corrective maintenance Planning factors (number 5). Columns 3 through 6 give the average man-hours per year for one unit of equipment that the sites reported as required to do all corrective maintenance, including parts replacement during PM. The rest of the table was designed to illustrate the frequency of failure and mean time to repair. But, as explained earlier, the methods of reporting failures by sites differed too much to use these factors, and the data is given here to show why these characteristics cannot be correlated.

Table II-5 is a list of non-CM jobs (such as overhauls) over and above those listed on the MRC cards. Columns 1 and 2 give the maintenance number and name of the equipment corresponding to the other II-series tables. The description of each job is given in column 3, and the additional man-hours per year required to do it are in column 4. The sites feel these jobs are necessary, although they have not been formally approved by ComNavTelComm or the Naval Electronics System Command. The list of extra jobs now being done, their frequency, and the man-hours needed have been tabulated. This data can be reviewed by ComNavTelComm, which can then decide on a proper maintenance policy based on environmental conditions at a particular site, the man-hours needed, and the value of doing the work. This data constitutes planning factor number 4.

At the end of the list is a section called nonrecurring extra jobs. These are tasks done during 1974--such as installations--that are not expected to be repeated on that equipment. However, the nonrecurring jobs indicate how much time may be spent on other jobs, and ComNavTelComm may wish to program additional man-hours.

ANALYSIS OF MAINTENANCE DATA

This section contains the analytical results obtained by correlating all the maintenance data collected during this project. These results also can be applied to other NavCommSta maintenance areas.

Basically, the analysis consisted of two types of data comparisons. First, the man-hours reported required by each site to do a work element were compared. Second, official Navy standards (approved by Op-124) were also identified, and these were compared with the requirements stated by each site. Table II-6 of annex 1 shows the results of this comparison.

First, consider the intersite comparison. The analysis consisted of calculating a number of ratios using the PMS standard as the uniform basis of comparison, thus eliminating differences in the numbers and mix of equipment among stations. In the analysis:

- Line 1 shows the sum of PMS standard man-hours for all equipment at each site.

- Line 2 shows the total man-hours required by each site to do all PM jobs, both the conventional PMS and all extra non-CM jobs (both recurring and non-recurring). Norfolk included a 20-percent factor for "make-ready and put-away" and "work breaks" in its PMS requirements; the other sites

estimated they do the conventional PMS work in PMS time, including the breaks, make-ready, and put-away. All 4 sites indicated they took work samples as the basis for their estimates.

- Line 3 shows the man-hours used for the extra non-CM jobs done at each site.

- Line 4 shows the man-hours used to do the conventional PM jobs.

- Line 5 shows the total man-hours required for CM.

- Line 6 shows the ratios of total requirements for PM and CM as reported by each site (including all extra non-CM jobs) to the PMS standard. This was the most important result.

These ratios were then compared with Navy maintenance standards approved by Op-124. While these standards were constructed for communications equipment used by the fleet, they are the best data available to Op-124. The standards were obtained this way:

- The PMS standard listed on the MRC card is the official requirement for PM actions. But the PMS standard is for working time only; an additional 17 percent is allowed for PF&D (planning factor 15).

- The PMS standard does not include make-ready and put-away time, which is allowed as an additional factor (number 3); no official time has been set by the Navy. The exact amount of time is a function of the distance between where the tools and parts are kept and where the equipment is located, and how many times the same tools are used in maintenance at that location. Op-124 permits a factor of 30 percent for the fleet and has indicated it will also permit a 30-percent factor for shore stations until a thorough study can be conducted.

Thus, the total Navy PM requirement for work specified on the MRC card is 1.47 times the PMS standard.

While there is no Navy CM standard similar to the PMS standard, there is an OpNav policy used for fleet manning purposes--paragraph 106.1.c(6) of reference A-2. This policy states that for every hour of CM action, one hour of PM action is needed for electronic equipment. Op-124 further interprets this policy for determining billet requirements by estimating the CM man-hours required for the fleet as being equal to the total PMS man-hours required. Again, it will permit this factor to be used as the Navy requirement for shore stations until a more thorough study can be made. The CM-to-PM man-hour ratio was therefore calculated for each station, using the PMS standard man-hours as a reference. An appropriate CM:PM ratio thus can be used as a standard for each site or for the entire command.

The total maintenance requirement for fleet operations is therefore 2.94 PMS time. Additional man-hours for extra non-CM maintenance appear on MRC cards when officially approved by NavMat.

The maintenance standard used by the SCA was found to be 3 times the PMS man-hours, reasonably close to the Op-124 standard.

With the preceding discussion in mind, we next compared each of the site's total maintenance requirements ratio (line 6 of table II-6) with the derived Navy requirement, whose ratio is 2.94. Honolulu and Italy require much less than the Navy requirement. Guam is 92 percent of the Navy requirement. Norfolk, by contrast, is 184 percent of the Navy requirement. All sites except Norfolk can do all their current maintenance jobs and stay under the Navy requirement. However, Norfolk indicates it can meet the Navy requirement in the future.

While the intent is to use the PMS standard as the basis for allocating billets, the NavCommStas themselves differed in their numerical values of the same PMS standard, as shown in table II-2. In some cases, the value given is even lower than the official standard. When a set of numbers differs considerably, ComNavTelComm should determine why and assign a correct value for each site.

The reasons for the differences include:

- Differences in the amount of work being done, particularly in "as-required" work.

- Differences in PMS standards for different models of the same equipment; column 15 of table II-2 shows the range of values of the standard for different models.

- Arithmetic errors by the site in calculating the standards.

Because of the large differences in ratios among the sites, several other analyses were also made at the next level of detail. The first was a calculation of the man-hours required to do the extra, non-CM jobs now being done (and listed in table II-5). A comparison among sites of the extra man-hours is best shown by taking the ratio of the total PM man-hours required to the man-hours associated with the PMS standard. These ratios are shown in row 7 of table II-6. While Honolulu does extra jobs (though not as many as Guam and Norfolk), its total PM is only 70 percent of the PMS standard. Italy requires 20 percent more than the standard. Guam requires 100 percent of the standard, and Norfolk far exceeds it.

A second analysis was concerned with finding the ratio of CM man-hours to the Navy man-hours allowance for PM and comparing this ratio with the Navy requirement (unity). This is shown in row 10 of table II-6. Norfolk is also very high in this respect. Row 11 of table II-6 provides a similar ratio of CM required to the PMS standard, rather than to the Navy PM required.

The results show that the 4 sites can be placed into three classes:

- Honolulu and Italy[1] perform about the same--that is, few man-hours for extra PM jobs, and CM required only a small percentage of the Navy PM requirement.
- Guam spends 60 percent extra on non-CM jobs, and its CM requirement is 70 percent of the Navy PM requirement (well within the 100-percent requirement).

[1] Italy had maintenance data available on the FRT-39, -40, and -83 and some other minor equipment; the analysis was based on that equipment. However, this set of equipment accounted for 81 percent of the total maintenance requirement, as measured by the PMS standards.

- Norfolk, by contrast, spends 120 percent extra man-hours on non-CM jobs, but its CM is 220 percent of the Navy requirement. This example seems to violate the rule of thumb that doing more PM reduces CM. Much higher CM is the main reason why Norfolk's manpower needs are 184 percent of the Navy's requirement, and 540 percent of Honolulu's.

Finally, the CM man-hours per year reported by all sites were recently made available by ComNavTelComm's Readiness Department (Code-04); this data was collected biweekly as part of the Phase I Maintenance Data Collection System (MDCS). Since the values of this MDCS data were lower than the data officially forwarded to OEG, they were brought into the analysis (even though both 12-month periods covered do not coincide).

Table II-7 shows the MDCS data for 1 April 1974 through 1 April 1975. Column 4 lists the average man-hours per year per unit for each equipment model and type at Honolulu (columns 1 and 2). Two calculations were made with this data. First, the total number of each type of equipment in inventory was calculated; (shown as the sum for each equipment type in column 3). Also, the average unit CM man-hours per year for each equipment type was calculated by taking the weighted average of all equipment models. This is also shown on the bottom line of each equipment type in column 4.

This unit CM value was also compared with the unit CM value calculated in this project (column 5). Similar calculations were made for the MDCS data accumulated from the other sites; that data appears in columns 6 through 14.

Table II-8 compares the total yearly CM man-hours submitted through MDCS with the total CM man-hours required as submitted to this project. Each value was obtained as the product of the number of equipment items of a particular type and the appropriate unit CM value. A ratio of the MDCS value to the OEG value was then calculated.

Honolulu's MDCS data is 150 percent of that reported to OEG. Guam's CM man-hours as reported to MDCS were only 60 percent of the man-hours reported to OEG, Norfolk's were 30 percent, and Italy's, 90 percent.

Thus, we apparently have two sets of officially submitted CM data covering two separate 12-month periods. The "correct" data should be somewhere between the two values obtained. To show this range of uncertainty, the ratios obtained in table II-8 were applied to the original data (table II-6) and a new set of ratios calculated--that is, holding PM required fixed and calculating a new set of CM requirements based on the ratios of table II-8. These calculations are shown in table II-9; the new values obtained are much closer to the Navy requirement.

Lastly, calculations of all maintenance ratios were made for the electronic maintenance divisions and receiver sites at the 4 NavCommStas. These are shown in table II-10. Again, the data submitted by the Norfolk transmitter site is the only data that lies outside the Op-124 standard.

OPERATIONAL MANPOWER REQUIREMENTS

The operational manpower planning factors that were derived are based on this model of transmitter operations (validated by the sites):

- The entire operational workload consists of:
  - Tuning and retuning transmitters in use (not those on standby or unavailable).
  - QC checks.
  - Other operational activities, including tuning/readjusting a transmitter following power outage, on-the-job training, and excess travel by O&M personnel.
- Man-hours required for each work element are the product of the unit time for that activity and how often it is done.

Organization of Tuning/Retuning Data

Tables III-1a and III-1b of Annex 1 contain data relating the number of operating hours to the number of tunings/retunings required in the past year for each communications system/transmitter type (planning factors 6 and 7). Combining this data with the total time required for each tuning/retuning (planning factor 8) enabled calculating the total operating man-hours per 1,000 hours of system operating time (planning factor 9). Table III-1a deals with systems operated continuously; table III-1b is the equivalent table for systems operated intermittently.

Columns 1 and 2 of the tables contain the system names and the transmitter types used in that system. The operational usage factor (planning factor 6) in columns 3 through 6 is the number of hours per year that the equipment was operational[1] (up time). Columns 7 through 10 give the number of tunings and retunings associated with each system/transmitter type.

Columns 11 through 14 give two numbers concerning planning factor 7, which relates the number of tunings/retunings to transmitter usage. The first number in each column is the average operational hours between each tuning or retuning; that is, column 11 equals column 3 divided by column 7. The second number is the inverse of the first number (times 1,000) and shows the number of tunings or retunings per 1,000 hours of up time (that is, column 11 after the slash equals column 7 divided by column 3 times 1,000).

Before discussing columns 15 through 18, refer to table III-2. That table gives planning factor 8--the unit times submitted for each site for tuning or retuning a given transmitter type (columns 2, 3, 4, and 7). These times also include the time spent on the orderwire, on logging, as well as time spent on selecting a new antenna when required.

Table III-2 also itemizes the average time spent on orderwire and logging for Guam and Norfolk. While we intended to measure the total tuning function, it was not possible to do so. Therefore, an audit of the Norfolk log was made; these times are given in column 5. Since these times were appreciably smaller than the Norfolk data submitted in column 4, an arithmetic mean of both sets of data was taken and used as the final Norfolk data. This is shown in column 6. Finally, a weighted mean time for all 4 sites was calculated (using columns 2, 3, 6, and 7). This mean is given in column 8. The weighting was based on the number of tunings/retunings of that transmitter occurring at each site.

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[1]Operational means that the transmitter is not in standby condition. It has high voltage applied and is ready for keying; it may not have been keyed all of these hours.

Using these times, the operational man-hours used per 1,000 hours of up time was calculated and entered in columns 15 through 18 of tables III-1a and III-1b. These values were obtained by multiplying the number of tunings/retunings per 1,000 hours of up time (columns 11 through 14) by the unit time given in table III-2 for that particular equipment type. This is planning factor 9--tuning/retuning man-hours to usage.

Analysis of Tuning/Retuning Data

The most accurate way of estimating the number of tunings/retunings required in the future at each site analyzed is to use tables III-1a and III-b. Assumptions that need to be made are that each future communications system/transmitter will require the same number of tunings/retunings, and that these will be proportional to the number of operating hours estimated. The planner must thus estimate the new number of operating hours for each communications system/transmitter type (using 1974 operating hours as a guide) and multiply by planning factor 7 (column 11 through 14 of these tables).

We also tried to develop a simpler way to relate the total number of tunings/retunings to total operating hours, since:

- The calculations might be easier.
- The estimating model might be usable for all other transmitter sites.[1]

To develop this more simplified model, the number of tunings/retunings made for all continuously operated systems at each site was plotted vs. the number of transmitters used (table III-1a), and the number of tunings/retunings made for all intermittently operated systems at each site plotted vs. the full-time equivalent[2] transmitters used (table III-1b); see figure A-1.

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[1] If the number of tunings/retunings at a site were known, the man-hours required could be calculated as the product of the number of tunings/retunings and the average time required for tuning based on the mix of transmitters at that site.

[2] Each 8,760 hours of transmitter use per year is one full-time equivalent transmitter.

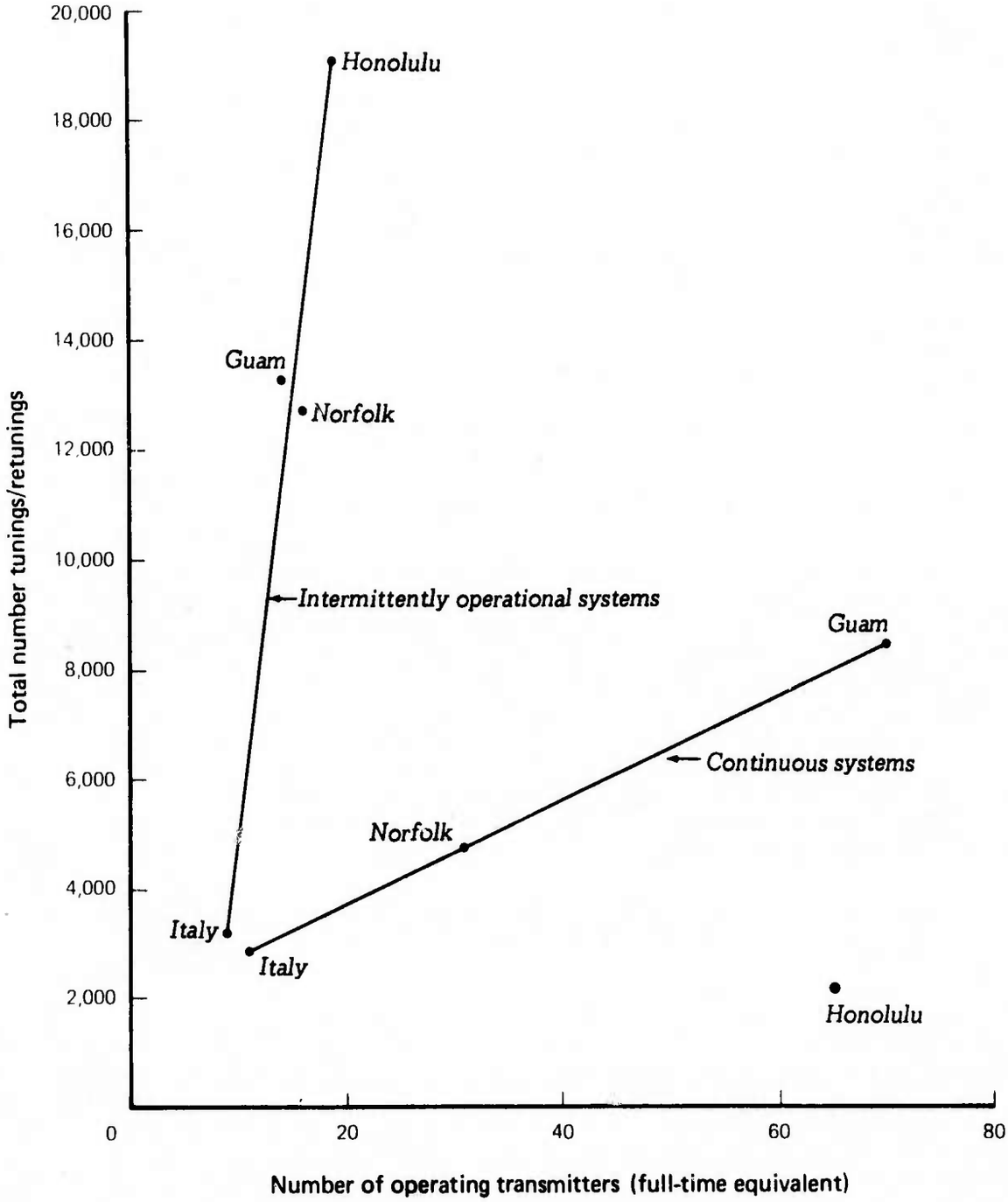

FIG. A-1: NUMBER OF TUNINGS/RETUNINGS REQUIRED

While the 4 data points plotted for the intermittently operated systems follow a linear function, it does not pass through the origin, as expected. More study is needed to determine why. But because of the good correlation obtained, this function apparently could be used (instead of table III-1b) so long as the mix of systems used is not changed radically at a different site. Further analysis of this model is needed to obtain additional validation.

The model of continuous operations seems to hold for 3 sites but not for Honolulu,[1] which required fewer tunings/ retunings than the function predicts. To determine why Honolulu was different from the other sites, the ratio of the number of tunings/ retunings per 1,000 hours (column 11 of table III-1a) was plotted against the number of operating hours (column 3) for each Honolulu system/transmitter; see figure A-2. We also determined which of these systems is operated only at Honolulu; these unique systems are indicated separately in the figure. The figure also shows the average ratio of tunings/retunings to operating hours for:

- Each of the 4 sites.
- The function shown in figure A-1 (calculated as the slope of the line).

Most of the systems unique to Honolulu have a much lower ratio of tunings/retunings to operating hours than do the other stations (or average slope). It may be possible to treat these communications systems as a special category, thus permitting more simplified models than the tables to be used for all NavCommStas. Further work is needed for this validation.

A partial analysis of why these systems differ indicates that instead of dividing the entire set of systems into two classes (continuous and intermittently operated), three classes should be considered:

- Continuously operated systems, such as multichannel broadcast, that always operate on the

[1] Again, this function does not pass through the origin for some unaccountable reason.

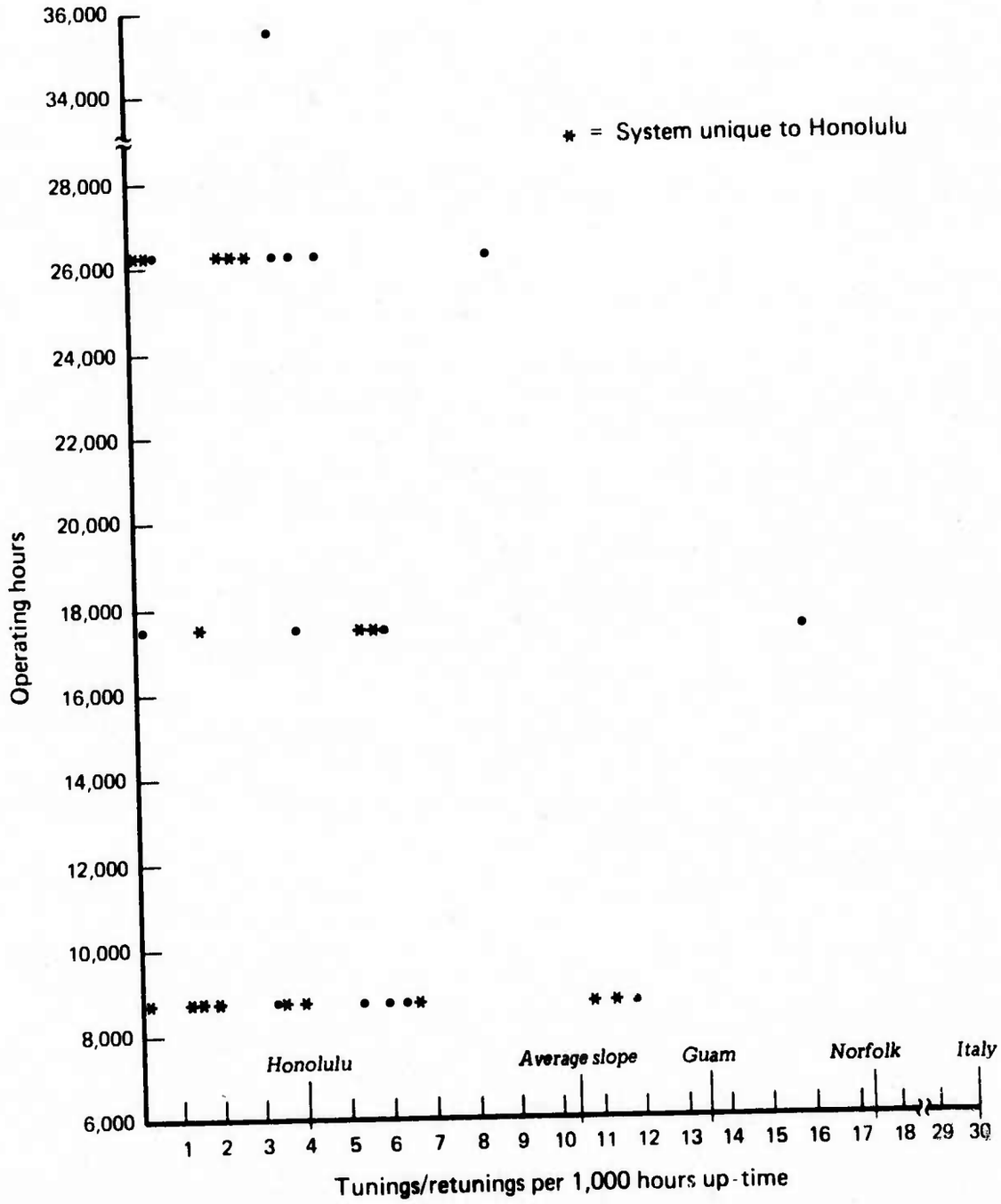

FIG. A-2: NUMBER OF TUNINGS/RETUNINGS PER 1,000 HOURS vs. OPERATING HOURS FOR EACH HONOLULU SYSTEM/TRANSMITTER TYPE

same frequency. For this class, the only reason for a tuning should be because of maintenance actions (CM or PM), and the only reason for a retuning is frequency drift. Hence, the number of tunings/retunings per operating hour should be very low.

- Continuously operated systems, such as some point-to-point circuits, that undergo frequency changes periodically. For this class, tunings/retunings occur because of:

  - Maintenance actions, expected at the same rate per operating hour as continous systems.

  - The number of frequency changes (retunings) occurring per operating hour.

- Intermittently operated systems, such as full-period terminations, that undergo tunings/retunings because of:

  - Maintenance actions, expected at the same rate per operating hour as continuous systems.

  - The number of activations per hour of system operating time; that is, the more often the system is activated, the more tunings are required.

  - The number of retunings once the system is activated.

Thus, all intermittently operated systems need to be reviewed and these factors introduced:

- Average up time once the system is activated.

- Average up time at a given frequency once the system is activated.

Three other factors were also considered:

- Type of transmitter used; this would influence how often maintenance actions are required.

- Number of ships in the area; Communications Area Master Station Norfolk indicates that as more ships enter the area, the number of transmitters operating is merely increased. The number of ships thus does not seem to influence the number of tunings/retunings per operating hour.

- Quality control checking; the more QC checks that are made, the greater the chance that transmitter drift or other deviations will be detected, requiring transmitter adjustment (that is, retuning as defined here). QC checking policies differ among sites (as described elsewhere in this appendix) and may cause nonuniformity among sites in the tunings/retunings needed for any mix of systems.

Once the number of tunings/retunings has been estimated at a site, the average time required per tuning/retuning needs to be determined. This will be calculated as a weighted average of the various times required for each transmitter type within each communications system class (as developed in the preceding discussion). In this case, the weighting is directly proportional to the operating hours associated with that transmitter type.

For example, consider that within a class of communications systems at the site, we have estimated these numbers of hours of transmitter usage for all continuous systems:

	FRT-39:	10,000 hours;
	FRT-40:	20,000 hours;
and	FRT-83:	30,000 hours.

Also, assume that the command standards for tunings/retunings are:

	FRT-39:	10 minutes;
	FRT-40:	12 minutes;
and	FRT-83:	6 minutes.

The weighted average tuning/retuning time for the transmitter mix is:

$$\frac{(10{,}000)(10 \text{ min.}) + (20{,}000)(12 \text{ min.}) + (30{,}000)(6 \text{ min.})}{60{,}000}$$

equals 8.7 minutes.

For Guam, the number of tunings/retunings in tables III-1a and III-1b was based on a 6-month sample (1 April through 30 September 1974); presumably, the sampled data was extrapolated to 12 months by doubling it. If this were the case, the only peak operations (the first 3 weeks of July) would be counted twice. Therefore, a factor to correct the sampling error was generated for Guam. Since the number of tunings/retunings should be related to the number of active transmitters, we calculated a correction factor for Guam based on this analysis:

- The plots of transmitters active each day for October 1973 through September 1974 (as supplied by Guam) show a total of 22,854 transmitter days over 362 days excluding 6, 7, and 8 October 1973; data for those 3 days was not supplied. The total is transmitter days of usage (TD) 362.

- The plots of transmitters active each day for 1 April-30 September 1974 show a total of 12,084 transmitter days for these 183 days, or (TD)183.

- The ratio of the two yearly extrapolations--362 days of use extrapolated to 365, and divided by days of use extrapolated to 365--is the correction factor (CF). Thus, CF is:

$$CF = \frac{(TD)362\ (365)/362}{(TD)183\ (365)/183} = 0.95.$$

Applying this CF to the total man-hours required for tunings/retunings at Guam would more accurately compensate for the one major fleet exercise during the 6 months when extrapolating to 12 months. But this CF does not include the peak October 1973 data. Therefore, a judgment needs to be made whether the October data should be included, or whether it is compensated for by the other peak data and thus not include a CF. Either way, the difference is probably small.

Organization and Analysis of QC Checks Data

The man-hours used at each site for QC checks was plotted against the number of transmitters in inventory and against the number of full equivalent transmitters operating during 1974. Both functions are shown in figure 2 of the main text. Since the number of man-hours required is determined chiefly by the number of operational hours, the solid curve in the figure is to be used as planning factor number 10.

Apparently, all stations are not performing the same QC checks specified in ComNavTelComm instructions. For this reason, various work samples were taken of some of the QC checks done at Norfolk.

Information describing most of the QC checks made at Norfolk and the schedule of such checks is contained in this section. The time taken to do each check, including confidence limits based on a 90-percent confidence level and the sample size used, is contained in table III-3. (Data taken during the work sampling tests at Norfolk will be published separately.) That table also contains the unit times reported by Norfolk for comparison.

The curve shown in figure 2 of the main text may serve as a first approximation to the man-hours required at each site. But if greater accuracy is desired, a more detailed analysis should consider (as in the case of Norfolk):

- The specific QC checks to be done at each site.
- How often these checks are to be done.
- Time required to do each check.

These characteristics would then be converted into the average annual man-hours required for each transmitter and for each land line or microwave channel undergoing QC checks at each site. These unit man-hours, which would then be the new set of planning factors, would be multiplied by the number of transmitters and keying circuits at each site to obtain the total number of man-hours needed for this function.

Table III-4 shows the results of such a calculation using the work measurements made at Norfolk. The table can serve as a model for similar calculations required at the other sites, taking into account all differences in site characteristics affecting how often tests are required and the number of circuits involved.

QUALITY CONTROL TESTS PERFORMED AT NORFOLK STATION

Test 1: High-Level Total Peak Distortion

The operator uses data analysis equipment (DAC-V) or equivalent to detect deteriorating signal quality caused by faulty equipment or a poor radio path. Total peak distortion readings exceeding indicated standards are indications of deteriorating circuit quality requiring corrections. The operator informs Technical Control of the high distortion readings and coordinates with control to determine whether the keying or transmitter signal is distorted.

Test 2: High-Level Current

The operator uses milliampmeters of various types to check high-level current in DC channels. This test will ensure against circuit distortion caused by improper adjustment of station battery. Substituting or adding equipment to a DC circuit may cause enough of a change in current level so that resulting additional distortion will degrade the circuit.

Test 3: Composite Data Transmission Levels

The operator uses transmission measuring set type 12-B (Daven) or equivalent to ensure that proper operating composite data transmission levels are maintained and will lessen the possibility of cross-talk between channels.

Test 4: Intermodulation Distortions and Modulation Levels

The operator uses an AN/GRM-3B Spectrum Analyzer or equivalent to measure a transmitter's capability to transmit complex signals without generating unwanted frequencies because of nonlinearity of various stages of the transmitter. These unwanted frequencies detract from power available to the desired transmissions and generate interference.

Test 5: Transmitter Synthesizer Synchronization

This is a visual check by the operator by observing the SYNC light on the front panel of the exciter rack. Then lighted the SYNC light indicates that the synthesizer and internal frequency standard are synchronized. The purpose of the test is to ensure that the frequency synthesizer used in the AN/FRT-39, -40, -62, and -74 transmitters is synchronized to the internal frequency standard.

Test 6: Transmitting Antenna VSWR and Power Out

This is a visual check by the operator to ensure that the transmitting antenna system is operating at maximum efficiency. An excessive VSWR (exceeding the design limits of the antenna) indicates a defect in the transmitting antenna system. The operator also checks power output to ensure the transmitter is operating at desired power, taking into account emission, number of channels, etc.

OTHER OPERATIONAL ACTIVITIES FACTORS

The man-hours required to perform other operational activities at a site were also gathered. These make up the additional planning factor (number 11) unique to each station. These activities include:

- Tuning/readjusting equipment following a power outage.
- On-the-job training for both operations and maintenance.
- Excessive travel by O&M personnel.

While these activities are operational, their descriptions and times required are included in table IV-2 under support collateral duty jobs, since the data follows the same format.

A considerable amount of on-the-job training time for both operations and maintenance results in the completion of part of the operations and maintenance workload. Thus, if on-the-job training time were added to the O&M workload requirements, "double counting" of the same workload would result. Therefore, we must estimate the amount of on-the-job training man-hours that is the equivalent amount of productive O&M workload and not count these man-hours in on-the-job training requirements. The expression "equivalent amount" of productive O&M workload is used, since the trainee may take more man-hours than the average trained person to do the same job.

To illustrate this point, consider Italy's on-the-job training needs. New radio men and electronic technicians are each trained on off-the-air circuits for 60 man-hours per year. Each is also assigned for 176 man-hours to on-the-air circuits. However, it can be assumed that this productive work is done at a lower efficiency then by trained personnel (assume 70 percent efficiency). Thus, $[60 + (0.30)(176)]/(60 + 176)$ or 48 percent of this part of the on-the-job training was nonproductive and should be counted.

Also, according to Op-124, on-the-job training requirements must be based on raising the capabilities of those unqualified for the job--for example, training for specific equipment. The requirements cannot be based on assigning persons with lower grades or incorrect Naval Enlisted Codes.

SUPPORT MANPOWER REQUIREMENTS

Three types of support work loads are identified:

- Support primary duty workload--that work done by nonsupervisory personnel whose primary duty is to support the site, as opposed to "hands on" operations and maintenance services.

- Support collateral duty workload--that work done by nonsupervisory personnel in addition to their primary duties.

- Supervisory workload--that work done by non-direct labor supervisors.

Support Primary Duty Factors

Table IV-1 is a list of all support primary duty billets filled at the 4 sites and constitutes planning factor 12. Column 1 gives the position titles (of support billets only) from the master billet list, and columns 2 through 5 show the titles that are in use for filled billets at all the sites. If the site uses the same title as shown in column 1, "same" is indicated. A star after a title different from the master-billet title signifies that this title is preferred by the site. Support billets that do not correspond to a billet from the master list are preceded by the letter used to identify the position submitted ty that site.

After each site's billet title is the number of persons now in that billet if that number is more than one. Also indicated is the percentage of time, less than 100 percent, that the person is involved in direct labor. Part of this direct labor time may be spent in collateral duty support jobs (see the next section). How much time is taken from primary duty time and used in support collateral duty is shown in table IV-2.

Only those support billets from the master list that are filled at one or more of the sites are listed in column 1. Most of these billets are organizationally located in the support divisions of each site. Those that are in operations or maintenance at a given site are so designated.

No work analysis was made of these support primary duty jobs. However, to systematically assign these support billets, the command must analyze table IV-1 and determine:

- Whether the work function is required at each site that has the billet listed. It must also be confirmed that the support activity cannot be done by the station's public works department or other Navy support activities because of the site's distance from a regular Navy base. (Appendix B of reference A-3 contains the set of tasks relating to the master billets listed.)

- How many full-time equivalent workers are required for this work function at each site. This depends on the size and layout of each site and whether the function is (or can be) provided to any extent by the main station or by other Navy support services (such as regional medical services).

This way, judgment has to be used in allocating these billets.

Support Collateral Duty Factors

Table IV-2 is a composite of support collateral duty jobs now being done at the 4 sites and constitutes planning factor 13. Column 1 briefly describes the type of job involved, such as cleaning. This is followed by a list of support jobs, by number, as a cross reference to the data submitted by each site, and the total man-hours per year required to do each job clustered in that job category. A more detailed description of those collateral support jobs appears in table IV-3, including the method for calculating support.

Columns 1, 2, and 3 of the table describe the job and the work unit measure. Column 4 is the hours needed by one man to complete one work unit. Column 5 is the number of work units done per week by all the men involved; it is thus the product of the number of times each man does a work unit per week and the number of men doing them simultaneously. Column 6 is the total man-hours per year required for the job, and consists of 52 times columns 4 and 5.

A lack of submitted data prevented a detailed work analysis. As with support primary duty billets, it will be necessary for ComNavTelComm to review these lists and decide:

- Which collateral jobs must be done, and how often.

- How many man-hours are needed for each job. Op-124 stresses that requirements can include only working time; for "on-call" duty, only actual working time can be counted.

- Who should do the work--operational or maintenance (or both) personnel, primary duty personnel, or outside personnel.

Supervisory Factors

Another support planning factor is the supervisory overhead rate (planning factor 14), which is the total number of full-time equivalent supervisors divided by the full-time equivalent nonsupervisory (now on board) personnel in the organizational unit being analyzed.

This calculation was made for each of these organizational components:

- Total site overhead.

- General management (percent of total direct labor).

- Watch operations (including maintenance personnel on watch).

- Total operations division (total watch and day operations personnel).

- Maintenance division (excluding maintenance watch personnel).

The data shown in table I-3 is organized into the above components and arranged into total full-time equivalent direct labor and supervisors and the calculated supervisory overhead factors within these components. The results of these calculations were taken out of table I-3 and summarized in table IV-4. The most important set of numbers is the overall site supervisory overhead ratio, which varies from 20.0 to 25.8 percent and is thus fairly consistent from site to site. There is no Navy requirement as to what this ratio should be.

Further analysis of table I-3 shows that there are significant differences in component overhead rates, both among and within sites; some of these rates are quite high (for example, 50 percent on watch at Norfolk). Further discussions with the Norfolk officer in charge regarding the division of work between the supervisor and workers revealed that:

- The supervisor works side by side with the workers doing a portion of the operating work load previously described, particularly during busy hours.

- The only operating work load not listed, and which is done by the supervisor, consists of on-the-job training, spot-checking the quality of work of his personnel; availability as the senior person for any problems that arise during the watch; and evaluating personnel.

- While the supervisor has overall responsibility for proper operations during the watch, he delegates this responsibility among all watch personnel. Thus, the only man-hours this ultimate responsibility really costs is in performing the tasks described in the preceding item.

Further review of the Norfolk personnel data by the officer in charge showed that the supervisory function is actually closer to 10 percent of direct labor. The overhead ratios given in table IV-4 were obtained from judgments based on job titles and not on work function analyses; the ratios therefore may be inaccurate. To improve the accuracy of these ratios, and obtain a Navy requirement, each organizational unit should be examined and the supervisory work more specifically defined and measured.

OP-124 WORK STANDARDS

Work standards provided by Op-124 as planning factors are described in this section.

Personal Fatigue and Delay (PF&D) Factor (Planning Factor 15)

Op-124 allows a PF&D factor of 17 percent of productive work time for blue-collar workers for all work stoppages, including personal relief. When deriving the total man-hours

It is therefore necessary to determine whether the measure consisted of only productive work time (such as would be obtained through work samples), or whether the time also included various work stoppages--such as coffee breaks--as in the corrective maintenance times recorded.

Standard Work Week (Planning Factor 16)

Standard Work Week for Military Personnel Ashore

The standard work week (reference 1 of the main text) for military personnel at CONUS activities and overseas bases where dependents are authorized is 40 hours. Included in this work week is an allowance for service diversions; this allowance provides for quarters, sick call, personal business, etc. The 40-hour standard work week for military consists of:

	Hours per week
Service diversion training	4.83
Leave	1.85
Holidays	1.38
Time available for work	31.94
Total	40.00

The standard work week for military ashore at CONUS activities and overseas where dependents are not authorized should be computed this way:

	Time available for work	Nonavailable hours	Total
Continuous shift watchstander	60.0	6.0	66.0
Duty status watchstander	61.7	6.0	67.7
Nonwatchstander	51.1	6.0	57.0

The work week for military firefighters and other watchstanding personnel using the 72-hour work week is:

	Hours per week
Service diversions training	4.83
Leave	5.07
Available for work	62.10
Total	72.00

Standard Work Week for Civilians

The standard work week for civilians is 40 hours. Training includes classroom lectures, on-the-job instructions, and safety indoctrination. Diversions include minor unavoidable delays such as fire drills, chest X-rays, voting, blood donations, etc. The 40-hour standard work week for civilians consists of:

	Hours per week
Leave	4.60
Holidays	1.38
Training	0.22
Diversions	0.44
Time available for work	33.38
Total	40.00

The standard work week for civilian supervisory firefighters using the 56-hour work week is:

	Hours per week
Leave	6.37
Training	0.20
Diversions	0.44
Available for work	48.99
Total	56.00

The standard work week for civilian firefighters using the 72-hour work week is:

	Hours per week
Leave	8.21
Training	0.20
Diversions	0.44
Available for work	63.15
Total	72.00

MANPOWER REQUIREMENTS AND UTILIZATION ANALYSIS OF O&M PERSONNEL

The main objectives of this analysis were to:

- Compile relative manpower requirements for each work category performed by O&M personnel. This would be useful in sensitivity analyses, since the impact of any approximation on total error could be more readily evaluated.

- Provide a first calculation of the billets required based on the work loads and make a first step in comparing these billets with personnel on board.

- Perform a "check and balance" on some of the data provided by the sites.

Man-Hours Required

Table V-1 gives the man-hours required for each job as defined. This calculation was made two ways: in terms of the stated site requirements (lower bound, except for Norfolk), and in terms of the Navy requirement (upper bound).

For example, in terms of the Navy requirement, the Honolulu work load requirements are in these proportions (as percentages, rounded off):

Maintenance by technicians

CM	:	30
PM	:	19
		49

Collateral duty support	:	22

Operations

PM	:	11
QC checks	:	9
Tunings/retunings	:	5
Other	:	5
		30

Billets Required and Utilization

The next set of calculations involved converting the man-hours required in each category into direct-labor billets; this was done by dividing by 1,661 man-hours productive time per billet per year. (This is for military personnel only. A more accurate calculation would consider the military-to-civilian mix. This approach does not include any limitations, such as having a minimum of 2 men per watch section.) This was then compared with the total number of direct-labor personnel now on board in each work category. A personnel utilization calculation was made next by taking the ratio of billets required to current manning. These results (see table V-2) indicate the average proportion of time that current manning would spend working in these categories:

- Watch direct labor personnel doing operations and PM.
- Maintenance direct labor personnel doing CM and technician PM.
- Total O&M direct labor personnel doing collateral duty support.
- Total O&M direct labor personnel doing all required work.

The results show a very high (greater than 100 percent) utilization for Norfolk direct-labor personnel--much higher than the other sites. Possible reasons for this are:

- Work load data submitted in error (that is, higher than it should be).

- Personnel working an average of more than the standard work week.

- Supervisory personnel doing some O&M work, at variance with the supervisory percentages originally given by the sites.

As discussed elsewhere in this report, some of the supervisory percentages seem to be too high. Therefore, a recalculation of personnel utilization was made in tables V-1, and V-2, based on total current manning in each category, including both direct-labor and supervisory personnel. While this total unit utilization is less than the first case (since total personnel is the denominator of the ratio), it is probably a more realistic number than the one obtained from the first calculation. Also, this number can be extrapolated to the direct-labor force by subtracting perhaps 10 percent for supervision.

REFERENCES

A-1. Navy Manpower Shore Survey Team, Norfolk #2, Navy Manpower and Material Analysis Center, Atlantic, "Shore Manning Document, NCS Washington, Cheltenham Survey Dates: 12 Sep-13 Oct 1972," Unclassified; "NCS San Francisco Survey Dates: 7 Nov-1 Dec 1972," Unclassified

A-2. OpNav 12P-4, "Guide to the Preparation of Ship Manning Document," Unclassified, 1971

A-3. Center for Naval Analyses Memorandum, CNA-1480-74.10, "NAVCOMMSTA Manpower Planning Analysis, Transmitter Site," Unclassified, 24 Sep 1974

TABLE I-1

CURRENT BILLET TITLES USED

(1) Master billet/position title	(2) Honolulu	(3) Guam	(4) Norfolk	(5) Italy
Officer in charge (office)		Department head (office)		
1. Radio station -- OIC	Transmitting facility OIC*	Transmitter site officer*	Transmitter officer Assistant transmitter officer (A)	Chief in charge
2. Clerk (typing)	Same	Clerk (typist)		
3. Military clerk	Personnel petty officer*			
4. Communications specialist			Same	
5. Administrative clerk	Administrative assistant*		Same	
6. CMAA	CMAA/first lieutenant division chief	Same	CMAA/security force supervisor/BEQ supervisor/special services assistant	
		MAA (T) MAA force (W) Guard mail orderly (U) Maintenance/housekeeping security force (V)		
First lieutenant division				
7. First lieutenant	Same			
Supply Division				
8. Supervisory supply clerk	Supply officer	Supply clerk--50 dept.*	PO inc. ready supply store	
9. Supply clerk	Same		Same	
10. Storekeeper	Assistant supply officer			
11. Galley chief	Food services petty officer*		Galley supervisor	
12. Galley captain	Provisions storekeeper*			
13. Watch captain				
14. Galley watch				
15. Mess attendant			Food service worker	
16. Cook	Same		Same	
	Exchange operations supervisor (H)		Asst. resident asst. navy exch. off. (I)	
	Exchange operator (I)		Sales clerk (J)	
	ATCU supply clerk (D)			
Dispensary				
17. Advance general service				

APPENDIX A
ANNEX 1
DATA

TABLE I-1 (Cont'd.)

(1) Master billet/position title	(2) Honolulu	(3) Guam	(4) Norfolk	(5) Italy
Public Works Division				
18. Auxiliary equipment CPO	Engineering chief*		Diesel eng. mechanic	
19. Diesel mechanic/ATCU				
20. Electric shop CPO	Electrical chief*			
21. Auxiliary equipment electrician			Same	
22. Electrician/ATCU				
23. Construction elect. power				
24. Utilities technician				
26. Truck driver	Motor vehicle operator*		Janitor	
27. Laborer (cleaner)	Janitor*			
28. Facilities maintenance			Security guard	
29. Permanent security watch			Emerg. diesel/fire fighting equip. maint. & upkeep/ MAA (B)	
			Power & lighting elec./ fire fighting equip. maint. upkeep/ motion picture equip. maint. upkeep/MAA(C)	
30. Building & grounds manager				
31. Clerk (typing)				
32. Shop planner (general)			PW foreman	
33. Maintenance foreman				
34. Motor vehicle operator				
35. Wood craftsman				
36. Antenna mechanic leader			Same	
37. Antenna mechanic			Ant. mechanic helpee(G)	
38. Pipefitter				
39. Electrician			Same	
40. Tractor operator	Same			
41. Laborer				
42. Maintenanceman			Same	
43. Heating equipment mechanic	Engineering maintenance*		Same	
44. Electrician (power plant)				
45. Maintenance supervisor	Same			

TABLE I-1 (Cont'd.)

(1) Master billet/position title	(2) Honolulu	(3) Guam	(4) Norfolk	(5) Italy
46. Station MAA/armory supervisor				
47. Electrical maintenance				
48. Emergency power operator				
49. Diesel maintenance			Painter (D) Air cond. mech. (E) Plumber (F)	
Operations/Maintenance Division				
50. Operations officer	Operations officer* (half time)	Same		
51. Maintenance officer	Electronics maintenance officer*	Same		
52. ELX instl. & rp. - facilities maintenance				
53. Operations supervisor	Operations chief*	Operations chief*		
54. Administrative clerk	Same VLF project officer (A)	Administrative clerk		
Operations Branch				
55. Crew chief	Same Assistant operations chief* (B)	Deck chief*	Ops. supervisor Asst. ops. chief/ ops. LPO training PO (K)	
56. Transmitter watch supervisor	Same	Chief of the watch (COW)	Same	
57. Transmitter operator	Same	Same	Same	Same
58. Supervisor/operator		Building supervisor	Asst. watch supervisor	
59. Quality control CPO				
60. Antenna/plans chief				
61. Logs/records				
62. Quality control tech.				
63. Quality control analyst	Same			
64. Quality control/patchman				
65. Watch technician	Technician/operator*			
66. Local operations supervisor	Building supervisor* (part-time)			
67. Local ops operator/technician				
68. VLF broadcast supervisor	Same			
69. VLF broadcast operator/ technician	Same			
70. Multichannel supervisor				

TABLE I-1 (Cont'd.)

(1) Master billet/position title	(2) Honolulu	(3) Guam	(4) Norfolk	(5) Italy
71. Multichannel operator/technician				
72. Broadcast supervisor	Building supervisor* (part-time)			
73. Broadcast operator/technician				
74. Broadcast quality control operator				
75. Pt. to pt. supervisor	Building supervisor* (part-time)			
76. Pt. to pt. operator/technician				
77. Pt. to pt. quality control operator				
78. Supervisory electronic technician	Technician/supervisor*			
79. Stack technician	Screen room technician*			
80. Line technician				
81. Terminal technician				
82. Part fabricator				
Maintenance Branch				
83. Electronic maintenance chief	Same		Maintenance chief	Transmitters LPO
84. Electronic maintenance general				
85. Transmitter maintenance		Transmitter maintenance CPO (A) Transmitter overhaul LPO (H) PMS transmitter tech (I) PMS transmitter tech (J) PMS transmitter tech (K) PMS transmitter tech (L)		
86. Maintenance technician		Maintenance tech. (N) Maintenance tech. (O) Maintenance tech. (P) Maintenance tech. (Q) Maintenance tech. (R) Maintenance tech. (S)	Electronics tech.	Same
87. Electronic mechanic/leader				
88. Electronic mechanic	Building 1 electronic mechanic*		Same	
89. Electronic systems mechanic				

TABLE I-1 (Cont'd.)

	(1) Master billet/position title	(2) Honolulu	(3) Guam	(4) Norfolk	(5) Italy
90.	Microwave/transmitter maintenance	Building/maint. chief* (part time)			
		LF building maintenance petty officer/test equipment supervisor (E)*	Maintenance tech/test equipment PO (H)		
		LF building maintenance technician/test equipment technician (F)*			
91.	Test equipment repair mechanic				
92.	Radio mechanic				
93.	Special projects PO	Same			
94.	Special projects tech.				
95.	Operations training PO	Same	Same		Same
96.	Electronics supply PO	Same			Training PO*
97.	MDCS coordinator				
98.	Section CPO				
99.	Elect. maintenance technician				
100.	3M analyst	3M assistant*			
101.	SSB technician				
102.	VLF/LF technician	Same			
103.	VLF broadcast bldg. maint. chief	Same			
104.	VLF broadcast maint. PO	Same			
105.	CCL station control/bldg. supervisor	CCL building chief*	CCL maintenance supervisor		
106.	CCL technician	Same	CCL maintenance tech.		
		CCL maintenance petty officer* (G)			
107.	Pt. to pt. bldg. maintenance chief	Building 1 maintenance chief (part-time)*			
			Building maintenance CPO (B)		
108.	Pt. to pt. bldg. maintenance PO	Building 1 maintenance petty officer*	Building maintenance LPO (C)		
109.	Pt. to pt. maintenance technician	Building 1 maintenance technician*			
			Exciter maintenance tech. bldg. 51 (D)		
			Exciter maintenance tech. bldg. 52 (E)		
			Exciter maintenance tech. bldg. 51 (F)		
			Exciter maintenance tech. bldg. 52 (G)		

TABLE I-1 (Cont'd.)

	(1) Master billet/position title	(2) Honolulu	(3) Guam	(4) Norfolk	(5) Italy
110.	Local ops. bldg. maint. PO	Building maintenance petty officer building			
111.	Local ops. maint. technician	Building 66 maintenance technician*			
112.	Multichannel bldg. maint. PO				
113.	Multichannel bldg. technician				
114.	Broadcast bldg. maintenance chief	Building 68 maintenance chief*			
115.	Broadcast bldg. maintenance PO	Building 68 maintenance petty officer*			
116.	Broadcast bldg. maint. technician	Building 68 PM technician*			
117.	Broadcast bldg. electronics mechanic	Building 68 electronic mechanic*			
118.	OEL test equipment supervisor				
119.	Test equipment technician				
120.	Leader rigger (antenna)		Antenna maintenance supervisor		
121.	Rigger (antenna)		Antenna mechanic		
122.	Helper rigger (antenna)				
123.	Auto equipment operator				
124.	ATCU officer				
125.	ATCU maintenance chief	Same			
126.	ATCU maintenance technician	ATCU CSE repair*			
127.	ATCU operator/technician	ATCU operator/repair*			
		ATCU CSE repair supervisor* (C)			

TABLE I-2

MANNING DISTRIBUTION

	Operations				Maintenance				Support				Total			
	Hono	Guam	Norfolk	Italy	Hono	Guam	Norfolk	Italy	Hono	Guam	Norfolk	Italy	Hono	Guam	Norfolk	Italy
Direct Labor																
No. mil.	50.0	24.25	12.00	3.6	25.8	28.6	18.00	5.2	12.7	7.4	8.3	---	88.5	60.25	38.3	8.8
No. civ.	--	--	.40	--	3	8.9	4.40	--	11.0	--	21.0	---	14.0	8.9	25.8	--
Total No.	50.0	24.25	12.40	3.6	28.8	37.5	22.40	5.2	23.7	7.4	29.3	---	102.5	69.15	64.1	8.8
Functional Support																
No. mil.	1.95	2	--	--	2	2	--	1.2	--	--	--	---	3.95	4	--	1.2
No. civ.	--	--	.08	--	--	--	.32	--	--	--	--	---	--	--	.4	--
Total No.	1.95	2	.08	--	2	2	.32	1.2	--	--	--	---	3.95	4	.4	1.2
General Management (all mil.)													1.5	1	2	1
Supervisors																
No. mil.	12.55	10.75	6.00	.4	7.7	5.4	1.00	.6	3.8	.6	2.7		25.55	17.75	11.7	1.0
No. civ.	--	--	1.70	--	--	1.1	.10	--	1	--	1		1.0	1.1	2.8	--
Total No.	12.55	10.75	7.70	.4	7.7	6.5	1.10	.6	4.8	.6	3.7		26.55[a]	18.85[a]	14.5[a]	2.0[a]
Total																
No. mil.													118	82	50	12
No. civ.													15	10	29	--
Total No.													133	92	79	12

[a]Includes general management.

TABLE I-3

MANNING DISTRIBUTION AND SUPERVISORY OVERHEAD RATES

	Operations				Maintenance				Support				Total			
	Hono	Guam	Norfolk	Italy	Hono	Guam	Norfolk	Italy	Hono	Guam	Norfolk	Italy	Hono	Guam	Norfolk	Italy
Direct Labor																
No. Day	--	--	.4	--	28.8	37.5	22.4	1.4	23.7	7.4	28.3	--	52.5	44.9	51.1	1.4
No. Watch	50	24.25	12	3.6	--	--	--	3.8	--	--	1		50	24.25	13	7.4
Functional Support																
No. Day	1	2	.08	--	2	2	.32	1.2	--	--	--	--	3	4	.4	1.2
No. Watch	.95	--	--	--	--	--	--	--	--	--	--	--	.95	--	--	--
No. General Management (all day)													1.5	1	2	1
Supervisory																
No. Day	2.5	5	1.7	--	7.7	6.5	1.1	.4	4.8	.6	3.7	--	16.5[a]	13.1[a]	8.5[a]	1.4[a]
No. Watch	10.05	5.75	6	.4	--	--	--	.2	--	--	--	--	10.05	5.75	6	.6
% Day	250	250	354.2	--	40.0	16.5	4.8	15.4	20.2	8.1	13.1	--	29.7	26.7	16.5	53.8
% Watch	19.7	23.7	50.0	11.1	--	--	--	5.3	--	--	--	--	19.7	23.7	46.2	8.1
% Total	24.1	41	61.7	11.1	40.0	16.5	4.8	9.4	20.2	8.1	12.6	--	24.9	25.8	22.5	20.0
Total Personnel																
No. Day													72	62	60	4
No. Watch													61	30	19	8

[a]Includes general management.

TABLE II-1: MAINTENANCE MANPOWER REQUIREMENTS – SUMMARY INFORMATION (PART A)

(1) MAINT. NO.	(2) HONO	(3) GUAM	(4) NORF	(5) ITALY	(6) TYPE	(7) DESCRIPTION
	MAINT. NUMBER ON ORIG. TABLES 2 & 3					
1	9				AN/FRT-19	TRANSMITTER
2	10	1	1	3	AN/FRT-39	TRANSMITTER
3	11	2	2	4	AN/FRT-40	TRANSMITTER
4	12				STRAPPED AN/FRT-40	TRANSMITTER
5		3			AN/FRT-62	TRANSMITTER
6		4			AN/FRT-71	TRANSMITTER
7	13	5	6		AN/FRT-72	TRANSMITTER
8	46				AN/FRT-72	LF TRANSMITTER
9			3	5	AN/FRT-83	TRANSMITTER
10		11	4		AN/FRT-84	TRANSMITTER
11		12	5		AN/FRT-85	TRANSMITTER
12		18			AD2	MULTICOUPLER
13	1	17		1	AM-410	AF AMP
14		21			AMP 728	LINE AMP
15	2				AN/FCC-17	MUX/DEMUX

TABLE II-1: MAINTENANCE MANPOWER REQUIREMENTS – SUMMARY INFORMATION (PART A, CONT'D)

(1) MAINT. NO.	(2) HONO	(3) GUAM	(4) NORF	(5) ITALY	(6) TYPE	(7) DESCRIPTION
	MAINT. NUMBER ON ORIG. TABLES 2 & 3					
16	3				AN/FCC-38	MUX TERM.
17	4	13		2	AN/FCC-67	TERM. EQUIP.
18	5				AN/FCC-69	TERM. EQUIP.
19	6				AN/FCC-71	TELETYPE TERM.
20		14			AN/FGC-60	TELEGRAPH TERMINAL
21	7	8			AN/FPT-11	SOUNDER TRANSMITTER
22	8				AN/FRC-149	MICROWAVE TRANSMITTER
23	14	16			AN/UGA-4	AUDIO AMP
24				6	AN/URA-38	ANTENNA COUPLER
25		32			AS-1862 FRC	ANTENNA
26		7			BAUER 707	MF TRANSMITTER
27	15				CBTB-252-2	STATION BATTERY
28	16				CBVB-HTR-6	POWER SUPPLY
29	17				CCLX-PXP-IC	SPEAKER PANEL
30	18				CCLX-KIT-155	VOX KEYER

TABLE II-1: MAINTENANCE MANPOWER REQUIREMENTS – SUMMARY INFORMATION (PART A, CONT'D)

(1) MAINT. NO.	(2) HONO	(3) GUAM	(4) NORF	(5) ITALY	(6) TYPE	(7) DESCRIPTION
	MAINT. NUMBER ON ORIG. TABLES 2 & 3					
31	19				CCLX-TER-25K	DUMMY LOAD
32	20				CCLX-TER-25K-0-50U	DUMMY LOAD
33	21				CDMX-63L	ANTENNA ROTATOR
34	22				CLX-TER-5000	DUMMY LOAD
35	23				CLX-529A	POWER SUPPLY
36	24				CHC-SP-600	RECEIVER
37	25				COL-143A-1	ANTENNA ROTATOR
38	29				CPTC-LF-50K	DUMMY LOAD
39	26				CU-656	COUPLER
40	27				CU-873	COUPLER
41	29				DA-395/URT	DUMMY LOAD
42	30				DA-446/FRT	DUMMY LOAD
43	31	1[illegible]		11	DA-484/URT	DUMMY LOAD
44			8		GRC-169	MICROWAVE TRANSCEIVER
45	32			1	KW-7/TSEC	CRYPTO

TABLE II-1: MAINTENANCE MANPOWER REQUIREMENTS – SUMMARY INFORMATION (PART A, CONT'D)

(1) MAINT. NO.	(2) HONO	(3) GUAM	(4) NORF	(5) ITALY	(6) TYPE	(7) DESCRIPTION
	MAINT. NUMBER ON ORIG. TABLES 2 & 3					
46	33				KY-554/URT	KEYER
47			15	7	KY-655/FRT	KEYER FREQUENCY SHIFT
48		19			M/C F1[illegible]2A	MULTICOUPLER
49		23			PP 125	POWER SUPPLY
50		25			PP 227	POWER SUPPLY
51		24			PP 842	POWER SUPPLY
52	34				PS-1-67-57	POWER SUPPLY
53	38				R-20	POWER SUPPLY
54	37				R-39	RECEIVER
55	35		7	8	R-1051	RECEIVER
56	36				R-14[illegible]1/G	RECEIVER
57		9	11		SA-1551	DELTA SWITCHING MATRIX
58			13		SB-3[illegible]92	COMM PATCH PANEL AUDIO
59		27			SB-3[illegible]92A	PATCH MODULES
60		26	12		SB-3189	PATCH MODULES

TABLE II-1: MAINTENANCE MANPOWER REQUIREMENTS – SUMMARY INFORMATION (PART A, CONT'D)

(1) MAINT. NO.	(2) HONO	(3) GUAM	(4) NORF	(5) ITALY	(6) TYPE	(7) DESCRIPTION
	MAINT. NUMBER ON ORIG. TABLES 2 & 3					
61	39				SMD-203130-1	WAVE METER
62	[illegible]	6			TAB-7	TRANSMITTER
63	-1	15			TD-918	MUXER
64			14		TH-39	TELEGRAPH TERMINAL
65	43				TH-39A/UGT	TIS
66	44	2[illegible]		9	TH-39B/UGT	TIS
67	45				TTG-2	AUDIO SIG GEN
68			9		UCC-4	MULTIPLEX DEMULTIPLEX
69			10		2153	VOICE FREQ TELEGRAPH GRP
70		22			12912	LINE EQUALIZER
71		42			ANTENNA INSPECTION	VISUAL INSPECTION
72			18		ANTENNA MAINTENANCE	VARIOUS
73		33			COLLINS 237-A-1	ANTENNA
74		34			COLLINS 237-B-1	ANTENNA
75	A-2	29			CONICAL MONOPOLE	ANTENNA

TABLE II-1: MAINTENANCE MANPOWER REQUIREMENTS – SUMMARY INFORMATION (PART A, CONT'D)

(1) MAINT. NO.	(2) HONO	(3) GUAM	(4) NORF	(5) ITALY	(6) TYPE	(7) DESCRIPTION
	MAINT. NUMBER ON ORIG. TABLES 2 & 3					
75		44			DEHYDRATORS	DEHYDRATORS
77		35			HORIZONTAL DOUBLET	ANTENNA
78		36			HPCMP GRANGER 774	ANTENNA
79			17		INST TRANS PATCH + TEST FAC	-
80	A-3				INVERTED CONE MONOCONE	ANTENNA
81		31			INVERTED DISCONE	ANTENNA
82	A-5				LPA	ANTENNA
83		37			MARCONI	ANTENNA
84			16		PATCH + TEST FACILITY	VARIOUS
85		43			REPLACE TOWER LIGHTS	TOWER LIGHTS
86	A-1	30			RHOMBIC	ANTENNA
87	A-4				RLPA	ANTENNA
88		39			SLEEVE	ANTENNA
89A	-2				TEST EQUIPMENT (HONO)	VARIOUS
89B				12	TEST EQUIPMENT (ITALY)	VARIOUS

TABLE II-1: MAINTENANCE MANPOWER REQUIREMENTS – SUMMARY INFORMATION (PART A, CONT'D)

(1) MAINT. NO.	(2) HONO	(3) GUAM	(4) NORF	(5) ITALY	(6) TYPE	(7) DESCRIPTION
	MAINT. NUMBER ON ORIG. TABLES 2 & 3					
90		45			TRANSMISSION LINE TESTING	PRESSURE TESTING
91		40			UG ANTENNA	ANTENNA
92		38			VERTICAL DOUBLET	ANTENNA
93	A-7				VLF	-
94		28			WHIP ANT.	ANTENNA
95		41			400 FT. LF ANTENNA	ANTENNA
96	A-6				OTHERS	ANTENNA + PATCH PANELS

TABLE II-1: MAINTENANCE MANPOWER REQUIREMENTS – SUMMARY INFORMATION (PART B)

(1) MAINT. NO.	(2) EQUIPMENT TYPE	(8) TOTAL NUMBER ON HAND/ACTIVE HONO	(9) GUAM	(10) NORF	(11) ITALY
1	AN/FRT-19	1			
2	AN/FRT-39	75	46	35	11
3	AN/FRT-4[illegible]	45/39	42	24	4/2.5
4	STRAPPED AN/FRT-4[illegible]	11			
5	AN/FRT-62		2		
6	AN/FRT-7[illegible]		7		
7	AN/FRT-72	1	2	2	
8	AN/FRT-72	1			
9	AN/FRT-83			10	7
10	AN/FRT-84		11	10	
11	AN/FRT-85		7	5	
12	ADZ		5		
13	AM-413	5	7		1
14	AMP 728		12		
15	AN/FCC-17	1			

TABLE II-1: MAINTENANCE MANPOWER REQUIREMENTS – SUMMARY INFORMATION (PART B, CONT'D)

(1) MAINT. NO.	(2) EQUIPMENT TYPE	(8) TOTAL NUMBER ON HAND/ACTIVE HONO	(9) GUAM	(10) NORF	(11) ITALY
16	AN/FCC-38	2			
17	AN/FCC-67	1	2		1
18	AN/FCC-69	1			
19	AN/FCC-71	1			
20	AN/FGC-60		3		
21	AN/FPT-11	1	1		
22	AN/FRC-149	1			
23	AN/UGA-4	4	4		
24	AN/URA-38				3/2
25	AS-1862 FRC		6		
26	BAUER 707		1		
27	CBT3-252-2	2			
28	CBV9-HTR-6	1			
29	CCLX-BXP-ID	1/0			
3	CCLX-KIT-155	14			

TABLE II-1: MAINTENANCE MANPOWER REQUIREMENTS – SUMMARY INFORMATION (PART B, CONT'D)

(1) MAINT. NO.	(2) EQUIPMENT TYPE	(8) HONO	(9) GUAM	(10) NORF	(11) ITALY
		TOTAL NUMBER ON HAND/ACTIVE			
31	CCLX-TER-25K	1			
32	CCLX-TER-25K-0-50U	1			
33	CDMX-630	4			
34	CLX-TER-5000	1			
35	CLX-529A	3			
36	CHC-SP-600	1			
37	COL-143A-1	10			
38	CPTC-LF-50K	1			
39	CU-656	7/6			
40	CU-873	2			
41	DA-395/URT	2			
42	DA-446/FRT	1			
43	DA-484/URT	9	11		1
44	GRC-169			4	
45	KW-7/TSEC	2			2

TABLE II-1: MAINTENANCE MANPOWER REQUIREMENTS – SUMMARY INFORMATION (PART B, CONT'D)

(1) MAINT. NO.	(2) EQUIPMENT TYPE	(8) TOTAL NUMBER ON HAND/ACTIVE HONO	(9) GUAM	(10) NORF	(11) ITALY
46	KY-554/URT	6			
47	KY-555/FRT			10	7
48	M/C 5102A		2[illegible]		
49	PP 125		2		
50	PP 227		2		
51	PP 842		1		
52	PS-1-67-57	3			
53	R-20	4			
54	R-39[illegible]	1			
55	R-1051	2		2	1
56	R-1401/G	1			
57	SA-1551		21	13	
58	SB-3[illegible]92			17	
59	SB-3[illegible]92A		73		
60	SB-3189		12	8	

TABLE II-1: MAINTENANCE MANPOWER REQUIREMENTS – SUMMARY INFORMATION (PART B, CONT'D)

(1) MAINT. NO.	(2) EQUIPMENT TYPE	(8) TOTAL NUMBER ON HAND/ACTIVE HONO	(9) GUAM	(10) NORF	(11) ITALY
61	SMD-203130-1	1			
62	TAB-7	2	3		
63	TD-918	13	4		
64	TH-39			14	
65	TH-39A/UGT	20			
66	TH-39B/UGT	8	50		15
67	TTG-2	1			
68	UCC-4			1	
69	2153			4	
70	12912		127		
71	ANTENNA INSPECTION		-		
72	ANTENNA MAINTENANCE			89	
73	COLLINS 237-A-1		1		
74	COLLINS 237-B-1		5		
75	CONICAL MONOPOLE	33	19		

TABLE II-1: MAINTENANCE MANPOWER REQUIREMENTS – SUMMARY INFORMATION (PART B, CONT'D)

(1) MAINT. NO.	(2) EQUIPMENT TYPE	(8) HONO	(9) GUAM	(10) NORF	(11) ITALY
		TOTAL NUMBER ON HAND/ACTIVE			
76	DEHYDRATORS		21		
77	HORIZONTAL DOUBLET		2		
78	HPCMP GRANGER 774		2		
79	INST TRANS PATCH + TEST FAC			-	
80	INVERTED CONE MONOCONE	24			
81	INVERTED DISCONE		16		
82	LPA	6			
83	MARCONI		5		
84	PATCH + TEST FACILITY			1	
85	REPLACE TOWER LIGHTS		-		
86	RHOMBIC	28	35		
87	RLPA	18			
88	SLEEVE		5		
89A	TEST EQUIPMENT (HONO)	191/168			
89B	TEST EQUIPMENT (ITALY)				25

TABLE II-1: MAINTENANCE MANPOWER REQUIREMENTS – SUMMARY INFORMATION (PART B, CONT'D)

(1) MAINT. NO.	(2) EQUIPMENT TYPE	(8) TOTAL NUMBER ON HAND/ACTIVE HONO	(9) GUAM	(10) NORF	(11) ITALY
9[illegible]	TRANSMISSION LINE TESTING		-		
91	UG ANTENNA		1		
92	VERTICAL DOUBLET		[illegible]		
93	VLF	-			
9[illegible]	WHIP ANT.		2		
95	40[illegible] FT. LF ANTENNA		1		
96	OTHERS	27			

TABLE II-1: MAINTENANCE MANPOWER REQUIREMENTS – SUMMARY INFORMATION (PART C)

(1) MAINT. NO.	(2) EQUIPMENT TYPE	(12) TOTAL CONV. CM & PM REQ. MAN HRS/YEAR/UNIT HONO	(13) GUAM	(14) NORF	(15) ITALY
1	AN/FRT-19	152			
2	AN/FRT-39	114.8	216.3A	504.5A	87.6
3	AN/FRT-40	162.3	381.5A	678.5A	162.3
4	STRAPPED AN/FRT-40	148.7			
5	AN/FRT-62		758.9A		
6	AN/FRT-70		164.5A		
7	AN/FRT-72	236.9A	236	588.6	
8	AN/FRT-72	-			
9	AN/FRT-83			265.2	92.3
10	AN/FRT-84		120.9	241.9	
11	AN/FRT-85		171.7	411.5	
12	AD2		11.8		
13	AM-413	6.8	4.0		-
14	AMP 728		1.1		
15	AN/FGC-17	19.9			

TABLE II-1: MAINTENANCE MANPOWER REQUIREMENTS – SUMMARY INFORMATION (PART C, CONT'D)

(1) MAINT. NO.	(2) EQUIPMENT TYPE	(12) TOTAL CONV. CM & PM REQ. MAN HRS/YEAR/UNIT HONO	(13) GUAM	(14) NORF	(15) ITALY
16	AN/FCC-38	41.9			
17	AN/FCC-57	55.4A	56.4		-
18	AN/FCC-69	28.2A			
19	AN/FCC-71	28.2A			
20	AN/FGC-60		19.7		
21	AN/FPT-11	323	972.5		
22	AN/FRC-149	199A			
23	AN/UGA-4	2.6	6.2		
24	AN/URA-38				-
25	AS-1862 FRC		131.1		
26	BAUER 707		48		
27	CBTR-252-2	1			
28	CBVB-HTR-6	1			
29	CCLX-BXP-ID	-			
30	CCLX-KIT-155	30			

TABLE II-1: MAINTENANCE MANPOWER REQUIREMENTS – SUMMARY INFORMATION (PART C, CONT'D)

(1) MAINT. NO.	(2) EQUIPMENT TYPE	(12) TOTAL CONV. CM & PM REQ. MAN HRS/YEAR/UNIT HONO	(13) GUAM	(14) NORF	(15) ITALY
31	CCLX-TER-25K	6			
32	CCLX-TER-25K-0-50U	6			
33	COMX-630	0.4			
34	CLX-TER-5000	0.5			
35	CLX-329A	1.9			
36	CHC-SP-600	-			
37	COL-143A-1	0.4			
38	CPTC-LF-50K	0.4			
39	CU-636	0.4			
40	CU-873	1.9			
41	DA-395/URT	-			
42	DA-446/FRT	8			
43	DA-484/URT	14.8	4.8		-
44	GRC-169			219	
45	KW-7/TSEC	10.5			-

TABLE II-1: MAINTENANCE MANPOWER REQUIREMENTS – SUMMARY INFORMATION (PART C, CONT'D)

(1) MAINT. NO.	(2) EQUIPMENT TYPE	(12) TOTAL CONV. CM & PM REQ. MAN HRS/YEAR/UNIT HONO	(13) GUAM	(14) NORF	(15) ITALY
46	KY-554/URT	0.8			
47	KY-655/FRT			19.2	-
48	M/C 5102A		1.0		
49	PP 125		0.7		
50	PP 227		0.5		
51	PP 8-2		1.0		
52	PS-1-67-57	1.6			
53	R-20	1.2			
54	R-39	95.4			
55	R-1051	30		26.4	-
56	R-14 1/G	1			
57	SA-1551		6.6	48	
58	SB-3192			15.4	
59	SB-3 92A		-		
60	SB-3189		-	43	

TABLE II-1: MAINTENANCE MANPOWER REQUIREMENTS – SUMMARY INFORMATION (PART C, CONT'D)

(1) MAINT. NO.	(2) EQUIPMENT TYPE	(12) TOTAL CONV. CM & PM REQ. MAN HRS/YEAR/UNIT HONO	(13) GUAM	(14) NORF	(15) ITALY
61	SMD-203130-1	-A			
62	TAB-7	65.1	90.2		
63	TD-9[illegible]8	[illegible]	5.2		
64	TH-39			19.[illegible]	
65	TH-39A/UGT	7.2			
66	TH-39B/UGT	7.2	7.1		-
67	TTG-2	0.5			
68	UCC-4			61.7	
69	2153			110.[illegible]	
70	12912		1.1		
71	ANTENNA INSPECTION		416		
72	ANTENNA MAINTENANCE			-	
73	COLLINS 237-A-1		31.8		
74	COLLINS 237-B-1		85.8		
75	CONICAL MONOPOLE	14.5	23.7		

TABLE II-1: MAINTENANCE MANPOWER REQUIREMENTS – SUMMARY INFORMATION (PART C, CONT'D)

(1) MAINT. NO.	(2) EQUIPMENT TYPE	(12) TOTAL CONV. CM & PM REQ. MAN HRS/YEAR/UNIT HONO	(13) GUAM	(14) NORF	(15) ITALY
76	DEHYDRATORS		67.6		
77	HORIZONTAL DOUBLET		36.0		
78	HPCMP GRANGER 77-		26		
79	INST TRANS PATCH + TEST FAC			4.[illegible]	
80	INVERTED CONE MONOCONE	23.[illegible]			
81	INVERTED DISCONE		31.2		
82	LPA	18.[illegible]			
83	MARCONI		24		
84	PATCH + TEST FACILITY			935.9	
85	REPLACE TOWER LIGHTS		11[illegible]		
86	RHOMBIC	24.[illegible]	30.2		
87	RLPA	22.7			
88	SLEEVE		34.[illegible]		
89A	TEST EQUIPMENT (HONO)	2.9A			
89B	TEST EQUIPMENT (ITALY)				-

TABLE II-1: MAINTENANCE MANPOWER REQUIREMENTS – SUMMARY INFORMATION (PART C, CONT'D)

(1) MAINT. NO.	(2) EQUIPMENT TYPE	(12) TOTAL CONV. CM & PM REQ. MAN HRS/YEAR/UNIT HONO	(13) GUAM	(14) NORF	(15) ITALY
90	TRANSMISSION LINE TESTING		-A		
91	UG ANTENNA		66		
92	VERTICAL DOUBLET		30.0		
93	VLF	-			
94	WHIP ANT.		36		
95	40 FT. LF ANTENNA		2 8		
96	OTHERS	94.7			

TABLE II-2: MAINTENANCE MANPOWER REQUIREMENTS – PLANNED MAINTENANCE SUBSYSTEM STANDARDS (PART A)

(1) MAINT. NO.	(2) EQUIPMENT TYPE	(3) HONO	(4) GUAM	(5) NORF	(6) ITALY
		BY OPERATING PERSONNEL			
1	AN/FRT-19	-			
2	AN/FRT-39	38.9	38.7	82.3	2.4
3	AN/FRT-40	88.6/32.7(L)	64.4	91	3.6
4	STRAPPED AN/FRT-40	88.6/27.5(L)			
5	AN/FRT-62		8.3		
6	AN/FRT-70		14		
7	AN/FRT-72	-	20	-	
8	AN/FRT-72	-			
9	AN/FRT-83			45.5	-
10	AN/FRT-84		36	5 .2	
11	AN/FRT-85		36	87	
12	AD2		-		
13	AM-413	-	-		-
14	AMP 728		-		
15	AN/FGC-17	-			

TABLE II-2: MAINTENANCE MANPOWER REQUIREMENTS – PLANNED MAINTENANCE SUBSYSTEM STANDARDS

(PART A, CONT'D)

(1) MAINT. NO.	(2) EQUIPMENT TYPE	(3) BY OPERATING PERSONNEL HONO	(4) GUAM	(5) NORF	(6) ITALY
16	AN/FCC-38	1[illegible].4			
17	AN/FCC-67	-	-		-
18	AN/FCC-69	-			
19	AN/FCC-71	-			
20	AN/FGC-65		-		
21	AN/FPT-11	-	36.5		
22	AN/FRC-149	36.5			
23	AN/UGA-4	-	-		
24	AN/URA-38				-
25	AS-1862 FRC		-		
26	BAUER 707		-		
27	CBTB-252-2	-			
28	CBVB-HTR-6	-			
29	CCLX-BXP-ID	-			
30	CCLX-KIT-155	-			

TABLE II-2: MAINTENANCE MANPOWER REQUIREMENTS – PLANNED MAINTENANCE SUBSYSTEM STANDARDS (PART A, CONT'D)

(1) MAINT. NO.	(2) EQUIPMENT TYPE	(3) BY OPERATING PERSONNEL HONO	(4) GUAM	(5) NORF	(6) ITALY
31	CCLX-TER-25K	-			
32	CCLX-TER-25K-0-50U	-			
33	COMX-630	-			
34	CLX-TER-5000	-			
35	CLX-529A	-			
36	CHC-SP-600	-			
37	COL-143A-1	-			
38	CPTC-LF-50K	-			
39	CU-636	-			
40	CU-873	-			
41	DA-395/URT	-			
42	DA-436/FRT	-			
43	DA-434/URT	-	-		-
44	GRC-169			-	
45	KW-7/TSEC	-			-

TABLE II-2: MAINTENANCE MANPOWER REQUIREMENTS – PLANNED MAINTENANCE SUBSYSTEM STANDARDS

(PART A, CONT'D)

(1) MAINT. NO.	(2) EQUIPMENT TYPE	(3) BY OPERATING PERSONNEL HONO	(4) GUAM	(5) NORF	(6) ITALY
46	KY-554/URT	-			
47	KY-655/FRT			-	36.5
48	M/C 5102A		-		
49	PP 125		-		
50	PP 227		-		
51	PP 842		-		
52	PS-1-67-57	-			
53	R-20	-			
54	R-391	-			
55	R-1051	1[illegible].8		1[illegible].8	1[illegible].8
56	R-1401/G	-			
57	SA-1551		1		
58	SB-3192			3(L)	
59	SB-3192A		-		
60	SB-3189		-	3	

TABLE II-2: MAINTENANCE MANPOWER REQUIREMENTS – PLANNED MAINTENANCE SUBSYSTEM STANDARDS (PART A, CONT'D)

(1) MAINT. NO.	(2) EQUIPMENT TYPE	(3) BY OPERATING PERSONNEL HONO	(4) GUAM	(5) NORF	(6) ITALY
61	SMD-203130-1	-			
62	TAB-7	-	13		
63	TD-918	-	-		
64	TH-39			-	
65	TH-39A/UGT	-			
66	TH-39B/UGT	-	-		-
67	TTG-2	-			
68	UCC-4			-	
69	2153			-	
70	12912		-		
71	ANTENNA INSPECTION		-		
72	ANTENNA MAINTENANCE			-	
73	COLLINS 237-A-1		-		
74	COLLINS 237-B-1		-		
75	CONICAL MONOPOLE	-	-		

TABLE II-2: MAINTENANCE MANPOWER REQUIREMENTS – PLANNED MAINTENANCE SUBSYSTEM STANDARDS (PART A, CONT'D)

(1) MAINT. NO.	(2) EQUIPMENT TYPE	(3) BY OPERATING PERSONNEL HONO	(4) GUAM	(5) NORF	(6) ITALY
76	DEHYDRATORS		-		
77	HORIZONTAL DOUBLET		-		
78	HPCMP GRANGER 774		-		
79	INST TRANS PATCH + TEST FAC			-	
80	INVERTED CONE MONOCONE	-			
81	INVERTED DISCONE		-		
82	LPA	-			
83	MARCONI		-		
84	PATCH + TEST FACILITY			-	
85	REPLACE TOWER LIGHTS		-		
86	RHOMBIC	-	-		
87	RLPA	-			
88	SLEEVE		-		
89A	TEST EQUIPMENT (HONO)	-			
89B	TEST EQUIPMENT (ITALY)				-

TABLE II-2: MAINTENANCE MANPOWER REQUIREMENTS – PLANNED MAINTENANCE SUBSYSTEM STANDARDS (PART A, CONT'D)

(1) MAINT. NO.	(2) EQUIPMENT TYPE	(3) BY OPERATING PERSONNEL HONO	(4) GUAM	(5) NORF	(6) ITALY
9	TRANSMISSION LINE TESTING		-		
91	UG ANTENNA		-		
92	VERTICAL DOUBLET		-		
93	VLF	-			
94	WHIP ANT.		-		
95	40 FT. LF ANTENNA		-		
96	OTHERS	-			

TABLE II-2: MAINTENANCE MANPOWER REQUIREMENTS – PLANNED MAINTENANCE SUBSYSTEM STANDARDS (PART B)

(1) MAINT. NO.	(2) EQUIPMENT TYPE	(7) BY MAINTENANCE PERSONNEL HONO	(8) GUAM	(9) NORF	(10) ITALY
1	AN/FRT-19	96			
2	AN/FRT-39	72.4	82.3	5.5	9.4
3	AN/FRT-40	119.0/110.0(L)	129.6	5	0.4
4	STRAPPED AN/FRT-40	119.0/74.4(L)			
5	AN/FRT-62		10[illegible].6		
6	AN/FRT-70		60		
7	AN/FRT-72	221.9	182	91.9	
8	AN/FRT-72	-			
9	AN/FRT-83			45.5	7.7
10	AN/FRT-84		20	15.2	
11	AN/FRT-85		28	15.9	
12	AC2		.8		
13	AM-413	[illegible]	1.-		.4
14	AMP 728		1		
15	AN/FCC-17	14			

TABLE II-2: MAINTENANCE MANPOWER REQUIREMENTS – PLANNED MAINTENANCE SUBSYSTEM STANDARDS (PART B, CONT'D)

(1) MAINT. NO.	(2) EQUIPMENT TYPE	(7) BY MAINTENANCE PERSONNEL HONO	(8) GUAM	(9) NORF	(10) ITALY
16	AN/FCC-38	[illegible].5			
17	AN/FCC-67	15.4/25.4(L)	15.4		15.4
18	AN/FCC-69	10.2/20.2(L)			
19	AN/FCC-71	10.2/20.2(L)			
20	AN/FGC-62		3		
21	AN/FPT-11	245.5(L)	416		
22	AN/FRC-149	44.1			
23	AN/UGA-4	.6	2.4		
24	AN/URA-38				3
25	AS-1862 FRC		82.2		
26	BAUER 707		12		
27	CBTB-252-2	1(L)			
28	CBVB-HTR-6	1.8(L)			
29	CCLX-BXP-ID	-			
30	CCLX-KIT-155	1[illegible](L)			

TABLE II-2: MAINTENANCE MANPOWER REQUIREMENTS – PLANNED MAINTENANCE SUBSYSTEM STANDARDS (PART B, CONT'D)

(1) MAINT. NO.	(2) EQUIPMENT TYPE	(7) BY MAINTENANCE PERSONNEL HONO	(8) GUAM	(9) NORF	(10) ITALY
31	CCLX-TER-25K	6(L)			
32	CCLX-TER-25K-0-50U	6(L)			
33	COMX-630	.4(L)			
34	CLX-TER-5000	.5(L)			
35	CLX-529A	1.6(L)			
36	CHC-SP-600	-			
37	CCL-143A-1	.4			
38	CPTC-LF-50K	.4			
39	CU-656	.-			
40	CU-373	1.9			
41	DA-395/URT	-			
42	DA-446/FRT	1[illegible]			
43	DA-484/URT	14.8	4.7		8.8
44	GRC-169			1[illegible].2	
45	KW-7/TSEC	1[illegible]			-

TABLE II-2: MAINTENANCE MANPOWER REQUIREMENTS – PLANNED MAINTENANCE SUBSYSTEM STANDARDS (PART B, CONT'D)

(1) MAINT. NO.	(2) EQUIPMENT TYPE	(7) BY MAINTENANCE PERSONNEL HONO	(8) GUAM	(9) NORF	(10) ITALY
46	KY-554/URT	.8			
47	KY-655/FST			12	1.6
48	M/C 512A		.5		
49	PP 125		.4		
50	PP 227		.4		
51	PP 8-2		.8		
52	PS-1-67-57	1.6			
53	R-23	1.2			
54	R-[illegible]9	[illegible].3			
55	R-1051	1[illegible].2		7	7.0
56	R-1401/G	1			
57	SA-1551		-		
58	SB-3192				
59	SB-3192A		-		
60	SB-3189		-	12	

TABLE II-2: MAINTENANCE MANPOWER REQUIREMENTS – PLANNED MAINTENANCE SUBSYSTEM STANDARDS (PART B, CONT'D)

(1) MAINT. NO.	(2) EQUIPMENT TYPE	(7) BY MAINTENANCE PERSONNEL HONO	(8) GUAM	(9) NORF	(10) ITALY
61	SMD-203130-1	-			
62	TAB-7	54.1	17.5		
63	TD-9 8	4	3		
64	TH-39			12(L)	
65	TH-39A/UGT	2			
66	TH-39B/UGT	2	2		.5
67	TTG-2	.5			
68	UCC-4			15.4	
69	2153			10(L)	
70	12912		1		
71	ANTENNA INSPECTION		416		
72	ANTENNA MAINTENANCE			-	
73	COLLINS 237-A-1		71.8		
74	COLLINS 237-B-1		31.8		
75	CONICAL MONOPOLE	-	33.4(L)		

TABLE II-2: MAINTENANCE MANPOWER REQUIREMENTS – PLANNED MAINTENANCE SUBSYSTEM STANDARDS (PART B, CONT'D)

(1) MAINT. NO.	(2) EQUIPMENT TYPE	(7) BY MAINTENANCE PERSONNEL HONO	(8) GUAM	(9) NORF	(10) ITALY
76	DEHYDRATORS		24		
77	HORIZONTAL DOUBLET		36		
78	HPCMP GRANGER 774		18		
79	INST TRANS PATCH + TEST FAC			-	
80	INVERTED CONE MONOCONE	-			
81	INVERTED DISCONE		33.4(L)		
82	LPA	-			
83	MARCONI		12		
84	PATCH + TEST FACILITY			-	
85	REPLACE TOWER LIGHTS		-		
86	RHOMBIC	-	20		
87	RLPA	-			
88	SLEEVE		25.-		
89A	TEST EQUIPMENT (HONO)	457.8			
89B	TEST EQUIPMENT (ITALY)				.2

TABLE II-2: MAINTENANCE MANPOWER REQUIREMENTS – PLANNED MAINTENANCE SUBSYSTEM STANDARDS (PART B, CONT'D)

(1) MAINT. NO.	(2) EQUIPMENT TYPE	(7) BY MAINTENANCE PERSONNEL HONO	(8) GUAM	(9) NORF	(10) ITALY
90	TRANSMISSION LINE TESTING		-		
91	UG ANTENNA		68		
92	VERTICAL DOUBLET		30		
93	VLF	-			
94	WHIP ANT.		54		
95	400 FT. LF ANTENNA		208		
96	OTHERS	-			

TABLE II-2: MAINTENANCE MANPOWER REQUIREMENTS – PLANNED MAINTENANCE SUBSYSTEM STANDARDS (PART C)

(1) MAINT. NO.	(2) EQUIPMENT TYPE	(11) HONO	(12) TOTAL (ALL PERSONNEL) GUAM	(13) NORF	(14) ITALY	(15) MRC STD CODE-04
1	AN/FRT-19	95				507.8
2	AN/FRT-39	111.3/99(L)	121.[illegible]	87.8	71.8	111.3/445.2
3	AN/FRT-[illegible]	2[illegible]7.6/142.7(L)	194	96	117.3	207.6/830.4
4	STRAPPED AN/FRT-40	207.6/1[illegible]1.9(L)				
5	AN/FRT-62		1[illegible]3.9			131.5
6	AN/FRT-70		74			174.6
7	AN/FRT-72	221.9	262	91.9		302.5
8	AN/FRT-72	-				
9	AN/FRT-83			91	47.7	47.7
10	AN/FRT-84		56	65.7		58.9
11	AN/FRT-85		64	1[illegible]2.9		59.6
12	AD2		.8			
13	AM-413	[illegible].4	1.4		.4	.4
14	AMP 728		1			
15	AN/FCC-17	14				14

TABLE II-2: MAINTENANCE MANPOWER REQUIREMENTS – PLANNED MAINTENANCE SUBSYSTEM STANDARDS (PART C, CONT'D)

(1) MAINT. NO.	(2) EQUIPMENT TYPE	(11) HONO	(12) TOTAL (ALL PERSONNEL) GUAM	(13) NORF	(14) ITALY	(15) MRC STD CODE-04
16	AN/FCC-38	17.9				17.9
17	AN/FCC-67	15.4/25.4(L)	15.4		15.4	15.9
18	AN/FCC-69	10.2/20.2(L)				11.7
19	AN/FCC-71	10.2/20.2(L)				
20	AN/FGC-60		3			21.2/27.6
21	AN/FPT-11	245.5(L)	452.5			
22	AN/FRC-149	80.6				43.5
23	AN/UGA-4	0.6	2.4			2.4
24	AN/URA-38				3	
25	AS-1862 FRC		82.2			15.0
26	BAUER 707		12			
27	CBTB-252-2	1(L)				
28	CBVB-HTR-6	1.5(L)				
29	CCLX-BXP-ID	-				
30	CCLX-KIT-155	15(L)				

TABLE II-2: MAINTENANCE MANPOWER REQUIREMENTS – PLANNED MAINTENANCE SUBSYSTEM STANDARDS (PART C, CONT'D)

(1) MAINT. NO.	(2) EQUIPMENT TYPE	(11) HONO	(12) TOTAL (ALL PERSONNEL) GUAM	(13) NORF	(14) ITALY	(15) MRC STD CODE-04
31	CCLX-TER-25K	6(L)				
32	CCLX-TER-25K-0-50U	6(L)				
33	CCMX-63[illegible]	.4(L)				
34	CLX-TER-5000	.5(L)				
35	CLX-529A	1.6(L)				
36	CHC-SP-600	-				
37	CCL-143A-1	.4(L)				
38	CPTC-LF-50K	.4(L)				
39	CU-656	.4(L)				
40	CU-873	1.9(L)				1.9
41	DA-395/URT	-				
42	DA-4[illegible]6/FRT	1[illegible]				
43	DA-484/URT	14.8(L)	4.7		8.8	
44	GRC-169			17.2		
45	KW-7/TSEC	1[illegible]			-	1[illegible]

TABLE II-2: MAINTENANCE MANPOWER REQUIREMENTS – PLANNED MAINTENANCE SUBSYSTEM STANDARDS (PART C, CONT'D)

(1) MAINT. NO.	(2) EQUIPMENT TYPE	(11) HONO	(12) TOTAL (ALL PERSONNEL) GUAM	(13) NORF	(14) ITALY	(15) MRC STD CODE-04
46	KY-554/URT	.8(L)				
47	KY-655/FRT			12	38.1	38.1
48	M/C 5102A		.5			
49	PP 125		.4			
50	PP 227		.4			
51	PP 842		.8			
52	PS-1-67-57	1.6				
53	R-20	1.2				
54	R-390	6.3				6.3
55	R-1051	21		17.8	17.8	6.4
56	R-1401/G	1				
57	SA-1551		5			
58	SB-3092			3(L)		
59	SB-3092A		-			
60	SB-3189		-	15		

TABLE II-2: MAINTENANCE MANPOWER REQUIREMENTS – PLANNED MAINTENANCE SUBSYSTEM STANDARDS (PART C, CONT'D)

(1) MAINT. NO.	(2) EQUIPMENT TYPE	(11) HONO	(12) TOTAL (ALL PERSONNEL) GUAM	(13) NORF	(14) ITALY	(15) MRC STD CODE-04
61	SMD-203130-1	-				
62	TAP-7	5-.1	3[illegible].6			5-.1
63	TD-9.8	4	3			
64	TH-39			12(L)		
65	TH-39A/UGT	2				2.[illegible]
66	TH-39B/UGT	2	2		.5	2.[illegible]
67	TTG-2	.5				
68	UCC-4			1[illegible].4		1-.[illegible]
69	2153			1[illegible](L)		
70	12912		1			
71	ANTENNA INSPECTION		-16			
72	ANTENNA MAINTENANCE			-		
73	COLLINS 237-A-1		71.8			
74	COLLINS 237-B-1		31.8			
75	CONICAL MONOPOLE	-	33.-(L)			

TABLE II-2: MAINTENANCE MANPOWER REQUIREMENTS – PLANNED MAINTENANCE SUBSYSTEM STANDARDS (PART C, CONT'D)

(1) MAINT. NO.	(2) EQUIPMENT TYPE	(11) HONO	(12) TOTAL (ALL PERSONNEL) GUAM	(13) NORF	(14) ITALY	(15) MRC STD CODE-04
76	DEHYDRATORS		24			
77	HORIZONTAL DOUBLET		36			
78	HPCMP GRANGER 774		18			
79	INST TRANS PATCH + TEST FAC			-		
80	INVERTED CONE MONOCONE	-				
81	INVERTED DISCONE		33.4(L)			
82	LPA	-				
83	MARCONI		12			
84	PATCH + TEST FACILITY			-		
85	REPLACE TOWER LIGHTS		-			
86	RHOMBIC	-	20			
87	RLPA	-				
88	SLEEVE		28.4			
89A	TEST EQUIPMENT (HONO)	457.8				
89B	TEST EQUIPMENT (ITALY)				.2	

TABLE II-2: MAINTENANCE MANPOWER REQUIREMENTS – PLANNED MAINTENANCE SUBSYSTEM STANDARDS (PART C, CONT'D)

(1) MAINT. NO.	(2) EQUIPMENT TYPE	(11)	(12) TOTAL (ALL PERSONNEL)	(13)	(14)	(15)
		HONO	GUAM	NORF	ITALY	MRC STD CODE-04
90	TRANSMISSION LINE TESTING		-			
91	UG ANTENNA		66			
92	VERTICAL DOUBLET		30			
93	VLF	-				
94	WHIP ANT.		54			
95	40 FT. LF ANTENNA		208			
96	OTHERS	-				

TABLE II-3: MAINTENANCE MANPOWER REQUIREMENTS – PLANNED MAINTENANCE REQUIRED

(1) MAINT. NO.	(2) EQUIPMENT TYPE	(3)	(4)	(5)	(6)	(7)	(8)	(9)
		PM REQ. MH/YEAR/UNIT				SCA	MMACLANT CM & PM	
		HONO	GUAM	NORF	ITALY	STD	SF	WASH
1	AN/FRT-19	96						239.2
2	AN/FRT-39	87-	121A	1 5.4A	71.8A	385	690.4	245.5
3	AN/FRT-40	111.5-	194A	115.2A	117.3A		430.1	486.3
4	STRAPPED AN/FRT-40	100.7-						
5	AN/FRT-62		108.9A				436.8	546.0
6	AN/FRT-70		74A					
7	AN/FRT-72	221.9A	111-	101.1			561.6	535.6
8	AN/FRT-72	-						
9	AN/FRT-83			109.2	47.7		93.6	
10	AN/FRT-84		54.2-	102.2			55.7	
11	AN/FRT-85		64	123.5			50.7	
12	AD2		0.8					
13	AM-413	0.4	0.4-		0.4			
14	AMP 728		1					
15	AN/FCC-17	14A						

TABLE II-3: MAINTENANCE MANPOWER REQUIREMENTS – PLANNED MAINTENANCE REQUIRED (CONT'D)

(1) MAINT. NO.	(2) EQUIPMENT TYPE	(3) PM REQ. MH/YEAR/UNIT HONO	(4) GUAM	(5) NORF	(6) ITALY	(7) SCA MMACLANT CM & PM STD	(8) SF	(9) WASH
15	AN/FCC-38	17.9						
17	AN/FCC-67	15.4A	16.4+		15.4			1 4
18	AN/FCC-69	15.2A						
19	AN/FCC-71	10.2A						
2	AN/FGC-69		3.9					
21	AN/FPT-11	238-	452.5					
22	AN/FRC-143	80.6A						
23	AN/UGA-4	0.8	2.4					
24	AN/URA-38				3.0			
25	AS-1862 FRC		31.8-					
26	BAUER 707		12					
27	CBTB-252-2	1						
28	CBVB-HTR-6	1						
29	CCLX-3XP-ID	-						
30	CCLX-KIT-155	1						

TABLE II-3: MAINTENANCE MANPOWER REQUIREMENTS – PLANNED MAINTENANCE REQUIRED (CONT'D)

(1) MAINT. NO.	(2) EQUIPMENT TYPE	(3)	(4)	(5)	(6)	(7)	(8)	(9)
		PM REQ. MH/YEAR/UNIT				SCA MMACLANT CM & PM		
		HONO	GUAM	NORF	ITALY	STD	SF	WASH
31	CCLX-TER-25K	6						
32	CCLX-TER-25K-0-500	6						
33	COMX-630	0.4						
34	CLX-TER-5000	0.5						
35	CLX-529A	1.6						
36	CHC-SP-600	-						
37	COL-143A-1	0.4						
38	CPTC-LF-50K	0.4						
39	CU-656	0.4						
40	CU-873	1.9						
41	DA-395/URT	-						
42	DA-446/FRT	8-						
43	DA-484/URT	14.8	4.7		8.8			
44	GRC-169			1[illegible]				
45	KW-7/TSEC	1[illegible]			-		32	

TABLE II-3: MAINTENANCE MANPOWER REQUIREMENTS – PLANNED MAINTENANCE REQUIRED (CONT'D)

(1) MAINT. NO.	(2) EQUIPMENT TYPE	(3) PM REQ. MH/YEAR/UNIT HONO	(4) GUAM	(5) NORF	(6) ITALY	(7) SCA STD	(8) MMACLANT CM & PM SF	(9) WASH
46	KY-554/URT	3.8						
47	KY-655/FRT			14.4	38.1			
48	M/C 5102A		3.5					
49	PP 125		3.4					
50	PP 227		3.4					
51	PP 842		3.8					
52	PS-1-67-57	1.8						
53	R-2[illegible]	1.2						
54	R-39[illegible]	6.3						
55	R-1051	21		21.4	17.8			1.4
56	R-14[illegible]1/G	1						
57	SA-1551		4.3	1.4				
58	SB-3192			3.5				
59	SB-3192A		-					
60	SB-3189		-	18				

TABLE II-3: MAINTENANCE MANPOWER REQUIREMENTS – PLANNED MAINTENANCE REQUIRED (CONT'D)

(1) MAINT. NO.	(2) EQUIPMENT TYPE	(3)	(4)	(5)	(6)	(7)	(8)	(9)
		PM REQ. MH/YEAR/UNIT				SCA MMACLANT CM & PM		
		HONO	GUAM	NORF	ITALY	STD	SF	WASH
61	SMD-203130-1	-A						
62	TAB-7	54.1	30.9+					
63	TD-908	4	1.7					
64	TH-39			12.3				
65	TH-39A/UGT	2						
66	TH-39B/UGT	2	2		0.5			
67	TTG-2	0.5						
68	UCC-4			21.7				
69	2153			1[illegible]				
70	12912		1					
71	ANTENNA INSPECTION		416					
72	ANTENNA MAINTENANCE			-				
73	COLLINS 237-A-1		31.8-					
74	COLLINS 237-B-1		31.8					
75	CONICAL MONOPOLE	14.5	20.1-					

TABLE II-3: MAINTENANCE MANPOWER REQUIREMENTS – PLANNED MAINTENANCE REQUIRED (CONT'D)

(1) MAINT. NO.	(2) EQUIPMENT TYPE	(3)	(4)	(5)	(6)	(7)	(8)	(9)
		PM REQ. MH/YEAR/UNIT				SCA MMACLANT CM & PM		
		HONO	GUAM	NORF	ITALY	STD	SF	WASH
76	DEHYDRATORS		45.7+					
77	HORIZONTAL DOUBLET		36					
78	HPCMP GRANGER 774		18					
79	INST TRANS PATCH + TEST FAC			-				
80	INVERTED CONE MONOCONE	23.[illegible]						
81	INVERTED DISCONE		29.9-					
82	LPA	18.[illegible]						
83	MARCONI		12					
84	PATCH + TEST FACILITY			74.9				
85	REPLACE TOWER LIGHTS		117					
86	RHOMBIC	24.[illegible]	23.5+					
87	RLPA	22.[illegible]						
88	SLEEVE		26.4					
89A	TEST EQUIPMENT (HONO)	457.8A						
89B	TEST EQUIPMENT (ITALY)				.2			

TABLE II-3: MAINTENANCE MANPOWER REQUIREMENTS – PLANNED MAINTENANCE REQUIRED (CONT'D)

(1) MAINT. NO.	(2) EQUIPMENT TYPE	(3)	(4)	(5)	(6)	(7)	(8)	(9)
		PM REQ. MH/YEAR/UNIT				SCA MMACLANT CM & PM		
		HONO	GUAM	NORF	ITALY	STD	SF	WASH
90	TRANSMISSION LINE TESTING		-A					
91	UG ANTENNA		66					
92	VERTICAL DOUBLET		30					
93	VLF	-						
94	WHIP ANT.		36-					
95	400 FT. LF ANTENNA		208					
96	OTHERS	73						

TABLE II-4: MAINTENANCE MANPOWER REQUIREMENTS – CORRECTIVE MAINTENANCE REQUIRED (PART A)

(1) MAINT. NO.	(2) EQUIPMENT TYPE	(3) CM REQ. MH/YEAR/UNIT HONO	(4) GUAM	(5) NORF	(6) ITALY	(7) FREQ. OF FAILURE/YEAR/UNIT HONO	(8) GUAM	(9) NORF	(10) ITALY
1	AN/FRT-19	56				5			
2	AN/FRT-39	27.8	95.3	255.9	15.8	30	16	16	5.6
3	AN/FRT-40	50.8	187.5	408.1	45	23.4	23.3	17	8.0
4	STRAPPED AN/FRT-40	48				81.8			
5	AN/FRT-62		650				9.5		
6	AN/FRT-70		90.5				20.3		
7	AN/FRT-72	15	125	487.5		5	25	24	
8	AN/FRT-72	-				1			
9	AN/FRT-83			156	35.8			10	5.6
10	AN/FRT-84		65.7	139.7			14.8	5.8	
11	AN/FRT-85		107.7	289			7.7	12	
12	AD2		11				8.4		
13	AM-413	6.4	3.6		-	1.5	1.4		-
14	AMP 728		0.1				.2		
15	AN/FCC-17	5.9				9			

TABLE II-4: MAINTENANCE MANPOWER REQUIREMENTS – CORRECTIVE MAINTENANCE REQUIRED (PART A, CONT'D)

(1) MAINT. NO.	(2) EQUIPMENT TYPE	(3) CM REQ. MH/YEAR/UNIT HONO	(4) GUAM	(5) NORF	(6) ITALY	(7) FREQ. OF FAILURE/YEAR/UNIT HONO	(8) GUAM	(9) NORF	(10) ITALY
16	AN/FGC-38	24				6			
17	AN/FGC-67	30	40		-	6	-		-
18	AN/FGC-69	18				3			
19	AN/FGC-71	18				6			
20	AN/FGC-66		16.7				-		
21	AN/FPT-11	115	520			6	4		
22	AN/FRC-149	58.4+60				55			
23	AN/UGA-4	2	3.8			1	5.5		
24	AN/URA-38				-				-
25	AS-1862 FRC		99.3				3.2		
26	BAUER 707		36				1		
27	CBTB-252-2	-				-			
28	CBVB-HTR-6	-				-			
29	CCLX-BXP-ID	-				-			
30	CCLX-KIT-155	20				4			

TABLE II-4: MAINTENANCE MANPOWER REQUIREMENTS – CORRECTIVE MAINTENANCE REQUIRED (PART A, CONT'D)

(1) MAINT. NO.	(2) EQUIPMENT TYPE	(3) CM REQ. MH/YEAR/UNIT HONO	(4) GUAM	(5) NORF	(6) ITALY	(7) FREQ. OF FAILURE/YEAR/UNIT HONO	(8) GUAM	(9) NORF	(10) ITALY
31	CCLX-TER-25K	-				-			
32	CCLX-TER-25K-0-50U	-				-			
33	CCMX-63.	-				-			
34	CLX-TER-5000	-				-			
35	CLX-529A	-				-			
36	CHC-SP-600	-				-			
37	COL-143A-1	-				-			
38	CPTC-LF-50K	-				-			
39	CU-656	-				-			
40	CU-873	-				-			
41	DA-395/URT	-				-			
42	DA-446/FRT	-				-			
43	DA-484/URT	-	.19		-	-	.09		-
44	GRC-169			47				3	
45	KW-7/TSEC	0.5			-	0.5			-

TABLE II-4: MAINTENANCE MANPOWER REQUIREMENTS – CORRECTIVE MAINTENANCE REQUIRED (PART A, CONT'D)

(1) MAINT. NO.	(2) EQUIPMENT TYPE	(3) CM REQ. MH/YEAR/UNIT HONO	(4) GUAM	(5) NORF	(6) ITALY	(7) FREQ. OF FAILURE/YEAR/UNIT HONO	(8) GUAM	(9) NORF	(10) ITALY
46	KY-554/URT	-				-			
47	KY-555/FRT			4.8	-			3	-
48	M/C 5102A		0.8				1.2		
49	PP 125		0.3				2		
50	PP 227		0.1				1		
51	PP 842		0.2				2		
52	PS-1-67-57	-				-			
53	R-20	-				-			
54	R-391	89.1				7.4			
55	R-1051	9		5	-	1.5		3	-
56	R-1401/G	-				-			
57	SA-1551		1.8	3.2			.05	4	
58	SB-3192			11.8				2	
59	SB-3192A		-				-		
60	SB-3189		-	25			-	-	

TABLE II-4: MAINTENANCE MANPOWER REQUIREMENTS – CORRECTIVE MAINTENANCE REQUIRED (PART A, CONT'D)

(1) MAINT. NO.	(2) EQUIPMENT TYPE	(3) CM REQ. MH/YEAR/UNIT HONO	(4) GUAM	(5) NORF	(6) ITALY	(7) FREQ. OF FAILURE/YEAR/UNIT HONO	(8) GUAM	(9) NORF	(10) ITALY
61	SMD-203130-1	-				-			
62	TAR-7	11	59.3			0.5	3.3		
63	TD-9 8	1	3.5			1	3		
64	TH-39			7.4				3	
65	TH-39A/UGT	5.2				4			
66	TH-39B/UGT	5.2	5.1		-	4	2.5		-
67	TTG-2	-				-			
68	UCC-4			43				1	
69	2153			10				13	
70	12912		3.1				3.1		
71	ANTENNA INSPECTION		-				-		
72	ANTENNA MAINTENANCE			-				3	
73	COLLINS 237-A-1		-				-		
74	COLLINS 237-B-1		54				1.2		
75	CONICAL MONOPOLE	-	36			.3	.1		

TABLE II-4: MAINTENANCE MANPOWER REQUIREMENTS – CORRECTIVE MAINTENANCE REQUIRED (PART A, CONT'D)

(1) MAINT. NO.	(2) EQUIPMENT TYPE	(3) CM REQ. MH/YEAR/UNIT HONO	(4) GUAM	(5) NORF	(6) ITALY	(7) FREQ. OF FAILURE/YEAR/UNIT HONO	(8) GUAM	(9) NORF	(10) ITALY
76	DEHYDRATORS		21.9				1.6		
77	HORIZONTAL DOUBLET		-				-		
78	HPCMP GRANGER 774		8				1.5		
79	INST TRANS PATCH + TEST FAC			4.[illegible]				-	
80	INVERTED CONE MONOCONE	-				.08			
81	INVERTED DISCONE		1.4				.1		
82	LPA	-				.17			
83	MARCONI		12				.8		
84	PATCH + TEST FACILITY			832				-	
85	REPLACE TOWER LIGHTS		-				-		
86	RHOMBIC	-	6.7			.14	.3		
87	RLPA	-				.17			
88	SLEEVE		7.6				.2		
89A	TEST EQUIPMENT (HONO)	0.2				.1			
89B	TEST EQUIPMENT (ITALY)				-				-

TABLE II-4: MAINTENANCE MANPOWER REQUIREMENTS – CORRECTIVE MAINTENANCE REQUIRED (PART A, CONT'D)

(1) MAINT. NO.	(2) EQUIPMENT TYPE	(3) CM REQ. MH/YEAR/UNIT HONO	(4) GUAM	(5) NORF	(6) ITALY	(7) FREQ. OF FAILURE/YEAR/UNIT HONO	(8) GUAM	(9) NORF	(10) ITALY
9[illegible]	TRANSMISSION LINE TESTING		-				-		
91	UG ANTENNA		-				-		
92	VERTICAL DOUBLET		-				-		
93	VLF	-				-			
9[illegible]	WHIP ANT.		-				?		
9[illegible]	[illegible] FT. LF ANTENNA		-				-		
9[illegible]	OTHERS	-				.[illegible]			

TABLE II-4: MAINTENANCE MANPOWER REQUIREMENTS – CORRECTIVE MAINTENANCE REQUIRED (PART B)

(1) MAINT. NO.	(2) EQUIPMENT TYPE	(11) HONO	(12) GUAM	(13) NORF	(14) ITALY
		MEAN MAN HOURS TO REPAIR			
1	AN/FRT-19	11.2			
2	AN/FRT-39	[illegible].9	5.9	1[illegible]	2.9
3	AN/FRT-4[illegible]	2.2	8	2[illegible]	5.5
4	STRAPPED AN/FRT-4[illegible]	[illegible].6			
5	AN/FRT-52		85		
6	AN/FRT-7[illegible]		4.5		
7	AN/FRT-72	3	15.6	2[illegible].3	
8	AN/FRT-72	-			
9	AN/FRT-83			15.[illegible]	6.4
1[illegible]	AN/FRT-84		4.5	24.3	
11	AN/FRT-85		14.0	24	
12	AD2		1.3		
13	AM-413	4.3	2.6		-
14	AMP 728		.5		
15	AN/FGC-1[illegible]	.7			

TABLE II-4: MAINTENANCE MANPOWER REQUIREMENTS – CORRECTIVE MAINTENANCE REQUIRED (PART B, CONT'D)

(1) MAINT. NO.	(2) EQUIPMENT TYPE	(11) MEAN MAN HOURS TO REPAIR HONO	(12) GUAM	(13) NORF	(14) ITALY
16	AN/FCC-38	[illegible]			
17	AN/FCC-57	5	1.3		-
18	AN/FCC-69	6			
19	AN/FCC-71	3			
20	AN/FGC-60		.9		
21	AN/FPT-11	19.1	47.3		
22	AN/FRC-149	1.1+			
23	AN/UGA-4	2	.7		
24	AN/URA-38				-
25	AS-1862 FRC		5.2		
26	BAUER 747		12		
27	CBTB-252-2	-			
28	CBVB-HTR-6	-			
29	CCLX-BXP-ID	-			
30	CCLX-KIT-155	5			

TABLE II-4: MAINTENANCE MANPOWER REQUIREMENTS – CORRECTIVE MAINTENANCE REQUIRED (PART B, CONT'D)

(1) MAINT. NO.	(2) EQUIPMENT TYPE	(11) MEAN MAN HOURS TO REPAIR HONO	(12) GUAM	(13) NORF	(14) ITALY
31	CCLX-TER-25K	-			
32	CCLX-TER-25K-0-500	-			
33	CDMX-630	-			
34	CLX-TER-5000	-			
35	CLX-529A	-			
36	CHC-SP-600	-			
37	COL-143A-1	-			
38	CPTC-LF-50K	-			
39	CU-656	-			
40	CU-873	-			
41	DA-395/URT	-			
42	DA-446/FRT	-			
43	DA-484/URT	-	1		-
44	GRC-169			15.7	
45	KW-7/TSEC	1			-

TABLE II-4: MAINTENANCE MANPOWER REQUIREMENTS – CORRECTIVE MAINTENANCE REQUIRED (PART B, CONT'D)

(1) MAINT. NO.	(2) EQUIPMENT TYPE	(11) MEAN MAN HOURS TO REPAIR HONO	(12) GUAM	(13) NORF	(14) ITALY
46	KY-554/URT	-			
47	KY-555/FRT			1.6	-
48	M/C 5102A		0.6		
49	PP 125		0.1		
50	PP 227		0.1		
51	PP 8-2		0.1		
52	PS-1-67-57	-			
53	R-20	-			
54	R-390	12			
55	R-1051	6		1.7	-
56	R-14 1/G	-			
57	SA-1551		19	.9	
58	SB-3 92			5.9	
59	SB-3.92A		-		
60	SB-3189		-	5.3	

TABLE II-4: MAINTENANCE MANPOWER REQUIREMENTS – CORRECTIVE MAINTENANCE REQUIRED (PART B, CONT'D)

(1) MAINT. NO.	(2) EQUIPMENT TYPE	(11) MEAN MAN HOURS TO REPAIR HONO	(12) GUAM	(13) NORF	(14) ITALY
61	SMD-203130-1	-			
62	TAB-7	22	18		
63	TD-9 8	1	1.2		
64	TH-39			2.5	
65	TH-39A/UGT	1.3			
66	TH-39B/UGT	1.3	2.0		-
67	TTG-2	-			
68	UCC-4			4[illegible]	
69	2153			7.7	
70	12912		0.8		
71	ANTENNA INSPECTION		-		
72	ANTENNA MAINTENANCE			-	
73	COLLINS 237-A-1		-		
74	COLLINS 237-B-1		45		
75	CONICAL MONOPOLE	-	1.8		

TABLE II-4: MAINTENANCE MANPOWER REQUIREMENTS – CORRECTIVE MAINTENANCE REQUIRED (PART B, CONT'D)

(1) MAINT. NO.	(2) EQUIPMENT TYPE	(11) HONO	(12) GUAM	(13) NORF	(14) ITALY
		MEAN MAN HOURS TO REPAIR			
76	DEHYDRATORS		0.6		
77	HORIZONTAL DOUBLET		-		
78	HPCMP GRANGER 774		16		
79	INST TRANS PATCH + TEST FAC			-	
8	INVERTED CONE MONOCONE	-			
81	INVERTED DISCONE		1.4		
82	LPA	-			
83	MARCONI		3		
84	PATCH + TEST FACILITY			-	
85	REPLACE TOWER LIGHTS		-		
86	RHOMBIC	-	.7		
8	RLPA	-			
88	SLEEVE		-		
89A	TEST EQUIPMENT (HONO)	-			
89B	TEST EQUIPMENT (ITALY)				-

TABLE II-4: MAINTENANCE MANPOWER REQUIREMENTS – CORRECTIVE MAINTENANCE REQUIRED (PART B, CONT'D)

(1) MAINT. NO.	(2) EQUIPMENT TYPE	(11) MEAN MAN HOURS TO REPAIR HONO	(12) GUAM	(13) NORF	(14) ITALY
90	TRANSMISSION LINE TESTING		-		
91	UG ANTENNA		-		
92	VERTICAL DOUBLET		-		
93	VLF	-			
94	WHIP ANT.		-		
95	400 FT. LF ANTENNA		-		
96	OTHERS	-			

TABLE II-5

OTHER NON-CM JOBS

RECURRING EXTRA JOBS

(1) Maintenance number	(2) Equipment type	(3) Job description	(4) Man-hours required
Honolulu			
7	AN/FRT-72	Modulator checks and tube socket rotation done weekly	90.1
15	AN/FCC-17	Scope creek evaluation	43
17	AN/FCC-67	R-1 done 20 times/yr	10
18	AN/FCC-69	R-1 done 20 times/yr	10
19	AN/FCC-71	R-1 done 20 times/yr	10
22	AN/FRC-149	Scope creek evaluation	214.0
61	SMD-203130-1	Picking up equipment for transportation to Cal Lab	.2
89	Test equip	M-1 done 12 times/yr at additional 32.4 hr	1,069.2
		M-2 requires equipment be collected, cleaned, and transported to calibration activity and picked up and redistributed to the building at an extra 1,036.8 hr	1,036.8
Guam			
2,3,5,6	AN/FRT-39,-40, -62,-70	PM of synthesizer semiannually (exciter stack alignment and maintenance). The synthesizer is removed from transmitter, taken to RFI-shielded room, cleaned, aligned, and necessary repairs made	1,472 1,344 64 224 3,104
3	AN/FRT-40	PM overhaul of 15 transmitters; does not include testing and accepting transmitter by operators. Time includes all work, travel time for tools, parts, etc., inspection, testing, and accepting work by supervisors, logging time, parts and money expended, and breaks taken	5,805
90	Transmission line testing	Pressure testing of new lines	26
Norfolk			
2,3	AN/FRT-39,-40	Overhauls of 10 FRT-40s and 20 FRT-39s. Overhaul consists of transmitter disassembly for inspection and cleaning. This includes all silver-plated parts, tuning mechanisms, and tube cavities. All wiring harness and RF cabling are thoroughly examined and repaired/replaced as necessary. Relay and high-voltage contacts are refaced or replaced. Components that seem to be deteriorated or burned, etc., are replaced. Synthesizers are completely checked out and aligned. Transmitters are reassembled and placed back into operation. Average overhaul times are 34 + 25 hr for part replacement (59 hr total) for the FRT-39, and 60 + 50 hr for part replacement (110 hr total) for the FRT-40. Part replacement consists of rebuilding resistor board, refacing contacts, replacing wiring harness, machine shop work, etc.	1,180 1,100
		Adjusting loops and synch (FRT-39)	3,832.5
		(FRT-40)	2,628

TABLE II-5 (Cont'd.)

(1) Maintenance number	(2) Equipment type	(3) Job description		(4) Man-hours required
Italy				
2,3	AN/FRT-39,-40	Power outages cause additional PM:		
		• Align CCL and CHG when performing a Q-2 quarterly (8 man-hours/unit)	(FRT-39)	88
			(FRT-40)	20
		• R-1 done quarterly; other stations may perform annually if few or no power failures (8 man-hours/unit)	(FRT-39)	88
			(FRT-40)	20
9	AN/FRT-83	Because of rapid dirt accumulation requiring cleaning weekly instead of monthly. Additional PM required:		
		M-1 = 4 man-hours per equipment		28
		Q-1 = 4.8 man-hours per equipment		33.6
		Nonrecurring extra jobs		
Guam				
59	SB3092A	Making cross connects, record keeping, installations, changes, labeling, and drawing plans		1,900
60	SB3189	Making cross connects, record keeping, installations, changes, labeling, and drawing plans		360
78	HCMP Granger 774	Connecting antennas to the Delta Patch panels		70
92	Vertical doublet	Reconfiguring antennas for new frequencies		260

TABLE II-6

RESULTS OF MAINTENANCE ANALYSIS

	Hono	Guam	Norfolk	Italy[a]	SCA approved	Op-124
1. PMS standard (man-hours/yr)	20,536.0	17,058.4	8,341.4	1,417.0	-	-
2. Total PM req (man-hours/yr, including all extra jobs)	15,199.7	28,066.0	18,750.4	1,694.6	-	-
3. Extra non-CM jobs (man-hours/yr)	2,483.3	11,525.0	8,740.5	277.6	-	-
4. Conventional PM (man-hours/yr)	12,716.4	16,541.0	10,009.9	1,417.0	-	-
5. CM req (man-hours/yr)	5,666.3	17,227.9	26,513.4	537.3	-	-
6. (PM req + CM req)/PMS	1.0	2.7	5.4	1.6	3	2.94
7. PM req/PMS	0.7	1.6	2.2	1.2	1.5	1.47
8. Conventional PM req/PMS	0.6	1.0	1.2	1.0	1.5	1.47
9. Extra jobs/PMS	0.1	0.7	1.0	0.2	-	-
10. CM req/(PMS x 1.47)	0.2	0.7	2.2	0.3	1	1
11. CM req/PMS	0.3	1.0	3.2	0.4	1.47	1.47

[a]Analysis based on incomplete data submitted.

TABLE II-7

CM UNIT VALUES DERIVED FROM MDCS DATA

		Hono			Guam			Norfolk			Italy		
Equipment	Model	Number	MDCS man-hours/ yr/unit	Man-hours/yr/ unit reported to OEG	Number	MDCS man-hours/ yr/unit	Man-hours/yr / unit reported to OEG	Number	MDCS man-hours/ yr/unit	Man-hours/yr / unit reported to OEG	Number	MDCS man-hours/ yr/unit	Man-hours/yr/ unit reported to OEG
FRT-39	A	12	29.4					--	--				
	B	24	49.0					8	64.8				
	D	26	47.2					18	111.9				
	E	6	31.1					--	--				
	G	1	78.6					4	67.0				
	K	4	25.9					--	--				
	LK	-	-					5	38.3				
		73	42.8	27.8				35	89.1	253.9			
FRT-40	-	3	257.6					--	--				
	A	9	50.8					1	69.0				
	B	33	67.9					19	130.8				
	C	10	99.8					4	32.0				
	G	1	12.9					--	--				
	H	-	-					--	--				
		56	80.0	50.8				24	111.8	408.1			
FRT-72	A							1	124.5	487.5			
FRT-83	-							10	53.8	156.0	7	31.2	35.8
FRT-84	-				11	51.6	66.7	10	64.5	139.7			
FRT-85	-				8	39.4	107.7	1	43.0	288.0			
GPC-169	-							1	10.	47.0			

TABLE II-β

TOTAL CM MAN-HOURS REQUIRED AS DERIVED FROM MDCS DATA

Equipment	Hono		Guam		Norfolk		Italy	
	Total man-hours/yr MDCS	Total man-hours/yr reported to OEG	Total man-hours/yr MDCS	Total man-hours/yr reported to OEG	Total man-hours/yr MDCS	Total man-hours/yr reported to OEG	Total man-hours/yr MDCS	Total man-hours/yr reported to OEG
FRT-39	3124.4	2029.4			3118.1	8956.5		
FRT-40	4480	2844.8			2682.2	9794.4		
FRT-72					124.5	487.5		
FRT-83					538.0	1560.0	218.4	250.6
FRT-84			567.6	733.7	645.0	1397.0		
FRT-85			315.2	861.6	43.0	288.0		
GRC-169					10.0	47.0		
Totals	7604.4	4937.2	882.8	1595.3	7160.8	22530.4	218.4	250.6
Ratio (MDCS:OEG)	1.5		0.6		0.3		0.9	

TABLE II-9

RESULTS OF MAINTENANCE ANALYSIS (REVISED)

	Hono		Guam		Norfolk		Italy			
	OEG Data	MDCS Data	OEG Data	MDCS Data	OEG Data	MDCS Data	OEG Data	MDCS Data	SCA Approved	Op-124
1. PMS Standard (man-hours/yr)	20,536	20,536	17,058.4	17,058.4	3,841.4	3,841.4	1,417.0	1,417.0	--	--
2. Total PM req. (man-hours/yr, including all extra jobs)	15,199.7	15,199.7	28,066.0	28,066.0	18,750.4	18,750.4	1,694.6	1,694.6	--	--
3. Extra non-CM jobs (man-hours/yr)	2,483.3	2,483.3	11,525.0	11,525.0	8,740.5	8,740.5	277.6	277.6		
4. Conventional PM (man-hours/yr)	12,716.4	12,716.4	16,541.0	16,541.0	10,009.9	10,009.9	1,417.0	1,417.0		
5. CM req. (man-hours/yr)	5,666.3	8,499.5	17,227.9	10,336.7	26,513.4	7,954.0	537.3	483.6	--	--
6. (PM req. & CM req.)/PMS	1.0	1.2	2.7	2.3	5.4	3.2	1.6	1.5	3	2.94
7. PM req./PMS	.7	.7	1.6	1.6	2.2	2.2	1.2	1.2	1.5	1.47
8. Conventional PM req./PMS	.6	.6	1.0	1.0	1.2	1.2	1.0	1.0	1.5	1.47
9. Extra jobs/PMS	.1	.1	.7	.7	1.0	1.0	.2	.2		
10. CM req./(PMS x 1.47)	.2	.3	.7	.4	2.2	.6	.3	.2	1	1
11. CM req./PMS	.3	.4	1.0	.6	3.2	1.0	.4	.3	1.47	1.47

TABLE II-10

COMPARISON OF MAINTENANCE RATIOS

	Honolulu					Guam			
	Trans. OEG	Trans. MDCS	EMD 1	EMD 2	Rec.	Trans. OEG	Trans. MDCS	EMD	Rec.
PM req + CM req/PMS	1.0	1.2	1.2	1.5	1.1	2.7	2.3	1.4	1.2
PM req/PMS	0.7	0.7	1.0	1.0	1.0	1.6	1.6	1.0	1.0
Conv PM req/PMS	0.6	0.6	1.0	1.0	0.9	1.0	1.0	1.0	1.0
Extra jobs/PMS	0.1	0.1	-	0.1	0.1	0.7	0.7	-	-
CM req/PMS	0.3	0.4	0.2	0.5	0.1	1.0	0.6	0.4	0.2

	Norfolk				Italy[a]				SCA	
	Trans. OEG	Trans. MDCS	EMD	Rec.	Trans. OEG	Trans. MDCS	EMD	Rec.	Approved	Op-124
PM req + CM req/PMS	5.4	3.2	2.0	2.0	1.6	1.5	1.8	1.3	3.0	2.94
PM req/PMS	2.2	2.2	1.0	0.9	1.2	1.2	1.0	0.9	1.5	1.47
Conv PM req/PMS	1.2	1.2	1.0	0.9	1.0	1.0	1.0	0.9	1.5	1.47
Extra jobs/PMS	1.0	1.0	-	-	0.2	0.2	-	0.01	-	-
CM req/PMS	3.2	1.0	1.0	1.0	0.4	0.3	0.8	0.4	1.47	1.47

[a]Analysis based on incomplete data submitted.

TABLE II-11

OPERATOR PM RATIOS

	Operator PMS standard	Total PMS standard	Operator-to-total PMS ratio
Honolulu	7,426.4	20,536	0.36
Guam	5,296.1	17,058	0.31
Norfolk	6,556.1	8,279[a]	0.79
Italy	302.4[b]	1,745[c]	0.17

[a]Differs from total PMS figure in table II-6 because the Patch and Test facility is not included; no breakdown of operator and maintenance technician PM times is available.

[b]The operator PM time for the FRT-40 is an estimate based on the ratio of operator PM-to-total PM time of the FRT-39. This was done because the breakdowns of operator PM and maintenance technician PM times were incorrect (did not add up to total PM time).

[c]Differs from total PMS figure in table II-6 because it was based on all equipment for which operator and total PMS times are available.

TABLE III-1A: OPERATIONAL EFFORT VS. USAGE (CONTINUOUS SYSTEMS) (PART A)

(1)/(2) SYSTEM DESCRIPTION/ EQUIPMENT TYPE	(3) OPERATING HOURS (UPTIME) HONO	(4) GUAM	(5) NORF	(6) ITALY	(7) NUMBER OF TUNINGS/RETUNINGS HONO	(8) GUAM	(9) NORF	(10) ITALY
1 SECONDARY SHIP/SHORE								
FRT-39		43800				8		
FRT-84		8760				134		
2 PRIMARY SHIP/SHORE								
FRT-39	35040	26280	8760		124	800	3[illegible]	
FRT-40		26280				96		
FRT-85		8760				4		
FRT-84		8760				102		
FRT-83			8760				24	
3 MULTI-CHNL BCST								
FRT-40	26280	52560	26280		223	66	93	
STRAPPED FRT-40	17520				2			
FRT-72	8760		8760		52		288	
FRT-39	8760	17520	17520	10139	55	26	60	61
FRT-83			8760				24	

TABLE III-1A: OPERATIONAL EFFORT VS. USAGE (CONTINUOUS SYSTEMS) (PART A, CONT'D)

(1)/(2) SYSTEM DESCRIPTION/ EQUIPMENT TYPE	(3) OPERATING HOURS (UPTIME) HONO	(4) GUAM	(5) NORF	(6) ITALY	(7) NUMBER OF TUNINGS/RETUNINGS HONO	(8) GUAM	(9) NORF	(10) ITALY
4 SINGLE CHNL BCST								
FRT-40		26280				84		
STRAPPED FRT-40	17520				68			
FRT-39	8760	35040			46	34		
FRT-39/40				13246				56
5 COMPOSITE GENERAL BCST								
STRAPPED FRT-40	26280				6			
FRT-40	26280				58			
FRT-39	17520				100			
6 ASW SINGLE CHNL								
FRT-39		26280				84		
FRT-40		8760				2		
FRT-83				8368				20
FRT-84		8760				16		
7 HIGH COMMAND NET								
FRT-39			26280				9	

TABLE III-1A: OPERATIONAL EFFORT VS. USAGE (CONTINUOUS SYSTEMS) (PART A, CONT'D)

(1)/(2) SYSTEM DESCRIPTION/ EQUIPMENT TYPE	(3) OPERATING HOURS (UPTIME) HONO	(4) GUAM	(5) NORF	(6) ITALY	(7) NUMBER OF TUNINGS/RETUNINGS HONO	(8) GUAM	(9) NORF	(10) ITALY
8 FACSIMILE BCST								
STRAPPED FRT-40	26280				118			
FRT-39	8760	26280			29	16		
FRT-40	8760	26280			103	24		
9 SUBMARINE BCST								
STRAPPED FRT-40	26280				11			
FRT-40	26280	17520			103	192		
FRT-39	17520				105			
FRT-64	8760				-			
FRT-72		8760				58		
10 SUBMARINE SHIP/SHORE								
FRT-39	26280				66			
11 WAHIAWA/ENIWETOK								
FRT-40	26280				76			
STRAPPED FRT-40	26280				8			

TABLE III-1A: OPERATIONAL EFFORT VS. USAGE (CONTINUOUS SYSTEMS) (PART A, CONT'D)

(1)/(2) SYSTEM DESCRIPTION/ EQUIPMENT TYPE	(3) OPERATING HOURS (UPTIME) HONO	(4) GUAM	(5) NORF	(6) ITALY	(7) NUMBER OF TUNINGS/RETUNINGS HONO	(8) GUAM	(9) NORF	(10) ITALY
12 COAST GUARD								
FRT-39	26280	26280	26280		91	236	97	
FRT-70		17520				28		
TAB		17520				26		
FRT-83				11986				665
FRT-84		8760				118		
FRT-40		8760				4		
13 ABK DCS CIRCUIT								
FRT-40		17520				2		
FRT-39		8760				514		
14 HICOM SINGLE CHNL								
FRT-40		17520				994		
FRT-84		8760				2		
FRT-85		8760				26		
15 NWC MULTI-CHNL PT-TO-PT								
FRT-40		17520				2962		

TABLE III-1A: OPERATIONAL EFFORT VS. USAGE (CONTINUOUS SYSTEMS) (PART A, CONT'D)

(1)/(2) SYSTEM DESCRIPTION/ EQUIPMENT TYPE	(3) OPERATING HOURS (UPTIME) HONO	(4) GUAM	(5) NORF	(6) ITALY	(7) NUMBER OF TUNINGS/RETUNINGS HONO	(8) GUAM	(9) NORF	(10) ITALY
15 NWC MULTI-CHNL PT-TO-PT								
FRT-39		8760				4		
16 NORATS SHIP/SHORE								
FRT-39	17520		8760		279		3	
17 SACLANT HIGH COMMAND NET								
FRT-39			17520				6	
18 NORATS SINGLE CHNL								
FRT-39		17520				592		
FRT-40		8760				2		
FRT-84		8760				4[illegible]		
19 NATO SINGLE CHNL SHIP/SHORE								
FRT-39			17520				5	
20 SHIPS TO NAVAIR ACTIVITIES								
FRT-39	17520				95			
21 TACTICAL SHORE STA PT-TO-PT								
FRT-39			17520				6	

TABLE III-1A: OPERATIONAL EFFORT VS. USAGE (CONTINUOUS SYSTEMS) (PART A, CONT'D)

(1)/(2) SYSTEM DESCRIPTION/ EQUIPMENT TYPE	(3) OPERATING HOURS (UPTIME) HONO	(4) GUAM	(5) NORF	(6) ITALY	(7) NUMBER OF TUNINGS/RETUNINGS HONO	(8) GUAM	(9) NORF	(10) ITALY
22 TACAMO REBROADCAST								
FRT-39	17520				28			
STRAPPED FRT-40	8760				2			
FRT-40	8760				13			
23 AIR-TO-GROUND (HIGH COMMAND)								
FRT-83			17520				1468	
FRT-39			17520				1476	
FRT-40			8760				738	
24 SHIP COMM RFCS								
FRT-39				15136				9-1
26 COMFAIR HAW COMPNET								
FRT-39	8760				95			
27 FLEET DRILL CIRCUIT								
FRT-39	8760				35			
28 FLEET/FMF TRAINING								
FRT-39	8760				31			

TABLE III-1A: OPERATIONAL EFFORT VS. USAGE (CONTINUOUS SYSTEMS) (PART A, CONT'D)

(1)/(2) SYSTEM DESCRIPTION/ EQUIPMENT TYPE	(3) OPERATING HOURS (UPTIME) HONO	(4) GUAM	(5) NORF	(6) ITALY	(7) NUMBER OF TUNINGS/RETUNINGS HONO	(8) GUAM	(9) NORF	(10) ITALY
29 SOUNDER								
FPT-11	8760				58			
30 FLEET SINGLE CHNL BCST								
FRT-19	8760				17			
STRAPPED FRT-40	8760				11			
FRT-40	8760				99			
31 NWC DCS CIRCUIT								
FRT-85		8760				4		
32 FLT SUPPORT								
FRT-39		8760				122		
FRT-40		8760				230		
FRT-84		8760				205		
FPT-85		8760				382		
33 AIR-TO-GROUND								
FPT-39			8760				3	
FPT-83			8760	15749			2+	5

TABLE III-1A: OPERATIONAL EFFORT VS. USAGE (CONTINUOUS SYSTEMS) (PART A, CONT'D)

(1)/(2) SYSTEM DESCRIPTION/ EQUIPMENT TYPE	(3) OPERATING HOURS (UPTIME) HONO	(4) GUAM	(5) NORF	(6) ITALY	(7) NUMBER OF TUNINGS/RETUNINGS HONO	(8) GUAM	(9) NORF	(10) ITALY
34 SIMPLEX SUB SUPPORT								
FRT-39			8760				3	
35 RASPBERRY AIR-TO-GROUND								
FRT-39			8760				3	
36 CHL SHORE-TO-SHORE VFCT								
FRT-39				8568				699
37 NGR SHORE-TO-SHORE VFCT								
FRT-39				8532				4 1

TABLE III-1A: OPERATIONAL EFFORT VS. USAGE (CONTINUOUS SYSTEMS) (PART B)

(1)/(2) SYSTEM DESCRIPTION/ EQUIPMENT TYPE	(11) RELATIONSHIP OF TUNING-RETUNING TO USAGE OP. HRS. PER RETUNING/TUNING PER 1000 HRS. UT HONO	(12) GUAM	(13) NORF	(14) ITALY	(15) OPERATING MHRS PER 1000 HRS UT HONO	(16) GUAM	(17) NORF	(18) ITALY
1 SECONDARY SHIP/SHORE								
FRT-39		5475/.2				0.02		
FRT-84		65.4/15.3				0.8		
2 PRIMARY SHIP/SHORE								
FRT-39	282.6/3.5	32.9/30.4	292/3.4		0.7	2.7	0.7	
FRT-40		273.8/3.7				0.4		
FRT-85		2190/.5				0.02		
FRT-84		85.9/11.6				0.5		
FRT-83			365/2.7				0.3	
3 MULTI-CHNL BCST								
FRT-40	117.8/8.5	796.4/1.3	282.6/3.5		1.7	0.1	0.9	
STRAPPED FRT-40	8760/.1				0.2			
FRT-72	168.5/5.9		30.4/32.9		1.3		4.6	
FRT-39	159.3/6.3	625.7/1.6	292/3.4	166.2/6.0	1.2	0.1	0.7	0.9
FRT-83			365/2.7				0.3	

TABLE III-1A: OPERATIONAL EFFORT VS. USAGE (CONTINUOUS SYSTEMS) (PART B, CONT'D)

(1)/(2) SYSTEM DESCRIPTION/ EQUIPMENT TYPE	(11) RELATIONSHIP OF TUNING-RETUNING TO USAGE OP. HRS. PER RETUNING/TUNING PER 1000 HRS. UT				(15) OPERATING MHRS PER 1000 HRS UT			
	HONO	GUAM	NORF	ITALY	HONO	GUAM	NORF	ITALY
4 SINGLE CHNL BCST								
FRT-40		312.9/3.2				[illegible].4		
STRAPPED FRT-40	237.6/3.9				[illegible]			
FRT-39	190.4/5.3	1030.6/1			1.[illegible]	[illegible].1		
FRT-39/40				236.5/4.2				[illegible]
5 COMPOSITE GENERAL BCST								
STRAPPED FRT-40	438[illegible]/.2				.0[illegible]			
FRT-40	453.1/2.2				[illegible].4			
FRT-39	175.2/5.7				1.1			
6 ASW SINGLE CHNL								
FRT-39		312.9/3.2				[illegible].3		
FRT-40		4380/.2				0.02		
FRT-83				418.4/2.4				0.2
FRT-84		547.5/1.8				0.1		
7 HIGH COMMAND NET								
FRT-39			292/3.4				[illegible]	

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TABLE III-1A: OPERATIONAL EFFORT VS. USAGE (CONTINUOUS SYSTEMS) (PART B, CONT'D)

(1)/(2) SYSTEM DESCRIPTION/ EQUIPMENT TYPE	(11) HONO	(12) GUAM	(13) NORF	(14) ITALY	(15) HONO	(16) GUAM	(17) NORF	(18) ITALY
	RELATIONSHIP OF TUNING-RETUNING TO USAGE OP. HRS. PER RETUNING/TUNING PER 1000 HRS. UT				OPERATING MHRS PER 1000 HRS UT			
8 FACSIMILE BCST								
STRAPPED FRT-40	222.7/4.5				.8			
FRT-39	332.1/3.3	1642.5/.6			.6	0.1		
FRT-40	85.0/11.8	1095/.9			2.3	0.1		
9 SUBMARINE BCST								
STRAPPED FRT-4[illegible]	2389.1/.4				0.1			
FRT-40	255.1/3.9	91.3/10.9			[illegible]	1.3		
FRT-39	166.9/5.9				1.1			
FRT-64	-				-			
FRT-72		151/6.6				0.7		
10 SUBMARINE SHIP/SHORE								
FRT-39	398.2/2.5				[illegible].5			
11 WAHIAWA/ENIWETOK								
FRT-40	345.8/2.9				.6			
STRAPPED FRT-4[illegible]	3285/.3				.1			

TABLE III-1A: OPERATIONAL EFFORT VS. USAGE (CONTINUOUS SYSTEMS) (PART B, CONT'D)

(1)/(2) SYSTEM DESCRIPTION/ EQUIPMENT TYPE	(11) RELATIONSHIP OF TUNING-RETUNING TO USAGE OP. HRS. PER RETUNING/TUNING PER 1000 HRS. UT				(15) OPERATING MHRS PER 1000 HRS UT			
	HONO	GUAM	NORF	ITALY	HONO	GUAM	NORF	ITALY
12 COAST GUARD								
FRT-39	288.8/3.5	111.4/8.9	292/3.4		[illegible].6	9.0	[illegible].7	
FRT-70		625.7/1.6				0.1		
TAB		673.8/1.5				1.5		
FRT-83				18.0/55.5				4.9
FRT-84		74.2/13.4				0.7		
FRT-40		2190/.5				0.1		
13 ABK DCS CIRCUIT								
FRT-40		8760/.1				.01		
FRT-39		17.0/58.7				5.8		
14 HICOM SINGLE CHNL								
FRT-40		17.6/56.7				7.0		
FRT-84		4380/.2				0.01		
FRT-85		336.9/2.9				0.2		
15 NWC MULTI-CHNL PT-TO-PT								
FRT-40		5.9/169.1				5.9		

TABLE III-1A: OPERATIONAL EFFORT VS. USAGE (CONTINUOUS SYSTEMS) (PART B, CONT'D)

(1)/(2) SYSTEM DESCRIPTION/ EQUIPMENT TYPE	(11) RELATIONSHIP OF TUNING-RETUNING TO USAGE OP. HRS. PER RETUNING/TUNING PER 1000 HRS. UT HONO	(12) GUAM	(13) NORF	(14) ITALY	(15) OPERATING MHRS PER 1000 HRS UT HONO	(16) GUAM	(17) NORF	(18) ITALY
15 NWC MULTI-CHNL PT-TO-PT								
FRT-39		2190/.5				0.5		
16 NORATS SHIP/SHORE								
FRT-39	68.2/15.9		292/3.4		5.7		0.7	
17 SACLANT HIGH COMMAND NET								
FRT-39			292/3.4				0.7	
18 NORATS SINGLE CHNL								
FRT-39		25.3/39.5				3.9		
FRT-40		4380/.2				0.02		
FRT-84		219/4.6				0.2		
19 NATO SINGLE CHNL SHIP/SHORE								
FRT-39			292/3.4				0.7	
20 SHIPS TO NAVAIR ACTIVITIES								
FRT-39	182.5/5.5				1.0			
21 TACTICAL SHORE STA PT-TO-PT								
FRT-39			292/3.4				0.7	

TABLE III-1A: OPERATIONAL EFFORT VS. USAGE (CONTINUOUS SYSTEMS) (PART B, CONT'D)

(1)/(2) SYSTEM DESCRIPTION/ EQUIPMENT TYPE	(11) RELATIONSHIP OF TUNING-RETUNING TO USAGE OP. HRS. PER RETUNING/TUNING PER 1000 HRS. UT HONO	(12) GUAM	(13) NORF	(14) ITALY	(15) OPERATING MHRS PER 1000 HRS UT HONO	(16) GUAM	(17) NORF	(18) ITALY
22 TACAMO REBROADCAST								
FRT-39	625.7/1.6				.3			
STRAPPED FRT-40	438[illegible]/.2				0.03			
FRT-40	573.8/1.5				.3			
23 AIR-TO-GROUND (HIGH COMMAND)								
FRT-83			11.9/83.8				10.4	
FRT-39			11.8/84.3				17.6	
FRT-40			11.8/84.2				21.8	
24 SHIP COMM RFCS								
FRT-39				15.1/62.2				9.8
26 COMFAIR HAW COMPNET								
FRT-39	92.2/10.8				2.[illegible]			
27 FLEET DRILL CIRCUIT								
FRT-39	250.3/4.0				.7			
28 FLEET/FMF TRAINING								
FRT-39	282.6/3.5				.7			

TABLE III-1A: OPERATIONAL EFFORT VS. USAGE (CONTINUOUS SYSTEMS) (PART B, CONT'D)

(1)/(2) SYSTEM DESCRIPTION/ EQUIPMENT TYPE	(11) RELATIONSHIP OF TUNING-RETUNING TO USAGE OP. HRS. PER RETUNING/TUNING PER 1000 HRS. UT				(15) OPERATING MHRS PER 1000 HRS UT			
	HONO	GUAM	NORF	ITALY	HONO	GUAM	NORF	ITALY
29 SOUNDER								
FPT-11	151/6.6				[illegible]			
30 FLEET SINGLE CHNL BCST								
FRT-19	515.3/1.9				[illegible]			
STRAPPED FRT-4[illegible]	796.4/1.3				.2			
FRT-40	88.5/11.3				2.2			
31 NWC DCS CIRCUIT								
FRT-85		2190/.5				0.03		
32 FLT SUPPORT								
FRT-39		71.8/13.9				1.3		
FRT-40		38.1/26.3				3.2		
FRT-84		43.8/22.8				1.1		
FRT-85		22.9/43.6				2.6		
33 AIR-TO-GROUND								
FRT-39			292/3.4				1[illegible].6	
FRT-83			365/2.[illegible]	3[illegible]2.2/2.7			1[illegible].4	[illegible].2

TABLE III-1A: OPERATIONAL EFFORT VS. USAGE (CONTINUOUS SYSTEMS) (PART B, CONT'D)

(1)/(2) SYSTEM DESCRIPTION/ EQUIPMENT TYPE	(11) HONO	(12) GUAM	(13) NORF	(14) ITALY	(15) HONO	(16) GUAM	(17) NORF	(18) ITALY
	RELATIONSHIP OF TUNING-RETUNING TO USAGE OP. HRS. PER RETUNING/TUNING PER 1000 HRS. UT				OPERATING MHRS PER 1000 HRS UT			
34 SIMPLEX SUB SUPPORT								
FRT-39			292/3.4				[illegible]	
35 RASPBERRY AIR-TO-GROUND								
FRT-39			292/3.4				[illegible]	
36 CHL SHORE-TO-SHORE VFCT								
FRT-39				12.3/31.6				12.9
37 NGR SHORE-TO-SHORE VFCT								
FRT-39				21.3/46.9				[illegible]

TABLE III-1B: OPERATIONAL EFFORT VS. USAGE (INTERMITTENTLY OPERATED SYSTEMS) (PART A)

(1)/(2) SYSTEM DESCRIPTION/ EQUIPMENT TYPE	(3) OPERATING HOURS (UPTIME) HONO	(4) GUAM	(5) NORF	(6) ITALY	(7) NUMBER OF TUNINGS/RETUNINGS HONO	(8) GUAM	(9) NORF	(10) ITALY
1 MULTI-CHNL SHIP/SHORE								
FRT-40	43110		8760		5194		1045	
FRT-39	32298		17520		3435		1562	
FRT-84			31536				2563	
FRT-83			10512				715	
FRT-85			8760				511	
STRAPPED FRT-40	3231				577			
2 NAVSECGRU SAB BCST								
FRT-39	25692				2262			
3 BCST FLOATERS								
FRT-39		2[illegible]760				146		
FRT-85		17183				92		
FRT-40		9650				283		
FRT-84		8718				158		
FRT-72		634				26		

TABLE III-1B: OPERATIONAL EFFORT VS. USAGE (INTERMITTENTLY OPERATED SYSTEMS) (PART A, CONT'D)

(1)/(2) SYSTEM DESCRIPTION/ EQUIPMENT TYPE	(3) OPERATING HOURS (UPTIME) HONO	(4) GUAM	(5) NORF	(6) ITALY	(7) NUMBER OF TUNINGS/RETUNINGS HONO	(8) GUAM	(9) NORF	(10) ITALY
4 SHIP/SHORE TERMS								
FRT-85	19576				3474			
FRT-40	18192				4364			
FRT-84	9888				2400			
FRT-39	5308				1600			
FRT-70	70				14			
5 WAHIAWA/CHRISTCHURCH								
FRT-40	15392			1999				
STRAPPED FRT-40	1909			222				
6 WAHIAWA/ADAK								
FRT-39	14655			1954				
7 YQJQ SUPPORT VFCT								
FRT-39			13395				298	
8 OSUB BCST SUPPORT								
FRT-40		13140				253		

TABLE III-1B: OPERATIONAL EFFORT VS. USAGE (INTERMITTENTLY OPERATED SYSTEMS) (PART A, CONT'D)

(1)/(2) SYSTEM DESCRIPTION/ EQUIPMENT TYPE	(3) OPERATING HOURS (UPTIME) HONO	(4) GUAM	(5) NORF	(6) ITALY	(7) NUMBER OF TUNINGS/RETUNINGS HONO	(8) GUAM	(9) NORF	(10) ITALY
9 SINGLE CHNL SHIP/SHORE								
FRT-84			12782				1859	
FRT-39			11388				770	
FRT-83			8760				671	
FRT-40			6570				814	
10 CINCPACFLT HICOM NET								
FRT-39	12463				1133			
11 WAHIAWA/MIDWAY								
FRT-40	10935				1151			
STRAPPED FRT-40	876				127			
13 ASW PATROL AIR COORDINATION								
FRT-39	9629				816			
14 NACK SUPPORT RFCS								
FRT-39				5855				450
15 BIFY SUPPORT VFCT								
FRT-39				5372				59

TABLE III-1B: OPERATIONAL EFFORT VS. USAGE (INTERMITTENTLY OPERATED SYSTEMS) (PART A, CONT'D)

(1)/(2) SYSTEM DESCRIPTION/ EQUIPMENT TYPE	(3) HONO	(4) GUAM	(5) NORF	(6) ITALY	(7) HONO	(8) GUAM	(9) NORF	(10) ITALY
	OPERATING HOURS (UPTIME)				NUMBER OF TUNINGS/RETUNINGS			
16 SHIP TRAINING CIRCUIT								
FRT-83			5020				1305	
17 NMYU SUPPORT VFCT								
FRT-39				4255				117
18 SHIP RFCS/VOX								
FRT-40				3888				66
19 SHIP SUPPORT VFCT								
FRT-39				3660				229
20 NJVF SUPPORT VFCT								
FRT-39				3375				152
21 GSPG SINGLE CHNL BCST								
FRT-39		3192				34		
FRT-84		3158				24		
FRT-40		88				24		
22 NEW SUPPORT NORATS								
FRT-39				2302				839

TABLE III-1B: OPERATIONAL EFFORT VS. USAGE (INTERMITTENTLY OPERATED SYSTEMS) (PART A, CONT'D)

(1)/(2) SYSTEM DESCRIPTION/ EQUIPMENT TYPE	(3) OPERATING HOURS (UPTIME) HONO	(4) GUAM	(5) NORF	(6) ITALY	(7) NUMBER OF TUNINGS/RETUNINGS HONO	(8) GUAM	(9) NORF	(10) ITALY
23 VOX NET								
FRT-83				2880				16
24 NABV SUPPORT VFCT								
FRT-39				2832				115
25 SUPPORT RFCS								
FRT-39				27[illegible]				223
26 DCS POINT-TO-POINT								
FRT-40			2628				152	
27 NSY SUPPORT VFCT								
FRT-39				254[illegible]				1[illegible]
28 SAR SINGLE CHNL								
FRT-70		2425				112		
FRT-84		115				16		
FRT-39		110				10		
FRT-40		8				2		
FRT-85		35				2		

TABLE III-1B: OPERATIONAL EFFORT VS. USAGE (INTERMITTENTLY OPERATED SYSTEMS) (PART A, CONT'D)

(1)/(2) SYSTEM DESCRIPTION/ EQUIPMENT TYPE	(3) OPERATING HOURS (UPTIME) HONO	(4) GUAM	(5) NORF	(6) ITALY	(7) NUMBER OF TUNINGS/RETUNINGS HONO	(8) GUAM	(9) NORF	(10) ITALY
29 NOUD SUPPORT VFCT								
FRT-39			2210				103	
30 NATO SINGLE CHNL BCST								
FRT-40		2190				24		
31 NJRS SUPPORT VFCT								
FRT-39			2160				56	
32 NNCD SUPPORT VFCT								
FRT-39			2160				71	
33 NMIB SUPPORT VFCT								
FRT-39			1780				112	
34 COMMSTA EMERG DCS ENTRY(MBL)								
FRT-39		1752				40		
FRT-40		1752				40		
35 NTJZ SUPPORT VFCT								
FRT-39			1440				78	

TABLE III-1B: OPERATIONAL EFFORT VS. USAGE (INTERMITTENTLY OPERATED SYSTEMS) (PART A, CONT'D)

(1)/(2) SYSTEM DESCRIPTION/ EQUIPMENT TYPE	(3) OPERATING HOURS (UPTIME) HONO	(4) GUAM	(5) NORF	(6) ITALY	(7) NUMBER OF TUNINGS/RETUNINGS HONO	(8) GUAM	(9) NORF	(10) ITALY
36 NABU SUPPORT VFCT								
FRT-39				1404				92
37 NATO POINT-TO-POINT								
FRT-39			1314				156	
38 VFCT/RFCS/VOX								
FRT-39				3467				42
FRT-83				1248				7
FRT-40				101				10
39 WAHIAWA/WELLINGTON								
FRT-40	868				78			
STRAPPED FRT-40	46				7			
40 SINGLE CHNL BCST								
FRT-39		720				60		
41 MTAC SUPPORT RFCS/VOX								
FRT-40				720				35

TABLE III-1B: OPERATIONAL EFFORT VS. USAGE (INTERMITTENTLY OPERATED SYSTEMS) (PART A, CONT'D)

(1)/(2) SYSTEM DESCRIPTION/ EQUIPMENT TYPE	(3) OPERATING HOURS (UPTIME) HONO	(4) GUAM	(5) NORF	(6) ITALY	(7) NUMBER OF TUNINGS/RETUNINGS HONO	(8) GUAM	(9) NORF	(10) ITALY
42 CANBERRA TEST								
FRT-40	636	996			148	210		
FRT-84		534				128		
FRT-85		64				20		
43 CINCPAC ABNCP-SINGLE CHNL								
FRT-84		578				136		
FRT-39		128				32		
FRT-40		20				10		
FRT-85		16				4		
44 FLEET MARINES DCS ENTRY(MBL)								
FRT-39			525.6				144	
45 BIG LOOK OPS-SINGLE CHNL								
FRT-84		512				98		
FRT-39		258				54		
FRT-70		20				6		
FRT-85		10				2		

TABLE III-1B: OPERATIONAL EFFORT VS. USAGE (INTERMITTENTLY OPERATED SYSTEMS) (PART A, CONT'D)

(1)/(2) SYSTEM DESCRIPTION/ EQUIPMENT TYPE	(3) OPERATING HOURS (UPTIME) HONO	(4) GUAM	(5) NORF	(6) ITALY	(7) NUMBER OF TUNINGS/RETUNINGS HONO	(8) GUAM	(9) NORF	(10) ITALY
45 BIG LOOK OPS-SINGLE CHNL								
FRT-40		4				4		
46 FMFPAC SINGLE CHNL								
FRT-85		432				44		
FRT-84		162				22		
FRT-40		34				8		
FRT-39		80				10		
47 CINCPACFLT AIRCRAFT								
FRT-40	384				63			
FRT-84		234				44		
FRT-39	152	30			33	4		
STRAPPED FRT-40	69				7			
FRT-85		52				6		
48 SHIP/SHORE SECURE VOICE								
FRT-40			350.4				62	

TABLE III-1B: OPERATIONAL EFFORT VS. USAGE (INTERMITTENTLY OPERATED SYSTEMS) (PART A, CONT'D)

(1)/(2) SYSTEM DESCRIPTION/ EQUIPMENT TYPE	(3) OPERATING HOURS (UPTIME) HONO	(4) GUAM	(5) NORF	(6) ITALY	(7) NUMBER OF TUNINGS/RETUNINGS HONO	(8) GUAM	(9) NORF	(10) ITALY
49 3RD MARDIV-SINGLE CHNL								
FRT-85	164				24			
FRT-40	104				16			
FRT-84	68				8			
50 SEAGRU DCS ENTRY(MOBILE)								
FRT-39		105.1				25		
51 TACAMO-SINGLE CHNL								
FRT-84	80				10			
52 DISASTER-SINGLE CHNL								
FRT-39	62				6			
53 CG-1ST MARDIV SINGLE CHNL								
FRT-40	50				12			
FRT-84	18				16			
FRT-85	2				2			

TABLE III-1B: OPERATIONAL EFFORT VS. USAGE (INTERMITTENTLY OPERATED SYSTEMS) (PART B)

(1)/(2) SYSTEM DESCRIPTION/ EQUIPMENT TYPE	(11) RELATIONSHIP OF TUNING-RETUNING TO USAGE OF OP. HRS PER RETUNING/RETUNING PER 1000 HRS UPTIME				(15) OPERATING MHRS PER 1000 HRS. UT			
	HONO	GUAM	NORF	ITALY	HONO	GUAM	NORF	ITALY
1 MULTI-CHNL SHIP/SHORE								
FRT-40	8.3/120.5		8.4/119.3		23.5		30.8	
FRT-39	9.4/106.4		11.2/89.2		19.7		18.5	
FRT-84			12.3/81.3				10.2	
FRT-83			14.7/68.0				8.5	
FRT-85			17.1/58.3				7.3	
STRAPPED FRT-40	5.6/178.6				33.0			
2 NAVSECGRU SAB BCST								
FRT-39	11.8/84.7				15.7			
3 BCST FLOATERS								
FRT-39		142.2/7.0				0.7		
FRT-85		186.7/5.4				0.3		
FRT-40		33.5/29.8				3.6		
FRT-84		55.2/18.1				0.9		
FRT-72		24.4/41.0				4.2		

TABLE III-1B: OPERATIONAL EFFORT VS. USAGE (INTERMITTENTLY OPERATED SYSTEMS) (PART B, CONT'D)

(1)/(2) SYSTEM DESCRIPTION/ EQUIPMENT TYPE	(11) RELATIONSHIP OF TUNING-RETUNING TO USAGE OF OP. HRS PER RETUNING/RETUNING PER 1000 HRS UPTIME				(15) OPERATING MHRS PER 1000 HRS. UT			
	HONO	GUAM	NORF	ITALY	HONO	GUAM	NORF	ITALY
4 SHIP/SHORE TERMS								
FRT-85		5.6/177.5				10.6		
FRT-40		4.5/223.4				26.8		
FRT-84		4.1/242.7				11.7		
FRT-39		3.3/301.4				26.2		
FRT-70		5/200.0				14.3		
5 WAHIAWA/CHRISTCHURCH								
FRT-40	7.7/129.8				25.3			
STRAPPED FRT-40	8.6/116.3				21.5			
6 WAHIAWA/ADAK								
FRT-39	7.5/133.3				24.7			
7 YQJQ SUPPORT VFCT								
FRT-39				44.9/22.2				3.5
8 OSUB BCST SUPPORT								
FRT-40			51.9/19.3				5.0	

TABLE III-1B: OPERATIONAL EFFORT VS. USAGE (INTERMITTENTLY OPERATED SYSTEMS) (PART B, CONT'D)

(1)/(2) SYSTEM DESCRIPTION/ EQUIPMENT TYPE	(11) RELATIONSHIP OF TUNING-RETUNING TO USAGE OF OP. HRS PER RETUNING/RETUNING PER 1000 HRS UPTIME				(15) OPERATING MHRS PER 1000 HRS. UT			
	HONO	GUAM	NORF	ITALY	HONO	GUAM	NORF	ITALY
9 SINGLE CHNL SHIP/SHORE								
FRT-84			6.8/146.4				18.3	
FRT-39			14.8/67.6				14.1	
FRT-83			13.1/76.6				9.6	
FRT-40			8.1/123.9				32.0	
10 CINCPACFLT HICOM NET								
FRT-39	11.0/90.9				16.8			
11 WAHIAWA/MIDWAY								
FRT-40	9.5/105.3				20.5			
STRAPPED FRT-40	6.9/144.9				26.7			
13 ASW PATROL AIR COORDINATION								
FRT-39	11.8/84.7				15.7			
14 NACK SUPPORT RFCS								
FRT-39				14.6/68.3				10.8
15 BIFY SUPPORT VFCT								
FRT-39				91.1/10.9				1.7

TABLE III-1B: OPERATIONAL EFFORT VS. USAGE (INTERMITTENTLY OPERATED SYSTEMS) (PART B, CONT'D)

(1)/(2) SYSTEM DESCRIPTION/ EQUIPMENT TYPE	(11) RELATIONSHIP OF TUNING-RETUNING TO USAGE OF OP. HRS PER RETUNING/RETUNING PER 1000 HRS UPTIME				(15) OPERATING MHRS PER 1000 HRS. UT			
	HONO	GUAM	NORF	ITALY	HONO	GUAM	NORF	ITALY
16 SHIP TRAINING CIRCUIT								
FRT-83			3.9/260.0				32.5	
17 NMYU SUPPORT VFCT								
FRT-39				36.4/27.5				4.3
18 SHIP RFCS/VOX								
FRT-40				58.9/16.9				3.0
19 SHIP SUPPORT VFCT								
FRT-39				16/62.6				9.9
20 NJVF SUPPORT VFCT								
FRT-39				22.2/45.0				7.1
21 GSPG SINGLE CHNL BCST								
FRT-39		93.9/10.6				1.0		
FRT-84		132/7.5				0.3		
FRT-40		3.6/27.3				31.8		
22 NEW SUPPORT NORATS								
FRT-39				3.6/279.5				44.1

TABLE III-1B: OPERATIONAL EFFORT VS. USAGE (INTERMITTENTLY OPERATED SYSTEMS) (PART B, CONT'D)

(1)/(2) SYSTEM DESCRIPTION/ EQUIPMENT TYPE	(11) RELATIONSHIP OF TUNING-RETUNING TO USAGE OF OP. HRS PER RETUNING/RETUNING PER 1000 HRS UPTIME				(15) OPERATING MHRS PER 1000 HRS. UT			
	HONO	GUAM	NORF	ITALY	HONO	GUAM	NORF	ITALY
23 VOX NET								
FRT-83				180/5.6				0.5
24 NABV SUPPORT VFCT								
FRT-39				24.6/40.6				6.4
25 SUPPORT RFCS								
FRT-39				12.1/82.5				13
26 DCS POINT-TO-POINT								
FRT-40			17.3/57.8				14.9	
27 NSY SUPPORT VFCT								
FRT-39				25.4/39.3				6.2
28 SAR SINGLE CHNL								
FRT-70		21.7/46.1				3.5		
FRT-84		7.3/137.9				7.0		
FRT-39		11/90.9				9.1		
FRT-40		24/41.7				4.2		
FRT-85		18/55.5				2.8		

TABLE III-1B: OPERATIONAL EFFORT VS. USAGE (INTERMITTENTLY OPERATED SYSTEMS) (PART B, CONT'D)

(1)/(2) SYSTEM DESCRIPTION/ EQUIPMENT TYPE	(11) RELATIONSHIP OF TUNING-RETUNING TO USAGE OF CP. HRS PER RETUNING/RETUNING PER 1000 HRS UPTIME				(15) OPERATING MHRS PER 1000 HRS. UT			
	(12) HONO	(13) GUAM	(14) NORF	ITALY	HONO	GUAM	NORF	ITALY
29 NOUD SUPPORT VFCT								
FRT-83				21.5/46.6				4.1
30 NATO SINGLE CHNL BCST								
FRT-40			91.3/11.0				2.8	
31 NJRS SUPPORT VFCT								
FRT-39				38.6/25.9				3.9
32 NNCD SUPPORT VFCT								
FRT-39				30.4/32.9				5.2
33 NMIB SUPPORT VFCT								
FRT-39				15.9/62.9				9.9
34 COMMSTA EMERG DCS ENTRY(MBL)								
FRT-39			43.8/22.8				4.7	
FRT-40			43.8/22.8				5.9	
35 NTJZ SUPPORT VFCT								
FRT-39				18.5/54.2				8.5

TABLE III-1B: OPERATIONAL EFFORT VS. USAGE (INTERMITTENTLY OPERATED SYSTEMS) (PART B, CONT'D)

(1)/(2) SYSTEM DESCRIPTION/ EQUIPMENT TYPE	(11) RELATIONSHIP OF TUNING-RETUNING TO USAGE OF OP. HRS PER RETUNING/RETUNING PER 1000 HRS UPTIME				(15) OPERATING MHRS PER 1000 HRS. UT			
	(12) HONO	(13) GUAM	(14) NORF	ITALY	HONO	GUAM	NORF	ITALY
36 NABU SUPPORT VFCT								
FRT-39				15.3/65.5				10.3
37 NATO POINT-TO-POINT								
FRT-39			8.4/118.7				24.7	
38 VFCT/RFCS/VOX								
FRT-39				32.5/12.1				1.9
FRT-83				178.3/5.6				0.5
FRT-40				10.1/99.0				17.8
39 WAHIAWA/WELLINGTON								
FRT-40	12.4/80.7				15.7			
STRAPPED FRT-40	6.6/152.2				28.3			
40 SINGLE CHNL BCST								
FRT-39		12/83.3				7.5		
41 MTAC SUPPORT RFCS/VOX								
FRT-40				20.6/48.6				8.6

TABLE III-1B: OPERATIONAL EFFORT VS. USAGE (INTERMITTENTLY OPERATED SYSTEMS) (PART B, CONT'D)

(1)/(2) SYSTEM DESCRIPTION/ EQUIPMENT TYPE	(11) RELATIONSHIP OF TUNING-RETUNING TO USAGE OF OP. HRS PER RETUNING/RETUNING PER 1000 HRS UPTIME				(12)	(13)	(14)	(15) OPERATING MHRS PER 1000 HRS. UT	(16)	(17)	(18)
	HONO	GUAM	NORF	ITALY	HONO	GUAM	NORF	ITALY			
42 CANBERRA TEST											
FRT-40	4.3/232.7	4.7/210.8						45.3	26		
FRT-84		4.2/239.7							12.4		
FRT-85		3.2/312.5							20.3		
43 CINCPAC ABNCP-SINGLE CHNL											
FRT-84		4.3/235.3							12.1		
FRT-39		4/250.							24.2		
FRT-40		2/500.							60		
FRT-85		4/250.							18.8		
44 FLEET MARINES OCS ENTRY(MBL)											
FRT-39			3.7/274.0							57.1	
45 BIG LOOK OPS-SINGLE CHNL											
FRT-84		5.2/191.4							10		
FRT-39		4.8/209.3							25		
FRT-70		3.3/300.							20.5		
FRT-85		5/200.							10		

TABLE III-1B: OPERATIONAL EFFORT VS. USAGE (INTERMITTENTLY OPERATED SYSTEMS) (PART B, CONT'D)

(1)/(2) SYSTEM DESCRIPTION/ EQUIPMENT TYPE	(11) RELATIONSHIP OF TUNING-RETUNING TO USAGE OF OP. HRS PER RETUNING/RETUNING PER 1000 HRS UPTIME				(15) OPERATING MHRS PER 1000 HRS. UT			
	HONO	GUAM	NORF	ITALY	HONO	GUAM	NORF	ITALY
45 BIG LOOK OPS-SINGLE CHNL								
FRT-40		1/1000.				125		
46 FMFPAC SINGLE CHNL								
FRT-85		9.8/101.9				6.5		
FRT-84		7.4/135.8				6.8		
FRT-40		10.5/95.2				11.9		
FRT-39		8/125.				12.5		
47 CINCPACFLT AIRCRAFT								
FRT-40	6.1/164.1				31.8			
FRT-84		5.3/188.0				9.8		
FRT-39	4.6/217.1	7.5/133.3			40.1	13.3		
STRAPPED FRT-40	9.9/101.5				18.8			
FRT-85		8.7/115.4				7.7		
48 SHIP/SHORE SECURE VOICE								
FRT-40			5.7/176.9				45.7	

TABLE III-1B: OPERATIONAL EFFORT VS. USAGE (INTERMITTENTLY OPERATED SYSTEMS) (PART B, CONT'D)

(1)/(2) SYSTEM DESCRIPTION/ EQUIPMENT TYPE	(11) RELATIONSHIP OF TUNING-RETUNING TO USAGE OF OP. HRS PER RETUNING/RETUNING PER 1000 HRS UPTIME				(15) OPERATING MHRS PER 1000 HRS. UT			
	(12) HONO	(13) GUAM	(14) NORF	ITALY	(16) HONO	(17) GUAM	(18) NORF	ITALY
49 3RD MARDIV-SINGLE CHNL								
FRT-85		6.8/146.3				9.1		
FRT-40		6.5/153.9				19.2		
FRT-84		8.5/117.6				5.9		
50 SEAGRU DCS ENTRY(MOBILE)								
FRT-39			4.2/237.9				49.5	
51 TACAMO-SINGLE CHNL								
FRT-84		8/125.				6.3		
52 DISASTER-SINGLE CHNL								
FRT-39		10.3/96.8				9.7		
53 CG-1ST MARDIV SINGLE CHNL								
FRT-40		4.2/240.				30		
FRT-84		1.1/888.9				44.4		
FRT-85		1/1000.				50		

TABLE III-2

TUNING/RETUNING UNIT TIMES
(Minutes)

(1)	(2) Honolulu	(3) Guam	(4) Norfolk	(5) Norfolk log	(6) Mean Norfolk	(7) Italy	(8) Mean site
FRT-39	11.1	5.9	12.5	8.8	10.7	9.5	9.8
FRT-40	11.7	7.4	15.5	12.8	14.2	10.6	10.2
FRT-70	-	4.5	-	-	-	-	4.5
FRT-72	13.0	6.4	8.5	-	8.5	-	8.5
FRT-83	-	-	7.5	4.2	5.9	5.3	5.8
FRT-84	-	3.1	7.5	4.9	6.2	-	4.8
FRT-85	-	3.8	7.5	-	7.5	-	4.2
Orderwire & logging	-	1.4	2.5	-	2.5	-	1.9

TABLE III-3

COMPARISON OF ESTIMATED (BY SAMPLING) VS. REPORTED TIMES FOR QUALITY CONTROL CHECKS

		Sample size	Estimated time[b] (minutes)	Reported time (minutes)
Test No. 1	Send	6	0.54 $\mp$ 0.197	-
	Receive	6	0.144 $\mp$ 0.031	Reported jointly at 0.167
Test No. 2		7	0.153 $\mp$ 0.079	
Test No. 3	Send	6	0.110 $\mp$ 0.016	0.3
	Receive	6	0.103 $\mp$ 0.021	0.3
Test No. 4		6	0.234 $\mp$ 0.065	0.27
Test No. 5		7	5.99 $\mp$ 1.057	10
Test No. 6		5[a]	5.58 $\mp$ 3.03	10

[a]One observation discarded.

[b]All confidence intervals obtained for a 90-percent confidence level using a t-statistic yield; all U_o values consistent with the data (that is, all U_o values for which the hypothesis H_o: the true average time to perform the test $U = U_o$ vs. $H_A = U \neq U_o$ would not have been rejected given the sample data at a 90-percent confidence level).

TABLE III-4

QC CHECKS DONE AT NORFOLK TRANSMITTER SITE

Test no.	Frequency per day	Average no. of channels	Average time per channel (minutes)	Average time (minutes)	Average time per day (minutes)
1S	3	1	0.54	0.54	1.62
1R	6	18	0.144	2.59	15.54
2	1	18	0.153	2.75	2.75
3S	3	3	0.11	0.33	0.99
3R	6	7	0.103	0.72	4.32
4	3	45	0.233	10.49	31.47
5	12	-	-	5.99	71.88
6	6	-	-	5.58	33.48
				Total	162.05 minutes = 2.7 hours/day = 985.5 man-hours/year

Adding the PF&D factor (17%) yields a total requirement of 1153.0 man-hours/year for the QC checks sampled.

TABLE IV-1

SUPPORT PRIMARY DUTY BILLETS

	Master Billet List	Honolulu	Guam	Norfolk
	OIC OFFICE			
2	Clerk (Typing)	Same	Clerk (Typist)	
3	Military Clerk	Personnel Petty Officer		Same (80%)
4	Communications Specialist			Same
5	Administrative Clerk	Administrative Assistant (50%)	Same (50%)	
6	CMAA	CMAA/1st Lt. Division Chief (25%)	(T) MAA (90%) (W) MAA Force (U) Guard Mail Orderly (2) (V) Security Force (2)	
	SUPPLY DIVISION			
8	Supervisory Supply Clerk	Supply Officer (50%)	Supply Clerk - 50 Dept[b]	PO Inc Ready Supply Store (50%)
9	Supply Clerk	Same		Same
10	Storekeeper	Assistant Supply Officer		
11	Galley Chief	Food Services Petty Officer		
12	Galley Captain	Provisions Storekeeper		
13	Watch Captain			
14	Galley Watch			Food Service Worker
15	Mess Attendant			Same (90%)
16	Cook	Same (2) (H) Exchange Operations Supervisor (40%) (I) Exchange Operator (2) (D) ATCU Supply Clerk		(I) Asst. Resident Asst. Navy Exchange Officer (J) Sales Clerk

[a] Functional support to Operations.

[b] Functional support to Maintenance.

TABLE IV-1 (Cont'd.)

SUPPORT PRIMARY DUTY BILLETS

	Master Billet List	Honolulu	Guam	Norfolk	Italy
	PUBLIC WORKS DIVISION				
18	Auxiliary Equipment CPO	Engineering Chief (50%)		Diesel Eng. Mechanic	
19	Diesel Mechanic/ATCU				
20	Electric Shop CPO	Electrical Chief (75%)		Same (2)	
22	Electrician/ATCU				
26	Truck Driver	Motor Vehicle Operator		Janitor (4)	
27	Laborer (cleaner)	Janitor (7)		Security Guard	
29	Permanent Security Watch			(B) Emerg.Diesel/Fire Fighting Equip.Maint. Upkeep/MAA	
				(C) Power & Lighting Elec./Fire Fighting Equip.Maint. Upkeep/ Motion Picture Equip. Maint. Upkeep/MAA (1)	
				Same (2)	
37	Antenna Mechanic			(G) Antenna Mechanic Helper (2)	
39	Electrician	Same (2)		Same (2)	
40	Tractor Operator			Same (2)	
42	Maintenance man			Same	
43	Heating Equip. Mechanic	Engineering Maintenance			
45	Maintenance Supervisor	Same (60%)		(D) Printer (E) Air Cond.Mech. (F) Plumber	
54	Administrative Clerk	Same[a]	Same[b]		
95	Operations Training PO	Same (95%)[a]	Same (2)[b]		Training PO (90%)[b]
96	Elec. Supply PO				Same (90%)[b]
100	3M Analyst	3M Assistant (75%)[b]			

[a] Functional support to Operations.

[b] Functional support to Maintenance.

TABLE IV-2

SUPPORT COLLATERAL DUTY JOBS

Job type	Honolulu		Guam		Norfolk		Italy	
	Job number	Total man-hours	Job number	Total man-hours	Job number	Total man-hours	Job number	Total man-hours
On-the-job training	-	9,788					5	2,208
Technical (acceptance testing)			20	1,750				
Test equipment			21	480				
Cleaning	4,5,6,7	9,360	1-5,15,26, 32,35,36	6,679	3	3,458	2-3	873
Military watch (security tours, fire tours, telephone watch, etc.)	1-3	11,830	23,24,25	-	1-2	3,252		
Inspections (fire, material, etc.)	8,9	84						
Pickup and deliveries	21,22	1,599	10,11,28	720	5	1,248		
Committee meetings	14-20	865						
Counseling	13	780						
TAD (except cleaning duties)			13-15,33,34	3,520	6,7	3,312		
Vehicle, equipment, and facility care			7,9,37,38	1,068	9-11,14	7,199		
Record keeping			22,30	2,379	13	1,378		
Storm condition			6	540				
Equipment removal			8	852				
Technical control coordination					8	1,875		
Librarian					12	546		
Various service diversions and training (nonavailable time)	10-12	1,957	12,16-19,29	3,163	4	520		
Power outages							1	76.6

TABLE IV-3 CURRENT SUPPORT MANPOWER REQUIREMENT

SITE LOCATION: NAVCOMMSTA HONOLULU FUNCTION: TRANSMITTERS 12 MONTH PERIOD COVERED: From 16 Nov 73 To 15 Nov. 74

(1) JOB	(2) DESCRIPTION	(3) WORK UNIT	(4) HOURS TO COMPLETE	(5) NUMBER OF WORK UNITS PER WEEK	(6) TOTAL HOURS PER YEAR	(7) BILLET NUMBER
1. Military Watch	Station Duty Officer	Watch	5	7	1820	18,20,45,83,90, 93,95,100,103, 105,107,119,112, 125, 127,C, D.
	Tour all areas of RTF 4 times each day and ensure proper execution of colors. Each tour					
	takes one hour and a total of one hour is expended observing colors(30 minutes each for					
	morning and evening colors).					
2. Military Watch	Master-at-Arms	Watch	12.5	7	4550	3,10,39,63,102, 104,106,108,109, 111,115,126.
	Tour industrial area 8 times each day, duration of each tour is 30 minutes. Hold morning and					
	evening colors, 30 minutes each time. Maintain an alert telephone watch at OOD office 7.5 hours					
	each day.					
3. Military Watch	Assistant Master-at-Arms	Watch	15	7	5460	39,42,96,106, 109, F, I.
	Hold colors twice daily for 30 minutes each time. Collect money for meals served in station Dining					
	Hall for 3.5 hours each day. Collect money for station movie and maintain order in the station					
	theater for two hours each day. Observe sunrise and sunset (15 minutes each) and sweepdown fo					
	watch area once each watch(30 minutes). Stands phone watch at OOD office for 7.5 hours a day.					

TABLE IV-3 CURRENT SUPPORT MANPOWER REQUIREMENT

SITE LOCATION: NAVCOMMSTA HONOLULU FUNCTION: TRANSMITTERS 12 MONTH PERIOD COVERED: From 16 Nov. 73 To 15 Nov. 74

(1)	(2)	(3)	(4)	(5)	(6)	(7)
JOB	DESCRIPTION	WORK UNIT	HOURS TO COMPLETE	NUMBER OF WORK UNITS PER WEEK	TOTAL HOURS PER YEAR	BILLET NUMBER
8. Fire Inspection	Check for fire hazards in six operational buildings. (5 persons)	Tour	.5	(.25)(5 men)	32.5	105, 107, 110, 114, E.
9. Zone Inspection	Material Inspection of 6 operational buildings.	Inspection	4	.25	52	51
10. Quarters	Maintenance division quarters held for 30 min. once each week. (36 men involved)	Muster	.5	(1)(36 men)	936	125,126,C,79, 83,93,96,100,
						105,106,107/90, 108,109,110,111,
						114,115,116, E, F, G.
11. Quarters	Operations Division quarters held for 15 min. once each week. (52 men involved)	Muster	.25	(1)(52 men)	676	53,54,55,56,57, 63,65,66,72,75,
						78,95,127,B,125, 126, C, D.
12. Pers. Insp.	Personnel inspection for all operations and maintenance division personnel once each	Inspection	1	(.08)(83 men)	345.3	1, 51 and all listed in jobs
	quarter. *(83 persons)					10 and 11 abv.
13. Human Relations / Drug Education	One man available for councelling at RAP center for 3 hours each day.	Duty tour	3	5	780	106

TABLE IV-3 CURRENT SUPPORT MANPOWER REQUIREMENT

SITE LOCATION: NAVCOMMSTA HONOLULU FUNCTION: TRANSMITTERS 12 MONTH PERIOD COVERED: From 16 Nov. 73 To 15 Nov. 74

(1) JOB	(2) DESCRIPTION	(3) WORK UNIT	(4) HOURS TO COMPLETE	(5) NUMBER OF WORK UNITS PER WEEK	(6) TOTAL HOURS PER YEAR	(7) BILLET NUMBER
4. Cleaning	Maintain cleanliness of operational spaces (Building 68).	Cleaning	(1/2)(2)(7)+8= 15	(1)(2 men)	1560	57, 65.
	Hold sweepdown two times each day(30 minutes each time). Hold field day once each week (8					
	Hours). Two persons are involved at any one time in performance of these duties.					
5. Cleaning	Maintain cleanliness of Building 1. (Operational spaces)	Cleaning	(1/4)(2)(7)+8= 11.5	(1)(2 men)	1196	57, 65.
	Hold sweepdown twice daily(15 minutes each) and					
	hold field day once each week (8 hours). Two persons involved at any one time.					
6. Cleaning	Maintain cleanliness of CC1 operational spaces.	Cleaning	(1/4)(2)(7)+8= 11.5	(1)(2 men)	1196	57, 65
	Hold sweepdown two time daily (15 minutes each time) and field day once each week(8 hours).					
	Two men are involved at any one time.					
7. Cleaning	Maintain cleanliness of Mantenance Division spaces of all buildings.	Cleaning	(1)(7) + 8 = 13	(1)(8 men)	5408	79, 106, 109,
	Sweepdown each working space in 5 seperate buildings once each day(one hour) and hold					111, 116, F.
	fielday in the same five buildings once each week(6 hours). Eight men are involved at any					
	one time in accomplishing these duties.					

TABLE IV-3 CURRENT SUPPORT MANPOWER REQUIREMENT

SITE LOCATION: NAVCOMMSTA HONOLULU FUNCTION: TRANSMITTERS 12 MONTH PERIOD COVERED: From 16 Nov. 73 To 15 Nov. 74

(1) JOB	(2) DESCRIPTION	(3) WORK UNIT	(4) HOURS TO COMPLETE	(5) NUMBER OF WORK UNITS PER WEEK	(6) TOTAL HOURS PER YEAR	(7) BILLET NUMBER
14. Committee	NAVMAG exchange Advisory Board (1 man).	Meeting	4	.08	16.6	105
15. Committee	Sailor of the Quarter Board (7 men)	Meeting	3	(.08)(7 men)	87.5	50,53,56,125, 83,103,18
16. Committee	Welfare & Recreation, BEQ and EM Club Committees. (15 men) (5 men for each of the 3 committees) Each committee meeting consists of 5 persons involvement.	Meeting	1.5	(.25)(15 men)	292.5	42,45,57,65,106, 109,116,126,127, B, C, D, G.
17. Committee	Leading Chief Petty Officer Advisory Board. (one person involved)	Meeting	4	.25	52	53
18. Committee	NAVMAG Credit Union Committee. (1 man Involved)	Meeting	2	1	104	126
19. Committee	NAVMAG Recreation Council. (one man involved)	Meeting	3	.25	39	127
20. Committee	Career Counselor meeting. (one man involved)	Meeting	3	3	468	126
21. CMS Draw	CMS pick-up and turn-in to CMS custodian at Wahiawa once each month. (one man involved)	Trip	3	.25	39	53

TABLE IV-3 CURRENT SUPPORT MANPOWER REQUIREMENT

SITE LOCATION: NAVCOMMSTA HONOLULU FUNCTION: TRANSMITTERS 12 MONTH PERIOD COVERED: From 16 Nov. 73 To 15 Nov. 74

(1) JOB	(2) DESCRIPTION	(3) WORK UNIT	(4) HOURS TO COMPLETE	(5) NUMBER OF WORK UNITS PER WEEK	(6) TOTAL HOURS PER YEAR	(7) BILLET NUMBER
22. Test Eqpt. P/U & Dlvy	Test equipment pick up and delivery to Wahiawa and various operating buildings for scheduled preventive maintenance and calibrations.	Trip	2.5	12	1560	E. F.

NCS HONOLULU--FOOTNOTES TO TABLE IV-3

1. For training time concurrent with AN/FRT-39 and AN/FRT-40 PM, a new man will participate in 8 quarterly PMs and 2 annuals. The man-hours involved, as taken from the MRCs, are:

	Quarterly	Annual
FRT-39	17.6	2.0
FRT-40	29.5	1.0

Since there are twice as many AN/FRT-39s and Strapped AN/FRT-40s as there are AN/FRT-40s, 2/3 x 8 AN/FRT-39 quarterlies and 1/3 x 8 AN/FRT-40 quarterlies will be done by a new man before he is considered to be a functioning member of the PM crew. Likewise, he will accomplish about 2/3 x 2 AN/FRT-39 and 1/3 x 2 AN/FRT-40 annuals. The total training time he will receive is:

2/3 x 8 x 17.6 man-hours for AN/FRT-39	Quarterly	=	93.9 man-hours
2/3 x 1 x 2.0 man-hours for AN/FRT-39	Annual	=	2.7 man-hours
1/3 x 8 x 29.5 man-hours for AN/FRT-40	Quarterly	=	78.7 man-hours
1/3 x 2 x 1.0 man-hours for AN/FRT-40	Annual	=	.7 man-hours
			176.0 man-hours of training per man

To obtain the number of new men trained each year, an average tour length was taken as 2½ years (2 years for single, 3 years for married men). Maintenance division normally has 30 ETs, and Ops division has 20 people being rotated per year; 176 man-hours per person x 20 people = 3,520 man-hours per year for PM training + 28 hours of additional training on the FRT-19.

2. In addition, one trainee is in the screen room in each of the 3 sections. This is an additional 120 man-hours per week used for screen-room training (6,240 man-hours per year).

TABLE IV-3: CURRENT SUPPORT MANPOWER REQUIREMENT

SITE LOCATION: NCS GUAM FUNCTION: TRANSMITTERS 12 MONTH PERIOD COVERED: From 01 Oct 73 thru xx 30 Sep 74

(1) JOB	(2) DESCRIPTION	(3) WORK UNIT	(4) HOURS TO COMPLETE	(5) NUMBER OF WORK UNITS PER WEEK	(6) TOTAL HOURS PER YEAR	(7) BILLET NUMBER
1. Cleaning	8 men in Bldg 52, and 14 men in Bldg	Cleaning	1/4	(4)[22 men)	1144	8(1),54(1),
	51 clean tech labs, screen rooms, CCL,					106(1), M(1),
	supply areas, heads, machine shop office,					G(1),D(1),K(3),
	and passageways for the last 15 minutes					L(1),J(1),S(3),
	each 4 days a week.					Q(2),R(6).
2. Field Day	8 men in Bldg 52 and 14 men in Bldg	Field Day	2	(1)[22 men)	2288	8(1),54(1),
	51 field day spaces in Job 1 plus clean					106(1), M(1),
	parking lot and pick up in outside areas					G(1),D(1),K(3),
	on Fridays for 2 hours each.					L(1),J(1),S(3),
						Q(2),R(6).
3. Cleaning	The duty ET sweeps and empties trash	Cleaning	1/6	2	17.33	Various
	cans on Saturday and Sunday. Time					
	required-10 minutes.					
4. Cleaning	6 men clean and reorganize the ware-	Cleaning	4	(4/52)[6 men)	96	K(3),S(3).
	house for 4 hours each, quarterly.					
5. Cleaning	2 men clean basement in Bldg 52 for	Cleaning	5	(4/52)[2 men)	40	S(2).
	5 hours each, quarterly.					

TABLE IV-3: CURRENT SUPPORT MANPOWER REQUIREMENT

SITE LOCATION: NCS Guam FUNCTION: Transmitters 12 MONTH PERIOD COVERED: From 01 Oct 73 thru ~~xxx~~ 30 Sep 74

(1) JOB	(2) DESCRIPTION	(3) WORK UNIT	(4) HOURS TO COMPLETE	(5) NUMBER OF WORK UNITS PER WEEK	(6) TOTAL HOURS PER YEAR	(7) BILLET NUMBER
6. Storm Conditions	Personnel respond to tropical storm or	Storms	6		540	All Maintenance
	typhoon condition. All bldgs are secured,					1,2,6,T,U,V,(2),
	doors sandbagged, windows covered supplies					W, 57(5)
	checked, vehicles are fueled. 2 warnings					
	in 1973, 3 in 1974. 2 exercises, "Oper-					
	ation Stormy," will be held if actual					
	conditions do not exist.					
7. Bldg Renovation	Bldg 51 refinished work benches and	Bldg. Renovation			244	K(2),S(2),Q(2),
	painted the tech lab, Bldg 52 built new					R(5),54(1).
	work benches and painted the tech lab,					
	storeroom, deepsink room and passageways.					
	Building work benches is a one time thing,					
	painting of all spaces will continue on					
	a cycle basis.					
8. Equipment Removal	13 surveyed transmitters, 9 FRT40 and	Equipment Removal			852	C(1),S(2),Q(2).
	4 FRT39, were stripped and removed					
	from Bldg 46.					

TABLE IV-3: CURRENT SUPPORT MANPOWER REQUIREMENT

SITE LOCATION: NCS Guam FUNCTION: Transmitters 12 MONTH PERIOD COVERED: From 01 Oct 73 thru 30 Sep 74

(1) JOB	(2) DESCRIPTION	(3) WORK UNIT	(4) HOURS TO COMPLETE	(5) NUMBER OF WORK UNITS PER WEEK	(6) TOTAL HOURS PER YEAR	(7) BILLET NUMBER
9. Vehicle Care	5 men are required for turn-in or	Vehicles			416	S4(1),S(2),R(2).
	pick-up of vehicles from the repair					V(2),S7(4)
	facility. 8 vehicles are fueled weekly.					
	Vehicles are washed weekly and waxed					
	monthly.					
10. Supply Runs	Bldg 52 picks up all supplies and repair	Supply	1/4	1	260	Q(2),O(2),S(2),
	parts from Bldg 51.					C(1)
11. Supply Runs	Storekeeper picks up supplies from main	Supply	4	1	200	B(1)
	COMMSTA, picks up open purchase items from					
	local merchants and he turns in precious					
	metal to salvage at the Naval Station.					
12. TAD	1 ET TAD to a factory training school in	TAD TRAINING			172	P(1)
	CONUS. (AN/FSQ-98) Non-available (Training)					
13. TAD	2 ETs assigned TAD to COMMNAVMAR as	TAD			640	C(2)
	household customs inspectors (on call)					
14. TAD	1 ET assigned TAD to the Reserve Security	TAD Security			84	O(1)
	Force at NCS					

TABLE IV-3: CURRENT SUPPORT MANPOWER REQUIREMENT

SITE LOCATION: NCS Guam FUNCTION: Transmitters 12 MONTH PERIOD COVERED: From 01 Oct 73 thru 30 Sep 74

(1) JOB	(2) DESCRIPTION	(3) WORK UNIT	(4) HOURS TO COMPLETE	(5) NUMBER OF WORK UNITS PER WEEK	(6) TOTAL HOURS PER YEAR	(7) BILLET NUMBER
15. TAD	3 ETs assigned TAD to compartment cleaning duties.Each man assigned for 2 months.	TAD BEQ			832	S(3)
Race 16.Relations	40 men attend 20 hours upward training, continuing effort. non-available (training)	Race Relations			800	Various
Check 17. in/out	24 departing and 15 men arriving spent an average of 2 days checking on or out of NAVCOMMSTA GUAM. Non-available (Service diversions)	Check In/Out			624	Various
18.Housing	Upon arrival, men require time off to move from hotels to Boonie housing, from Boonie housing to Navy housing. Time off to accept household shipments. Upon departure, men require time off for customs inspections, housing inspections, pack out of household goods, and time to move into hotels. 24 men, 13 married and 11 single departed. 30 hours each required for single and 44 hours each for married. 15 men arrived, 8 married and 7 single. 8 hours each	Housing			1342	Various

TABLE IV-3: CURRENT SUPPORT MANPOWER REQUIREMENT

SITE LOCATION: NCS Guam FUNCTION: Transmitters 12 MONTH PERIOD COVERED: From 01 Oct 73 thru ~~xx~~ 30 Sep 74

(1) JOB	(2) DESCRIPTION	(3) WORK UNIT	(4) HOURS TO COMPLETE	(5) NUMBER OF WORK UNITS PER WEEK	(6) TOTAL HOURS PER YEAR	(7) BILLET NUMBER
Housing (cont'd)	required for single men and 48 hours each for married					
	men. Total Departure Time - 902, Total Arrival Time 440.					
	Combined total is 1342. Non-available (Service Diversions)					
19. Sponsors	Men who assist arriving personnel, 5	Sponsors			160	Various
	men came in 8 married and 4 single.					
	8 married x 16 = 128 hours. 4 single x					
	8 = 32 hours Total 160 hours. (Non-					
	available (service diversions)					
20. Techni-	2 ET's expended 1750 hours assisting	Technical			1,750	Q(2)
cal	NAVSEEACT Guam prepare 22 FRT-83 series					
	transmitters for acceptance and per-					
	formed acceptance tests for the station.					
21. Test	In accordance with the calibration	Test equipment			480	M(1)
equipment	program, 1 ET delivers and picks up					
	test equipment from NCS Lab. Performs					
	cleaning, PM scheduling, and performs					
	a quarterly inventory inspection.					

TABLE IV-3: CURRENT SUPPORT MANPOWER REQUIREMENT

SITE LOCATION: NCS Guam FUNCTION: Transmitters 12 MONTH PERIOD COVERED: From 01 Oct 73 thru 30 Sep 74

(1) JOB	(2) DESCRIPTION	(3) WORK UNIT	(4) HOURS TO COMPLETE	(5) NUMBER OF WORK UNITS PER WEEK	(6) TOTAL HOURS PER YEAR	(7) BILLET NUMBER
22. Man-hour	All men fill out man-hour accounting		.1	5 (89 men)	2,314	All personnel
accounting	sheets daily. Continuing					
23. SDO	Site Duty Officer, 6 sections, E-3					51, A(2), B,
	thru O-4. On call phone watch must					50, 53
	make one round of the transmitter site					
	during the 24-hour watch. Must re-					
	spond to fires, incidents, or emer-					
	gencies.					
24. SSPO	Site Security Petty Officer. Responsi-					106(2), N, 2,
	ble for maintaining proper order at the					O(2), L(1), M,
	transmitter site. E-5's and E-6's,					D, C(2), 55(1),
	13 sections, weekdays 1600 to 0730,					95
	weekends 0800 to 0800. This is a					
	patrol type watch from 1600 or 0800					
	until 2300 and a sleeping watch or on					
	call watch from 2300 until 0600					

TABLE IV-3: CURRENT SUPPORT MANPOWER REQUIREMENT

SITE LOCATION: NCS Guam FUNCTION: Transmitters 12 MONTH PERIOD COVERED: From 01 Oct 73 thru 30 Sep 74

(1) JOB	(2) DESCRIPTION	(3) WORK UNIT	(4) HOURS TO COMPLETE	(5) NUMBER OF WORK UNITS PER WEEK	(6) TOTAL HOURS PER YEAR	(7) BILLET NUMBER
25. FSW	Fire and Security Watch, 7 sections,					V(2), K(2),
	E-1 thru E-4. The period of watch is					S(2), U
	from 1600 to 0730 weekdays and 0800 to					
	0800 weekends and holidays. The actual					
	alert (awake) watch is from 2400 until					
	0730. The watch makes tours of barracks					
	Admin, warehouse and outside areas for					
	fires and is responsible along with the					
	SSPO for security during the period of					
	watch. Due to the fact he is awake all					
	night he is granted the next day off					
	and is lost for that working period.					
26. Shop	1 Rigger spends 4 hours 1 day a week	Cleaning	4	1	208	121 (1)
cleaning	cleaning the antenna office and 3					
	antenna shop spaces.					

TABLE IV-3: CURRENT SUPPORT MANPOWER REQUIREMENT

SITE LOCATION: NCS Guam FUNCTION: Transmitters 12 MONTH PERIOD COVERED: From 01 Oct 73 thru 30 Sep 74

(1) JOB	(2) DESCRIPTION	(3) WORK UNIT	(4) HOURS TO COMPLETE	(5) NUMBER OF WORK UNITS PER WEEK	(6) TOTAL HOURS PER YEAR	(7) BILLET NUMBER
27. Vehicle	2 men are required for pickup or turn-	Vehicles	.3		390	121(4)
care	in of antenna maintenance vehicles from					
	the repair facility. 2 vehicles are					
	fueled weekly, 1 vehicle is fueled bi-					
	weekly. Vehicles are washed weekly and					
	waxed monthly.					
28. Supply	Antenna riggers pick up supplies and	Supply			260	120(1) 121(4)
runs	repair parts from Bldg 51. Repair					
	parts are also picked up from Engineer-					
	ing, located at the main COMMSTA.					
29. Quarters	5 riggers report to Bldg 51 each Monday	Quarters	.25	1 (5 men)	65	120(1) 121(4)
	for quarters and instructions. (Nonavailable service diversions)					
30. Man-hour	1 man performs man-hour accounting,				65	120(1)
accounting	daily.					
31. Duty ET	Duty DT's are in eleven section. Week-	Duty				R6, Q2, P1,
	days, after a normal working day, 1 ET					L1, K1
	assumes the duty at 1600 and performs					

TABLE IV-3: CURRENT SUPPORT MANPOWER REQUIREMENT

SITE LOCATION: NCS Guam FUNCTION: Transmitters 12 MONTH PERIOD COVERED: From 01 Oct 73 thru 30 Sep 74

(1) JOB	(2) DESCRIPTION	(3) WORK UNIT	(4) HOURS TO COMPLETE	(5) NUMBER OF WORK UNITS PER WEEK	(6) TOTAL HOURS PER YEAR	(7) BILLET NUMBER
Duty ET (cont'd)	required or assigned maintenance. He remains in a standby status until 2230, at that time he may go to sleep in the duty bunk bed but remains on call until 0730. Weekends and holidays follow the same routine, but the watch period is from 0800 until 0800 the following day.					
32. TAD	3 RM's assigned TAD to compartment cleaning duties, each man assigned for 2 months.	TAD BEQ			832	57 (3)
33. TAD	1 RM2 assigned TAD to COMNAVMAR as Household inspector for 6 mos.	TAD			812	L (1)
34. TAD	1 RMC TAD as CMAA for 4 mos and 1 RM1 TAD as CMAA for 5 mos.				1,152	55(1), 56(1)
35. Cleaning	Daily 1 RMSN sweeps deck. Sweeps, swabs console. Cleans coffee mess	Cleaning	1	7 (2 men)	728	57 (2)

TABLE IV-3: CURRENT SUPPORT MANPOWER REQUIREMENT

SITE LOCATION: NCS Guam FUNCTION: Transmitters 12 MONTH PERIOD COVERED: From 01 Oct 73 thru 30 Sep 74

(1) JOB	(2) DESCRIPTION	(3) WORK UNIT	(4) HOURS TO COMPLETE	(5) NUMBER OF WORK UNITS PER WEEK	(6) TOTAL HOURS PER YEAR	(7) BILLET NUMBER
Cleaning	(not valid work) and empties trash cans,					
(cont'd)	Bldg 51. 1 RMSN sweeps deck. Sweeps					
	and swabs console. Sweeps and swabs					
	head and empties trash cans Bldg 52.					
36. Field	Once a week, 1 RM2, 2 RM3, 2 RMSN dust	Cleaning	1.9	1 (5 men)	494	57 (5)
day	all equipment. Sweep deck, console,					
	and cable room. Waxes and buffs deck					
	console and head in both Bldg 51 and 52.					
37. Building	1 RM1 tiled deck in console	Renovation	6		6	56 (1)
renovation						
38. Building	1 RM1, 1 RM2, 1 RM3 and RMSN painted	Renovation	3		12	56(1), 57(3)
renovation	inside and outside of console.					

TABLE IV-3: CURRENT SUPPORT MANPOWER REQUIREMENT

SITE LOCATION: NCS Norfolk FUNCTION: Transmitters 12 MONTH PERIOD COVERED: From Not submitted To

(1) JOB	(2) DESCRIPTION	(3) WORK UNIT	(4) HOURS TO COMPLETE	(5) NUMBER OF WORK UNITS PER WEEK	(6) TOTAL HOURS PER YEAR	(7) BILLET NUMBER
1. Security	Tour bldg IAW station SOP every 2 hrs	Tour	0.5	140	3,640	
check (bldg)	during normal workday and every hour					
	thereafter 30 mins each (20 tours/day)					
2. Security	Required to replace civilian guard	Tour	8	7	2,912	
guard	2300-0700, Sat, Sun, Hol (12), 30 days					
	leave, every hour, 20 min tour (7 tours/					
	day)					
3. Cleaning	Maintain cleanliness of spaces, 1 sweep	Cleaning	9.5	7	3,458	
	after every watch, 30 min/3 times/day,					
	midwatch 1 part cleaned @ 8 hrs each					
	day					

TABLE IV-3: CURRENT SUPPORT MANPOWER REQUIREMENT

SITE LOCATION: NCS Norfolk FUNCTION: Transmitters 12 MONTH PERIOD COVERED: From Not submitted To

(1) JOB	(2) DESCRIPTION	(3) WORK UNIT	(4) HOURS TO COMPLETE	(5) NUMBER OF WORK UNITS PER WEEK	(6) TOTAL HOURS PER YEAR	(7) BILLET NUMBER
4. Military duty	Time preparing for site duty officer and assistant site duty officer duties. They leave ½ hour early to clean up, change clothes.				520	
5. Guard mail driver	Pick-up classified mail, repair parts etc., from comm. sta. and NOB Norfolk	Pick-up			1,248	86(4), 57(5)
6. CMAA TAD	1 man TAD to MAA force				1,656	
7. Supply	1 man TAD as supply PO				1,656	
8. Tech control coordination	Time spent coordinating with tech control facility personnel on various problems/discrepancies involving communications equip based on 10-day study	Coordination			1,875	

TABLE IV-3: CURRENT SUPPORT MANPOWER REQUIREMENT

SITE LOCATION: NCS Norfolk FUNCTION: Transmitters 12 MONTH PERIOD COVERED: From Not submitted To

(1) JOB	(2) DESCRIPTION	(3) WORK UNIT	(4) HOURS TO COMPLETE	(5) NUMBER OF WORK UNITS PER WEEK	(6) TOTAL HOURS PER YEAR	(7) BILLET NUMBER
9. Other inst and maint	Installation and maint of entertainment systems and public address system					
10. Other maint	Maintenance of firefighting equip	Driver/operator	8	7	2,912	
	Maintenance of firefighting equip	Supervisor	8	5	2,080	
11. Stations self-help program	Maintenance and improvements of facility recreation areas					
12. Librarian	Maintains library (issues and stacks)		3.5	3	546	
13. Ops/yoeman	Maintenance of Ops records and corresp		5.3	5	1,378	

TABLE IV-3: CURRENT SUPPORT MANPOWER REQUIREMENT

SITE LOCATION: NCS Norfolk FUNCTION: Transmitters 12 MONTH PERIOD COVERED: From Not submitted To

(1) JOB	(2) DESCRIPTION	(3) WORK UNIT	(4) HOURS TO COMPLETE	(5) NUMBER OF WORK UNITS PER WEEK	(6) TOTAL HOURS PER YEAR	(7) BILLET NUMBER
14. Spec	Maintains/issue equipment		8	3.9	1,661	
services						

Table IV-3: CURRENT SUPPORT MANPOWER REQUIREMENT

SITE LOCATION: NCS Italy FUNCTION: Transmitters 12 MONTH PERIOD COVERED: From 1 Jan 1974 To 1 Jan 1975

(1) JOB	(2) DESCRIPTION	(3) WORK UNIT	(4) HOURS TO COMPLETE	(5) NUMBER OF WORK UNITS PER WEEK	(6) TOTAL HOURS PER YEAR	(7) BILLET NUMBER
1. Power	There were 308 power shifts during	Power failure/shift	14.9 min	5.9	76.6	86(4) 57(4)
outage	this period. Transmitter hi-volt is					
	turned off on all transmitters, then					
	the emergency generator is put on the					
	line. All transmitters are then					
	brought up and checked for proper freq					
	and power out.					
2. Cleaning	One man takes last 15 min of each	Cleaning	15 min	21	273.0	86(4) 57(4)
	watch to sweep down transmitter deck					
	and straighten up operating area and					
	head. 3 watches/day					

Table IV-3: CURRENT SUPPORT MANPOWER REQUIREMENT

SITE LOCATION: CS Italy FUNCTION: Transmitters 12 MONTH PERIOD COVERED: From 1 Jan 1974 To 1 Jan 1975

(1) JOB	(2) DESCRIPTION	(3) WORK UNIT	(4) HOURS TO COMPLETE	(5) NUMBER OF WORK UNITS PER WEEK	(6) TOTAL HOURS PER YEAR	(7) BILLET NUMBER
3. Field day	Field day is held once a week, normally on the weekend watches, except when we have inspection once a month on Friday. In addition to normal cleanup mats are scrubbed, rec rm and transmitter deck swept and swabbed. Six watches; 2 hours each.	Cleaning	2	6	624.0	86(4) 57(4)
4. Quality control	Check all transmitters on the air for proper meter readings and loops. Make minor adjustments as necessary. This is done once every hour.	QC check	Estimated avg. 10 min	168	1,460	86(4) 57(4)
5. OJT	"See attached sheet." Calculations based on training 4 rm's and 4 et's during this period. This should be a good average for yearly turnover of personnel.	OJT			2,208	86(4) 57(4)

NCS ITALY--FOOTNOTES TO TABLE IV-3

Job 1. Column 4 was derived from the power outage log book. The average time for all transmitters to be returned to control is 4.93 minutes + 10 minutes for QC checks.

Job 5. On-the-job training.

1. New personnel spend one week during days on OJT.

a. RMs observe and are trained on off-the-air circuits: 60 man-hours/RM. This is because 40 hours of his and 20 hours of another person's time working on unnecessary off-the-air patches and tuning of transmitters. Total time: 40 hours/RM + 20 hours/"other person" per RM trained. The "other person" can be any qualified watchstander or the training PO. When the trainee is on days, it will be the RM or ET, depending on the trainee's rate.

b. ETs observe and are trained on off-the-air circuits and equipment the same way as RMs, since the ETs help the RMs as necessary. Total time: 40 hours/ET + 20 hours/other person/ET trained.

2. New RM and ET personnel are assigned to a section with a trained RM/ET to obtain a working understanding of the transmitter site; 176 hours (the monthly average for a watch section for training) breaking spent on OJT per RM and ET trained.

3. Special training as OJT.

a. Because of the need to activate the NavComPars system during undermanning, each ET at the transmitter site was trained to perform all the functions of the RM supervisor of the watch. Each of 4 ETs were trained 20 hours. The training need will continue and possibly increase because of the command training program's being revised. This includes both ETs and RMs.

b. Power van/generator shack--each ET and RM at the transmitter site was trained on both the old power van and the new generator shack. The new generator shack training is included in the reported hours. The old power van training is no longer necessary.

4. Practical factors and in-rate training not considered in the table. At this time, each person takes care of this in his spare time. When the new training program is instituted, hard data will be gathered.

5. Refresher training and checks are done on all personnel when needed; this will take/has taken about 10 hours per person twice a year, or 20 hours RM, ET trained, an average of 8 new people per year. This refresher training can be done by any qualified person. In the future, plans call for the training PO to conduct the final refresher checkouts.

TABLE IV-4

SUPERVISORY OVERHEAD ANALYSIS RESULTS
(Percent)

	Honolulu	Guam	Norfolk	Italy
Total supervisory overhead	24.9	25.8	22.5	20.0
Watch operations	19.7	23.7	46.2	8.1
Day operations	250	250	354	-
Total operations division	24.1	41.0	67.7	11.1
Maintenance division	40.0	16.5	4.8	9.4
General management	1.4	1.4	3.1	10.0

TABLE V-1

MANPOWER REQUIREMENTS OF O & M PERSONNEL

	Man-hours required				Direct Labor Full-Time Equivalent Required/On hand			
	Hono	Guam	Norfolk	Italy	Hono	Guam	Norfolk	Italy
Operations								
Tunings/retunings[a]	4737.3	2345.4	3713.3	1062.6				
QC checks[a]	9128.8	10099.6	2900.3	1708.2				
Operator PM								
Site req.	5471.9	5296.1	6556.1	302.4				
Navy req.	10867.7	7773.5	9686.9	354.1				
Other	4698.2	-	-	1036.6				
Total								
Site req.	24036.2	17741.1	13169.7	4109.8	14.5/50	10.7/24.25	7.9/12	2.5/3.6
Navy req.	29432.0	20218.5	16300.5	4161.5	17.7/50	12.2/24.25	9.8/12	2.5/3.6
				(Incl. Supvr's)	/60.05	/30	/18	/4.2
Maintenance								
Technician PM								
Site req.	9727.8	22769.9	12194.3	1392.2				
Navy req.	19320.3	17302.3	2575.0	1728.9				
CM								
Site req.	5666.3	17227.9	26513.4	537.3				
Navy req.	30187.9	25075.8	12261.9	2083.0				
Total								
Site req.	15394.1	39997.8	38707.7	1929.5	9.3/28.8	24.1/37.5	23.3/22.4	1.2/5.2
Navy req.	49508.2	42378.1	14836.9	3811.9	29.8/28.8	25.5/37.5	8.9/22.4	2.3/5.2
				(Incl. Supvr's)	/36.5	/44	/23.5	/5.6
Support (O & M direct labor man-hours)[a]								
	22792.9	17909.7	22662.7	1021.4	13.7/	10.8/	13.6/	0.6/
Total								
Site req.	62223.2	75648.6	74540.1	7060.7	37.5/78.8	45.5/61.75	44.9/34.4	4.3/8.8
Navy req.	101733.1	80506.3	53800.1	8994.8	61.2/78.8	48.5/61.75	32.4/34.4	5.4/8.8
				(Incl. Supvr's)	/96.55	/74	/41.5	/9.8

[a]Includes 17% PF&D factor.

TABLE V-2

UTILIZATION OF O&M PERSONNEL

	Honolulu	Guam	Norfolk	Italy
Watch operator				
Site req--direct labor only	.29	.44	.66	.69
Incl supvr's	.24	.36	.44	.60
Navy req--direct labor only	.35	.48	.82	.69
Incl supvr's	.29	.41	.54	.60
Maintenance				
Site req--direct labor only	.32	.64	1.04	.23
Incl supvr's	.25	.55	.99	.21
Navy req--direct labor only	1.03	.68	.40	.44
Incl supvr's	.82	.58	.38	.41
Support (of total direct labor personnel)	.17	.17	.40	.07
Total (incl coll support)				
Site req--direct labor only	.47	.74	1.31	.49
Incl supvr's	.39	.61	1.08	.44
Navy req--direct labor only	.78	.79	.94	.61
Incl supvr's	.63	.66	.78	.55