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Office of the Deputy Chief of Staff, Resource Management
Resource Analysis and Systems Division
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RESOURCE ESTIMATING RELATIONSHIPS AND FACTORS
FOR ARMY IN EUROPE

Ivette Feliciano, GS-1515-12

and

Paula Rebar, GS-1515-12

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INTRODUCTION:

Resources allocated to the Department of Defense (DOD) are declining. Efficient and effective use of limited resources becomes paramount in meeting DOD's priorities; that is, to maintain essential force readiness, protect essential sustainability, slow the pace of modernization, and minimize force structure impact, as stated in the FY90-94 Program Objectives Memorandum (POM). Because U.S. Army, Europe, (USAREUR) and Seventh Army is a forward deployed combat force, meeting defense priorities by ensuring optimum application of resources may have even more applicability and meaning in the European theater of operations than in the continental United States (CONUS).

While the phrase "doing more with less" is a clever reminder to use our resources well, such a "raised consciousness" for not wasting or mismanaging resources does not necessarily enhance our decision-making abilities. If USAREUR managers are to do an effective job in managing resources--manpower, materiel, money, time--they must have access to cost estimating tools to focus their decision analysis.

In USAREUR, the Resource Analysis and Systems Division (RASD) of the Office of the Deputy Chief of Staff for Resource Management (ODCSRM) has undertaken the task of developing

decision-making tools specifically tailored to the Army in Europe environment. Three basic approaches have been implemented:

- a. Base Operations (BASOPS) Cost Factors.
- b. USAREUR Circular 37-11, FYXX Resource Factors Handbook.
- c. Training and Operational Cost Models.

BASOPS COST FACTORS:

One valuable source of decision-making information is the ongoing BASOPS data collection effort. Beginning with FY87, RASD has formalized collection of an historical USAREUR community database of cost for each BASOPS account. In USAREUR, there are 39 separate and distinct communities.

The basic methodology employed has been to develop an annual Letter of Instruction (LOI) and a comprehensive reporting format which is distributed to USAREUR Major Commands (UMCs) and their respective communities. The communities then extract and summarize information from their end-of-fiscal year financial and manpower reports to include:

- a. P2 OMA BASOPS(-) and Real Property Maintenance Activities (RPMA) obligations by lettered account.
- b. Personnel data to include manyears and associated costs for U.S. military, U.S. civilian, local national, and civilian support group (CSG) personnel.



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c. Nonpersonnel costs to include total obligations for supplies and equipment, contracts, and other expenditures.

d. Nonrecurring, or one-time only, costs.

Upon receipt of community input, RASD edits information and coordinates corrective actions with communities. Since this iterative process has proven to be quite time consuming, we are now expanding the detail of obligation data available at Headquarters (HQ), USAREUR to include community-level obligations. In the past, as obligations were rolled up from community, to UMC, to HQ, USAREUR, the end product was summarized data. Soon, we will have a procedure in place which will capture the detail we require for analysis of community support. Once this mechanism is in place, we can virtually eliminate, or significantly reduce, off-line community reporting requirements.

The Community Demographic Profile (CDP), which is the population supported in each community broken into U.S. military, U.S. civilian, local national and civilian support group categories, is also entered into the BASOPS database. RASD then statistically analyzes data and computes Cost Estimating Relationships (CERs), Manpower Estimating Relationships (MERs) and per capita costs for each individual, lettered account and for a total BASOPS rollup. Information is further summarized at USAREUR, UMC, and community levels.

USAREUR's 19 BASOPS accounts are displayed at Appendix A. Of these accounts, 15 were included in this BASOPS analysis. Four accounts were excluded because of insufficient data. Not all communities received funding for accounts C (Direct Support/General Support, Maintenance of Materiel), E (Laundry and Dry Cleaning Services), X (Security and Counterintelligence Operations), and Y (Records Management, Publications) because of limited overall funding levels or limited distribution of funds.

In order to better understand the intent of this BASOPS support analysis, the following definitions are provided:

- a. CER - A linear, mathematical relationship ($Y = A + BX$) between BASOPS cost and the number of personnel supported.*
- b. MER - A linear, mathematical relationship ($Y = A + BX$) between the number of BASOPS support personnel and the number of personnel supported.*
- c. Per Capita Cost - Amount of BASOPS funding expended per person at community level.
- d. Per Capita Work Force - The number of BASOPS support personnel per person at community level.

*For both a CER and MER, the independent variable is the number of personnel supported; i.e., U.S. military and Department of Army (DA) civilians.

A regression analysis of all USAREUR communities, using a total rollup of BASOPS accounts and total support personnel, indicates a significant linear association for both CERs and MERs and the assigned population at community level (R^2 approximately 0.9). Regression analyses were also computed at individual account levels. While linear relationships were encouraging, they were less predictive. Once computations are completed, the last step is to obtain a final validation from USAREUR communities and enter the information into the database.

At present, because development of BASOPS Cost Factors is a relatively new endeavor and we have limited data, we are deriving our estimating relationships across communities by account. Once sufficient BASOPS data has accrued to the database, relationships can be developed by account for each community. Ultimately, the objective is to compile and maintain a ten-year database for each USAREUR community. The database will give us increased predictive capability to make educated adjustments to a community's funding and work force levels when the population it supports varies for one reason or another; e.g., new mission or force reduction.

CERs, MERs, and per capita cost factors are quick, easy-to-use tools which can be used in estimating resource impacts for changes in workloads and missions. They are also useful in "what if" drills to determine the effects of potential

troop reductions and base closures and in validating/justifying budget data. In essence, these estimating relationships will give managers the capability to relate Operations and Maintenance, Army (OMA) functions to common measures of workload. Based on projected workloads, managers can use the relationships to predict resource requirements at program element and installation/activity level.

While the USAREUR BASOPS data collection is in its early stages, this database and the decision making advantages it offers are timely. In light of recent proposals to reduce overseas troop strength, USAREUR managers will be increasingly involved in "what if" drills--where troop reductions could be taken, what base/posts could be closed, and the impact on level of BASOPS resources expended.

RESOURCE FACTORS HANDBOOK:

Given a backdrop of reduced defense spending and impending force reductions, questions on the cost of doing business are surfacing at all levels of government. To help USAREUR managers answer these questions, the Resource Factors Handbook has been prepared. The genesis of the handbook was the need for consistent, timely, and accurate cost factors for the development of cost, budget, and program estimates for USAREUR. Unlike other Army Major Commands (MACOMs) such as Forces Command (FORSCOM) and

Training Doctrine Command (TRADOC), USAREUR did not have cost factors to justify resource requirements or defend against budgets cuts. The lack of cost factors put USAREUR at a competitive disadvantage, thus ushering in the creation of the Resource Factors Handbook in October 1978 to fill this void.

The original handbook has continually been expanded and improved upon. It now contains cost factors for civilian/military pay and allowances; engineering, housing, and logistics; as well as other general cost factors and data sources. The handbook has become a frequently-used reference document for all USAREUR organizations, from the Headquarters, to UMCs, on down to community level. A single source to gather relevant data is far more efficient than having managers go to numerous individual sources having information that may have not even been scrubbed or validated. Information contained in the handbook has been especially useful in completing economic analyses, productivity program initiatives, and cost studies.

In July 1989, a floppy-disk prototype of the handbook will be introduced and tested. The handbook information was transposed into relational databases using the dBase III+ program. Text information (such as notes and data sources) will be included in a memo field. The floppy-disk relational databases are linked by a common field that has the same name, data type, and width. This common field relates the various databases, enabling users

to extract information from multiple databases simultaneously. Since many costing applications require assimilation of information from different sources, use of relational databases speeds the process, enhancing their value to the cost analyst. To augment this new format, we are also developing a user's manual to accompany the floppy disk.

The intent is for the handbook to be phased out as users become comfortable with the floppy-disk format as a means of providing timely, on-line information. Providing cost factor information to USAREUR subordinate organizations on floppy disk will help us overcome the printing, publication, and distribution delays we have experienced in the past in getting hard copies of the handbook to the field.

In addition to providing the handbook in floppy-disk format, another change underway is to expand the handbook's contents to include costs associated with operating USAREUR today. As a minimum, the following information is currently being researched: costs for each training event and Combat Maneuver Training Center (CMTC) rotation; costs to garrison a battalion-sized unit or to support a community; and costs for barracks renovation, family support facilities, and essential RPMA support. Publication of this information is targeted for early 1990.

In an effort to be proactive and ensure that our resource references are meeting customer needs, we recently developed and distributed a costing survey. The results of the survey will be used to add, delete, or modify the information we currently provide, as well as to assess any required long-range initiatives. This ongoing project will be revisited annually to ensure we are being responsive to our customers. Responses to the initial survey are expected in September 1989.

TRAINING AND OPERATIONAL COSTS:

RASD's third approach for providing cost estimating tools to USAREUR managers is in training and operational costs. Recent initiatives from Headquarters, Department of Army (HQDA) for determining resource requirements for materiel systems include the use of automated models for the planning, programming, budgeting, and execution system (PPBES). Use of the models allows for flexibility, timeliness, and efficiency. Inputs to the models include sustainment factors.

The primary model which requires sustainment factors as input is the Training Resource Model (TRM). The TRM provides the Army with a standardized procedure for planning, resourcing, and managing training. Unit P2 Mission Management Decision Packages (MDEPs); i.e., analogous to defining training costs, are composed of Operating Tempo (OPTEMPO) and non-OPTEMPO costs.

OPTEMPO, or activity rate, is the annual operating miles or hours for systems, such as tanks or aircraft, required to execute a training strategy. OPTEMPO cost factors are the costs of the resources consumed by these materiel systems per mile or hour. The two types of costs included in the OPTEMPO cost factors are the replenishment repair parts (Class IX) and Petroleum, Oil, and Lubricants (POL or Class III).

Since the fielding of the TRM in USAREUR, questions concerning the reasonableness of the OPTEMPO cost factors have increased. The main reason for this scrutiny is the direct impact OPTEMPO has on the development of the MDEPs and, consequently, on the funding levels to perform OPTEMPO training.

In December 1988, RASD initiated a study to determine the most representative OPTEMPO cost factors for USAREUR. As a result of this study, RASD has worked very closely with the U.S. Cost and Economic Analysis Center (USACEAC) and the Calibre Corporation. OPTEMPO cost factors are developed by the Calibre Corporation for USACEAC.

The model used to develop OPTEMPO cost factors is the Operating and Support Management Information System (OSMIS). OSMIS utilized logistics databases, such as the Logistics Intelligence File (LIF), to determine the costs for systems that have been in the field for several years. For systems that have not been fielded or are recently fielded, engineering estimates

are used. A positive attribute of this system is the number of edits and adjustments performed to the data input. Unreasonable data is closely examined and is either discarded or adjusted to resolve problems with the reporting system.

Although Calibre Corporation has installed a series of edits in the system to correct problems, the higher potential for error is the source data itself. For this reason, representatives from USACEAC and the Calibre Corporation will be visiting USAREUR in the September/October 1989 timeframe to review source data and identify any problems in the reporting system so appropriate adjustments can be made. Sites for validation are 1st and 3rd Armor Divisions. This effort will result in OPTEMPO cost factors that will be more representative of the consumption of resources by USAREUR units in the field.

The non-OPTEMPO component of P2 Mission, which includes rail costs, travel, civilian pay; and supplies from Class II (expendables, nonstandard items). Class IV (construction materials), and the Self-Service Support Center (SSSC), comprises more than 70 percent of some units' MDEPS. Non-OPTEMPO cost factors are just as important as the OPTEMPO cost factors. Unfortunately, non-OPTEMPO factors used in MDEP development are only estimates of a unit's consumption. Because these estimates are very weak when compared to the OPTEMPO factors, a significant amount of effort is still required to validate non-OPTEMPO factors.

RASD is currently working with USAREUR, Office of the Deputy Chief of Staff for Operations (ODCSOPS) and their training center to validate these factors. This effort will eventually require the joint participation of ODCSOPS, USACEAC, and the associated contractors, at both USAREUR and DA levels.

CONCLUSION:

The BASOPS Cost Factors, Resource Factors Handbook, and Training and Operational Cost Models are just three of the proactive approaches RASD has initiated and expanded upon to meet USAREUR's need for cost estimating tools that will enhance effective management of resources. Future directions will attempt to more comprehensively address the entire resource management arena.

The BASOPS cost factors will be refined and predictive capability will improve as the database matures. An expansion of the handbook is foreseen which will project certain cost factors, such as civilian salaries, beyond the current year, making the handbook a valuable tool for formulating operating budgets and POMs. Where applicable, expansion of cost factors to the outyears will be accomplished by using moving averages, time series forecasting, or probabilistic indexing techniques. Our current efforts to validate OPTEMPO and non-OPTEMPO cost factors will help ensure that USAREUR's share of operating and support (O&S) funding for training is adequate to support the U.S. Army's fighting posture in the event of war.

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BASE OPERATIONS ACCOUNTS

BASE OPERATIONS(-) ACCOUNTS

ACCOUNT

TITLE

B	SUPPLY OPERATIONS
C•	DIRECT SUPPORT/GENERAL SUPPORT (DS/
	GS) MAINTENANCE OF MATERIEL
D	TRANSPORTATION SERVICES
E•	LAUNDRY AND DRYCLEANING SERVICES
F	THE ARMY FOOD SERVICE PROGRAM
G	PERSONNEL SUPPORT
H	UNACCOMPANIED PERSONNEL HOUSING
	OPERATION, ADMIN, AND FURNISHINGS
N	COMMAND ELEMENT, SPECIAL STAFF,
	HQ COMMANDANT
P	AUTOMATION ACTIVITIES
S	COMMUNITY AND MORALE SUPPORT
	ACTIVITIES
T	PRESERVATION OF ORDER
U	RESOURCE MANAGEMENT OPERATIONS
V	PLANS, TRAINING, AND MOBILIZATION
X•	SECURITY AND COUNTERINTELLIGENCE
	OPERATIONS
Y•	RECORDS MANAGEMENT, PUBLICATIONS

REAL PROPERTY MAINTENANCE ACTIVITIES (RPMA) ACCOUNTS

ACCOUNT

TITLE

J	OPERATION OF UTILITIES
K	MAINTENANCE AND REPAIR OF REAL
	PROPERTY
L	MINOR CONSTRUCTION
M	ENGINEER SUPPORT

•NOTE: LIMITED DATA REPORTED; ONLY A FEW COMMUNITIES RECEIVED C, E, X, AND Y FUNDING. THEREFORE, ANALYSIS WAS PERFORMED ON REMAINING 15 ACCOUNTS.

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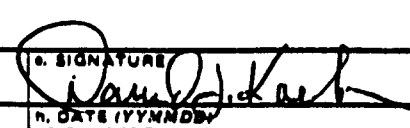
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