

12 May 1981

MEMORANDUM FOR: Director of Data Processing
FROM: Deputy Director for Applications
SUBJECT: Recommendations for the Improvement of
Applications Productivity

Bruce:

1. The attached document is the output from the Productivity Working Group that began its work in October. As you can see, it covers a wide range and has several points of view. Overall, I think they did a fairly good job of breaking down the questionnaires, analyzing the responses, and coming up with some sound suggestions that we can use to move forward in this area.

2. Our next step will be to discuss this in depth with the Working Group at the Applications Management meeting in June. As a result of that meeting, I would hope that we could agree on several specific areas in which to move forward. Fortunately, as this group points out, a lot of work needs to be done, but a lot of things can be done in parallel. I think we can look forward to some significant progress during this year.

STAT [redacted] 3. I have taken liberty of also forwarding a separate copy to [redacted] for his information.

[redacted]

STAT

STAT Attachment: As Stated
DD/A/ODP: [redacted]/rsl [redacted] 12May81

STAT Distribution:
Original - Addressee
1 - DD/A Chrono
1 - Prod. Wg. Gr. File

TRANSMITTAL SLIP		DATE
		5/13
TO: D/ODP		
ROOM NO.	BUILDING	
2D00	HQ	
REMARKS:		
DD has his own copy.		
E - I'd like a file under special projects on "Productivity",		
pls. Rex J		
FROM:		
ROOM NO.	BUILDING	EXTENSION

FORM NO. 241
1 FEB 55

REPLACES FORM 36-8
WHICH MAY BE USED.

(47)

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1 May 1981

MEMORANDUM FOR: Deputy Director for Applications
Office of Data Processing

FROM: Applications Productivity Working Group

SUBJECT: Recommendations for the Improvement of
Applications Productivity

I. MISSION AND SCOPE

1. The Applications Productivity Working Group, (APWG) was formed in November 1980 by the Deputy Director for Applications, ODP (DD/A/ODP) to study, evaluate, and recommend means to improve the productivity of the Applications divisions of ODP. The APWG, with the approval of the DD/A/ODP, defined the scope of its mission to cover both an increase in the amount of product produced per unit of resource expended, and a quality improvement of the product.

2. The Applications divisions of ODP produce a wide variety of products, ranging from large, integrated and complex software systems incorporating their host computers, networks and environments, down to small and simple programs to meet the day-to-day needs of the Agency clients. All of the software developed is in some way maintained, and thus modified to eliminate problems or meet evolving user requirements. Applications' clientele is effectively and potentially every office and staff of the CIA, and outside components and agencies of the Intelligence Community. Computer applications include the support of all types of disciplines, resulting in products which must perform data base management, scientific, mathematical/statistical, text processing, or most other imaginable data processing tasks.

3. In this product environment, there is currently no simple, quantifiable definition for productivity which could accurately and meaningfully demonstrate present performance or reflect the impacts of changes or improvements to the way Applications does business. Thus, the APWG did not attempt to define metrics which would demonstrate productivity, but instead focused on directions, which when taken would be expected to improve Applications' ability to produce a quality product.

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II. BACKGROUND

1. In October 1980, the DD/A/ODP circulated a "Productivity Improvement Questionnaire" designed to elicit opinions on and recommendations for its stated goal. The first task of the APWG was the analysis and evaluation of these questionnaires. The APWG was able to define general categories of suggestions, and collate the wide variety of responses into a list of response types with their frequencies by category. This summary is included as Appendix A. The categories were in no way mutually exclusive, but did reflect major areas for exploration by the APWG. Further refinement of this material resulted in the seven categories which are the basis of discussion in Appendices B through H, and which are:

- Management of People [redacted] STAT
- Management of Applications Development and Support [redacted]
- Services Support [redacted]
- Tools Support [redacted]
- Training [redacted]
- Environment [redacted]
- End User Development of Applications [redacted] STAT

2. These partitions of the problem allowed individual APWG members to focus on a particular area, rather than address the whole problem, and provided clear boundaries for group review of individuals' contributions. The Appendices (B through H) are those reviewed, individual contributions. Appendix I is a recommendation submitted by the Chief of A Division concerning space and environmental requirements for programmers and analysts. The next section attempts to draw together the recommendations from these papers, and form them into tasks which can be individually accomplished while contributing to an integrated concept of productivity improvement. These recommendations are the products of the APWG drawn from its first six months of analysis of the Applications environment and mission.

III. ANALYSIS AND RECOMMENDATIONS

1. Applications supports a wide variety of functions, along with means for their performance. Except for the effect of a common computer environment, little interface or coproductivity are built into the tools and techniques employed within Applications to manage and do its work. Many tools and techniques are initially selected to meet project-level requirements. Applications-wide requirements are generally not a factor in the selection or creation of tools, nor the derivation of techniques.

2. The problems which are caused by this localized approach are manifested in many ways. Information which would be useful is often not transferred from one function to another. Management resources are dissipated on exercises to simply make the

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administrative system run, no less manage people or create products. Recent statistical analysis of use of technical personnel in B Division showed that the administrative overhead was more than twice that expected and used for planning.

3. We have a large number of software engineering support tools and techniques covering standards, documentation, and the life-cycle phases and functions. Many tools are not properly maintained, yet are expected to help Applications create and maintain its products. Techniques depend on "voluntary" working groups for their standardization, having generally originated from the efforts of some of Applications' most creative staff members. Working groups compete for time with management and production requirements on their members, and generally come out a poor second. Applications has tended to avoid allocating the necessary staff time and resources toward improving the system.

4. While there are a wide variety of recommendations in Appendices B through H, they may be reduced to three broad recommendations:

- 1) Perform a comprehensive systems analysis to define an overall Applications' methodology;
- 2) Properly upgrade, maintain and administer the tools and techniques presently employed within Applications; and
- 3) Modify selected Applications' policies and environment.

Some observations about these recommendations:

- All must be performed if there are to be major productivity improvements;
- All require explicit and significant allocation of resources to their accomplishment, to the short-term detriment of the mission of Applications; and
- All are continuous and recurring.

5. These three broad recommendations summarize an assortment of more specific recommendations produced by the APWG. The assorted detailed recommendations, under headings of the three broad recommendations, are listed with references from their sources in Appendices B through I, and where appropriate, reference Computer Applications Request/Action forms (930's) in Appendix J.

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SYSTEM METHODOLOGY

Recommendation	Source	930
1. Develop an overall methodology and standard approach for applications development (incorporating requirements, design, implementation, and documentation) and management.	C,E	J-1
2. Develop automated support for requirements analysis/specification. Survey available packages.	C,E	J-1
3. Develop automated support for design analysis/specification.	C,E	J-1
4. Develop and upgrade implementation tools, including DBMS'.	E	J-1
5. Develop and upgrade documentation tools.	E	J-1
6. Provide project scheduling, planning and resource management support at all levels of Applications.	B,C, E,F	J-1
7. Develop standard metrics for resource utilization and productivity.	B	J-2

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SYSTEM TOOLS AND TECHNIQUES

Recommendation	Source	930
1. Establish software engineering tools library, including incentives for contributions, staffing, training, and maintenance.	D,E	J-3
2. Establish an inventory of applications, referencing people, projects and keywords.	E	J-4

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SYSTEM POLICIES AND ENVIRONMENT

	Recommendation	Source	930
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- | | | | |
|------|---|-----|------|
| | 1. Establish a list of points of contact for ODP experts in key technical areas. | D,E | |
| STAT | 2. Establish <input type="checkbox"/> Applications technical library with periodicals, books, video tapes, etc. | B | |
| | 3. Perform long-range personnel planning, especially covering rotational assignments and training. | B | |
| | 4. Coordinate training and assignments. | B,F | |
| | 5. Develop Applications-wide personnel performance criteria. | B | |
| | 6. Plan replacement of high-maintenance systems. | H | |
| | 7. Contract for development, maintenance, and documentation. | B,C | |
| | 8. Define a policy for <u>user</u> development/maintenance of applications. | H | |
| STAT | 9. Encourage users to schedule more meetings <input type="checkbox"/> | G | |
| | 10. Provide adequate work space for programmer/analysts. | I | |
| | 11. Upgrade tech-writing and provide clerical SCRIPT support. | D | |
| | 12. Install more terminals in <input type="checkbox"/> Applications area. | G | STAT |
| STAT | 13. Acquire <input type="checkbox"/> hi-quality, hi-speed printer. | G | |

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6. It is probable that a systematic requirements collection and analysis effort, as proposed in methodology recommendation 1, will add to and modify the recommendations listed above. Just as our users' requirements continue to evolve, so will Applications'. The emergence of needs to add and change is normal and healthy, and should be addressed with the allocation of sufficient resources to allow the accomplishment of at least the most urgent tasks. The environment supporting Applications has become too diverse, the tasks too many, and the organization too large to depend on random evolution of philosophy and methodology, as has been the tendency in the past.

[Redacted Signature]

Chairman, APWG

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APPENDIX A

10 December 1980

PRODUCTIVITY WORKING GROUP AREAS

TRAINING FOR THE ANALYST/PROGRAMMER --

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Develop in-house course on project planning, use people from all divisions for instructors
Test people for qualifications before sending to classes
Increase curriculum (both internal and external) (3)
Need in-house training more related to Applications needs
Need training courses to be part-time, vice full-time
Need training courses on high interest current topics, advanced subjects, and newest techniques (software & hardware) (7)
Provide requirements definition training (2)
Use Training Staff to teach advanced topics instead of basic user courses (3)
Provide continued training for analysts/programmers in structured techniques (2)
Provide training on learning to become better listeners
Provide Publications and briefings on generalized software development in all divisions

STAT MANAGEMENT OF PEOPLE --

Allow more time to develop new skills (5)
Assign fewer tasks per person - too many to do properly (3)
Improve poor performance by senior personnel, reduce resistance to learning new techniques and to change (5)
Reduce staff effort being utilized on maintenance tasks (2)
Plan assignments to coincide with recent training and rotations, and plan these changes better (7)
Move personnel less
Need more interesting type/level of work
Need more and better communication mechanisms (2)
Use AWP to motivate
Require employees to use a Time-Event chart -- make employees more accountable for time usage (2)
Consider an individual's preferences whenever possible
Train personnel to replace those going on rotation
Anticipate and plan ahead for specific project training (4)
Need more structure in application with regard to maintenance and development work areas of speciality
Establish performance standards for personnel based on project stereotyping
Need better motivation and pride in the finished product

APPENDIX A

MANAGEMENT OF APPLICATION DEVELOPMENT AND SUPPORT --

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Have separate development and maintenance activities clearly defined
 Initiate and enforce closer tracking of projects using new Hardware and Software techniques and tools (2)
 Improve administrative support (2)
 Don't implement all projects
 Discontinue less productive and unnecessary paper work, aid production maintenance check list before accepting programs
 Phased implementation
 Structured project management and design
 Schedule project reviews at shorter intervals (i.e. shorter milestones)
 Develop long range planning
 Management concentration on reducing changes in direction
 Management commitment to productivity improvement
 Establish management steering committee for productivity improvement
 Align project management practices with training
 Need maintenance group for all PAS work
 Reduce administrative overhead on technical personnel
 Documentation should be completed at the outset of a project, and not "after the fact"
 Establish Application-wide test group
 Develop systems which require less maintenance
 Require Problem Reports for all systems in production
 Separation of development & maintenance activities
 Code reading and guidance at beginning of projects; don't wait until documentation has ended
 Schedule project implementation soon after feasibility study
 Need maintenance guides for interpretation of newly implemented projects (could be shown under documentation)

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STANDARDS ---

Use of standard software-(DBMS,utilities)
 Need definition of productivity and how to measure it (2)
 Stricter enforcement of standards (coding, documentation, design, etc.) (7)
 Need standards for programming, documentation and design (2)
 Develop design standards for various languages (2)
 Need better and more meaningful documentation standards (9)
 In-code documentation (commenting)
 Increased effort in requirements review and systems design - The main emphasis should be geared toward clarity, simplicity and consistency (2)
 Clear definition of expected end results of finished products

APPENDIX A

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ENVIRONMENT --

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Improve communications with customers not at and with the support staff (3)
 Improve programming environment- terminal and office space (4)
 Centralize the location of computers, programmers, and users (2)
 Improve accessibility to Hqs. resources (library, CSS, SPD)
 Move back to Hqs.
 Make user travel as well as ODPer
 Need better shuttle service
 Eliminate trips to Rosslyn, C of C, etc.
 Reduce noise in private and central workspace (2)
 Increase number of terminals (5)
 More VM print capability (especially LASER)
 Decrease MTBF and MTRR on existing terminals and system (9)
 Decrease down time for VM and GIMS (3)

SUPPORT FOR THE ANALYST/PROGRAMMER (PEOPLE) --

STAT

Better communications, between all levels of end users, A/ODP, ED/P/ODP and SPD/P/ODP
 Hire technical writer for documentation/manuals
 Provide direct clerical SCRIPT keying support to analysts (10)
 Increase T.O. to handle increasing maintenance burden (2)
 Provide contractor support for maintenance and coding
 Improve secretarial force
 Designate individual or group to keep on top of utilities
 Create an Applications Tech Staff/ Product Development Group
 Create an Applications group to review requirements definition and system development (2)
 Designate individuals with expertise in specific hardware/software who could provide consultation to programmers (2)

SUPPORT FOR THE ANALYST/PROGRAMMER (TOOLS) --

STAT

Have more and better defined documentation aids (4)
 Implementation of 'GIMTRAN' software on GIM II
 Increase use of new/existing software tools (2)
 Have someone look into a 'design methodology' package
 Automatic flowchart program (2)
 Microprocessors
 Need better compilers, DBMS, etc.
 Obtain an independent dictionary and directory system to aid in system definition and documentation
 Use automated requirements definition, design/development tools (PSL/PSA) (6)
 Use structured languages -- PASCAL (2)
 Need to use tools developed outside the Agency
 Implement project planning tools

APPENDIX A

INVENTORY (Index/Library) --

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Develop index/library of completed applications and system enhancements (2)
Develop generalized systems for routine applications which can be tailored for individual components to avoid redundancy and reduce maintenance (3)
Develop and distribute a skills bank to support assigning projects and information exchange (2)
Catalog, distribute and promote use of the many system and software tools developed and held by small groups or individuals
Establish a librarian function to eliminate D/E of program code by programmer/analyst
Automated locating of experts for design and program aid standard software packages to do like tasks

END USER APPLICATION DEVELOPMENT --

STAT

Train users for maintenance and general education (2)
Increase support by customers of completed applications
Design systems for non-technical users (simplify) (2)
Use of friendly and easy to use high-level languages
Additional graphics capabilities -- such as TELAGRAF (2)
Obtain application generators to enable quick generation of 'bread board' models and simple applications
Support the use of ORACLE relational DBMS

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1 May 1981

1.0 Overview

"Management" is a relationship between people, concerning a work assignment. Computer programmers, analysts, and project leaders are classed as "knowledge workers". That is, the jobs performed by these persons require more mental than physical labor, and demand originality and creativity. Management of "knowledge workers" is not an easy task. Individual skills and capabilities vary widely across personnel. "Knowledge workers" demand a significant influence over the direction of their jobs and careers. None of these difficulties is unique to either ODP/Applications or the data processing field.

The formal organization of ODP/Applications ends at the Division management level. Below this level, the day-to-day work is accomplished by overlapping combinations of project teams, task forces, working groups, and individual efforts. Such an organization is both good -- in that it permits maximum flexibility, and bad -- in that it results in fragmentation of both resources and authority.

Management of people has been typically divided into two types of activities -- those which are people oriented and those which are task oriented. This paper does not address the people oriented side of management for two reasons. First, there are few universally accepted "good" and "bad" ways of relating to people on a supervisor-employee level. And secondly, even if there were accepted norms for this relationship, they could not be effectively mandated, monitored, or enforced. Thus, this paper deals with the structure and organization of tasks, rather than the techniques used to motivate people to do them well.

In order for a person to perform work tasks productively, he/she must:

- Fully understand the overall job function.
- Fully understand the specific work task.
- Receive continual feedback on performance.
- Provide to management continued feedback on the job and work.
- Be able to ask for and receive help, information, and guidance.
- Have the training, experience, skills, and environment needed to perform the task.

Each of these is discussed separately below:

Understanding the Job -- Computers do well when given a mindless sequence of tasks; people do not. For people to be they must first understand the overall function of their job. This includes:

- A job description

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- Job performance criteria
- General guidance

A job description should identify the overall responsibilities, skills and skill levels, relationships to other jobs, and activities to be performed. Job performance criteria should define policies, procedures, and constraints which apply to the overall job. Together these two provide the baseline for a job or job class. All employees performing the same job should have the same job description and performance criteria. General guidance is provided by a manager to set priorities, emphasize certain aspects of the job, and to convey the style, experience, and approach favored by the manager. This guidance may change over time, and may vary across managers.

Within ODP/Applications, formal job descriptions are used sparingly, if at all. Many people have never seen their job description. They are not used in performance appraisal. Instead, the General Objectives portion of the employee's Advance Work Plan (AWP) is used. It is recommended that all ODP/Applications job descriptions be reviewed, updated if appropriate, and made available to all personnel. A set of Applications-wide performance criteria should be developed for each job description, and made a part of the Performance Appraisal Report (PAR). The AWP should contain only those duties and tasks which are specific for an individual, such as project assignments.

In the area of performance criteria, we need to develop positive, negative, and absolute criteria. Positive criteria identify things which are desirable, allowing room for various levels of achievement. Negative criteria identify things which are not desirable, allowing room for various levels of avoidance. Absolute criteria identify things which must be adhered to, with no room for deviation.

Understanding the Task -- A task, as used in this paper, means a separate activity or duty performed as a part of, or complementary to, the job function. Tasks vary by individual. In order for the individual to perform the task productively, he/she must be given:

- The goals and objectives of the task.
- Specific guidance.

A goal is a general statement concerning the desired outcome of the task. An objective is a specific, measurable event which contributes to achievement of a goal. Specific guidance is provided by a manager to set priorities among tasks, emphasize certain aspects of the task, define relationships between tasks, and convey the experience and approach favored by the manager. This guidance will vary over time and across managers, and may vary across tasks.

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The AWP is, and should be, used by Applications managers to identify individual task assignments and performance objectives. However, it should not be used as a job description - as is often the case currently. It is recommended that supervisors take a more active role in the creation and updating of AWP's. In some instances, these duties are assumed solely by the employee. Letters of Instruction (LOI's) quickly degenerated into paper exercises in recent years. The AWP will undoubtedly suffer a similar fate unless it is taken seriously.

Receiving and Giving Feedback -- A key role of the manager is giving and receiving feedback on work and work performance. The manager gives feedback both correctively to influence performance which is not achieving its objectives, and as a reinforcement to encourage the desired performance. The PAR, a formal annual event, cannot be considered as a feedback mechanism. Unlike a vaccination, a once yearly booster shot of feedback does not immunize an employee against poor performance. The only useful purpose served by the PAR is as a backup justification for employee promotion or demotion. An undue emphasis on either the PAR or AWP indicates that the truly important aspects of feedback -- that it is continual, fair, honest, and uniform -- have been missed.

The employee must be encouraged to give feedback concerning the job and work assignments. An excellent means for achieving this end is to involve the employee in the work-related decision-making process. As a minimum, the employee feedback should be a report on the status of their tasks -- what they did; what they plan to do; problems they have; and their long-term evaluation of the work status. Additionally, the employee must be able to suggest changes to the work and propose exceptions to general rules. The less formal that the feedback mechanism is, the more likely the manager is to hear the true status and suggestions. Further, the manager who responds to a suggestion with "That's a good idea. Write me a paper on it." actually stifles creativity, rather than fosters it.

Feedback must be continual, and often spontaneous. It must be confidential, unless it involves praise, and always honest. It must permit the communication of feelings, concerns, and perceptions as well as facts. The Applications Productivity Questionnaire did not produce any responses which complained about current feedback practices.

Asking for Help -- An employee must be able to ask for and receive help, information, and guidance. While this sounds like an easy thing to do, it really means that:

- The manager needs to be readily accessible to employees, not always tied up in meetings or too

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busy to talk.

- The manager needs to be able to give as much help or guidance as is wanted without giving more than is wanted.

Division Chiefs and their Deputies are busy people. Because Applications has no formal structure below the Division level, two persons must manage thirty or more employees. Inaccessibility to Division managers on short notice is a common complaint. Institution of Branches below the Division level would help to alleviate this problem.

Providing the Environment -- If an employee is to perform the job and work tasks assigned, he or she must:

- Have the necessary skills, or be able to acquire them through training and experience.
- Be provided with an environment (equipment, facilities, tools, etc.) which supports the work.

In recent years the ODP training and travel budgets have been severely reduced. The result is that truly first rate courses like IBM's "Project Management" are restricted to a few persons per year. Thus, Applications has come to rely heavily on in-house and on-the-job training. The Productivity Questionnaire produced numerous complaints that in-house training was inadequate, external training was unavailable, and work pressures prevented on-the-job training. Clearly there is a significant concern that Applications is not developing technical skills needed to do the work more productively.

Our computer system development environment is excellent. The tools, development aids, and job turn-around times are far better than found in many data processing shops. We have little room for substantial improvements in this area.

The workload of customer requests far exceeds ODP/Applications ability to service them in the timeliness, quantity, and quality which it would prefer. Thus, ODP/Applications is concerned with individual and group productivity issues. This section addresses issues related to the management of personnel.

2.0 Results of ODP/Applications Survey

The productivity survey form distributed by the Deputy Director for Applications revealed some common complaints, and a few suggestions, concerning individual productivity. These are briefly addressed below.

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"Allow more time to develop new skills"
"Assign fewer tasks per person - too many to do properly"

These comments result from a feeling that the quantity of work to be performed prevents individuals from either learning new skills or providing a high quality of service. Several observations are relevant. First, individual training is readily available -- through in-house courses and seminars; through self-study courses and texts; and through university and corporate training. There are limits, resulting from budget constraints, but critical training needs are being met. Second, it is a widely held feeling that individuals are being overloaded with work assignments which cause them to either miss deadlines or skimp on systems development activities. Third, there is little indication that people are routinely working overtime to compensate for the work overload.

"Reduce staff effort being utilized on maintenance tasks"
"Need more interesting type/level of work"
"More structure in Applications with regard to maintenance and development of work areas of speciality"

These comments reflect a consensus in two areas. First, few persons like to maintain a system after it is developed. Second, Applications does a great deal of very similar work. The customers may vary, but the technical solutions are nearly identical.

"Consider an individual's preference whenever possible"
"Need more and better communications mechanisms"
"Use AWP to motivate"
"Better motivation and pride in finished product"

All of these comments center around a better supervisor/subordinate relationship. People seem to feel that they are left out of the overall work planning cycle. Many comments referred to the isolation resulting from small, fragmented project structures.

"Establish performance standards for personnel based on project stereotyping"
"Improve poor performance by senior personnel - reduce resistance to learning new techniques and to change"
"Require employees to use a Time Event chart - make employees more accountable for time usage"

These comments reflect the frustration felt when a person feels overloaded with work, isolated from others, and left out of the work

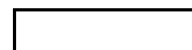
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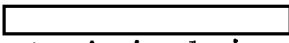
planning cycle. It is doubtful whether the Applications personnel who made these comments would really like to punch in/out with time cards, set up daily quotas for software production, and fire everyone who does not agree with some new technique.

"Train personnel to replace those going on rotation"
"Anticipate and plan ahead for specific project training"
"Plan assignments to coincide with recent training and rotations, and plan these changes better"
"Move personnel less"

These complaints indicate that Applications management is perceived as not doing an effective job of plan-ahead personnel scheduling. More study is needed to determine whether or not this complaint is true on a wide-scale basis.

3.0 Recommendations

The following recommendations are made in hopes of improving productivity by changing the manner in which personnel are managed.

1. Begin an active study to determine the appropriate software and/or personnel metrics needed to measure Applications output. For example, lines of production program per work-month, bytes of load module per production program, etcetera.
2. Begin an active study to determine the appropriate metrics needed to measure Applications resource expenditure. For example, PRISM hours, SMF machine costs, etcetera.
3. Using the metrics devised in 1 and 2, above, begin to measure Applications productivity.
4. Use past performance to model and estimate future performance.
5. Provide a powerful personnel and task scheduling tool for use by Applications managers and project leaders. Use this tool to prevent overloading of work assignments and to determine schedule impacts for changes in priorities and assignments.
6. Establish a small technical library in  This library should contain copies of recent technical journals, publications, and papers, training information, state-of-the-art books on topics of general interest. Encourage self study as a means of remaining competitive in the data processing field.

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7. Continue to investigate the possibility of obtaining a contract for Applications documentation and maintenance tasks.
8. Stress the "life cycle" concept for computer systems development. The end product is not the software, but the total system and its user.
9. Continue to investigate ways in which software and expertise can be shared, rather than reinvented.
10. Continue to develop generalized computer solutions -- like word processing and registries.
11. Continue to stress the use of packaged software, procured and maintained by vendors, rather than in-house systems.
12. Tie training more closely to actual assignments. Use assignments as training vehicles.

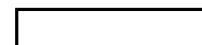
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A. Standards for Project Implementation

1. Project Planning and Management

Present Environment: Standards receive extremely varied treatment by different Divisions, and by size of project.  exacts minimal reporting but imposes little control or structure. Planning and management in B, C and D Divisions are mainly dependent on the project managers' individual experience and sophistication combined with their level and formality of interaction with group or Division management. Maintenance efforts enjoy almost no formal planning or management, leading to the perpetual obligation of maintenance personnel to a user group or office. Present or proposed standards do not attack these problems because:

- o They in the main do not structure project planning and management;
 - o They do not provide for the enforcement of the few things they do cover; and
- their poor applicability to conditions in Applications.

Finally, there is effectively no quality assurance authority extant in Applications to promote the correction of these conditions.

Work being done in this area: Work on standards in Applications has stopped due to the unavailability of personnel to work on them. No known effort exists to provide QA across Applications.

Recommendations: An overall philosophy and approach for applications development should be developed before any specific action is taken against this problem.

2. Project Implementation (Requirements, Development and Maintenance Phases; Documentation)

Present Environment: Present official standards are outmoded and often ignored, outside of A Division. Newly drafted standards are in limbo due to unavailability of senior personnel to complete them properly. Enforcement of any standards depends on management and review styles of individual project leaders and group or division management. No consistent, independent QA authority exists.

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Work being done in this area: Work on standards in Applications is at a standstill.

Recommendations: An overall philosophy and approach for applications development should be developed before any specific action is taken against this problem.

B. Quality Assurance

Present Environment: No Applications-wide quality assurance exists or is enforced. A Division pursues an effective internal program of QA oriented to its specific project structure. B, C, and D Divisions and Training Staff pursue QA mainly through implementation of the personal management styles and preferences of their Division and project managers. Previous efforts at implementing QA have approached only parts of the problem, such as tools (standards, SOP's, documentation support) or limited scope support, and review services (mentors and/or boards for specific applications types - GIM, RAMIS). These efforts have in general failed or had limited effect because they did not work within a single, coherent approach for K: for Applications as a whole, and thus broke down for lack of continuity or support in some phase of their enforcement or use. Lack of a specific QA directive within Applications has also forced such limited efforts to wither and fail for lack of the ability to command necessary resources.

Work being done in this area: Work is sanctioned in several isolated aspects of QA, and performed mainly under the Division or project managers. Work on Applications standards and SOP's is at a standstill. No work on a coherent QA methodology for Applications is known to be presently pursued.

Recommendations: A feasibility study should be commissioned on QA for Applications to define the following:

- o Requirements;
- o Alternative implementations;
- o Recommendations.

Action should be taken on the selected alternative.

C. Applications Management Methodology

Present Environment: Management in Applications is performed using a variety of fragmented tools and procedures for its

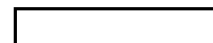
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MANAGEMENT OF APPLICATIONS

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accomplishment. Individual managers bridge the gaps and discontinuities between the aspects of management as well as they can. No known overall plan exists for Applications management methodologies, toward which efforts may be directed in the evolution of existing procedures. Individual efforts exist to improve reporting, task and subtask definition and monitoring, and SOP's.

Recommendations: A detailed review of existing management tools and procedutres should be performed to define the existing environment and presently recognized shortcomings. Through a comparison of the requirements of Applications (surfaced through the review), and the practical management methods demonstrated elsewhere, develop a model for improved management in Applications. Schedule upgrades to Applications management, and implement projects to acheive those upgrades.

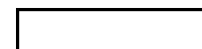
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SERVICES SUPPORT

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Better communications, between all levels of end users,
A/ODP, ED/P/ODP and SPD/P/ODP

Designate individuals with expertise in specific hardware/
software who could provide consultation to programmers (2)

Current environment:

Communications between personnel, for any reason, results from a need to inform or be informed. Normally the path of communication is known, however when it is not, often it is difficult to determine who needs to be informed or whom to request information from. At one time, ODP Consulting Services produced a list of experts in specific hardware/software skills, but the list was never maintained.

Recommendation:

Do a study on the feasibility of establishing an on-line directory of specific individuals to be contacted for consultation about matters concerning ODP functions and available expertise in specific hardware/software.

Hire technical writer for documentation/manuals

Current environment:

Done by ODP and Users.

Recommendation:

The availability of techwriters for ODP seems highly desirable for use in creating requirement/design specifications and RFPs, especially when the enforcement of standardization is applied.

Designate individual or group to keep on top of utilities that aid production and maintenance tasks.

Current environment:

A number of very good utility type functions currently exist and are floating around, some documented and some not, none of which have been assigned to a group or section responsible for their maintenance. There is no central point to determine what these utilities are or what their functions may be other than an attachment to the Applications Standard Operating Procedures (ASOP), a copy of which can be found in each Division.

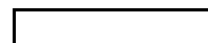
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Recommendation:

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Do a study on the feasibility of establishing a central library, which would be maintained to include SPD's ZDISK, , DLIB, along with the ASOP attachment and any other locatable production and maintenance aids.

Create an Applications Tech Staff/ Product Development Group

Create an Applications group to review requirements definition and system development (2)

Current environment:

Currently such groups exist but are not and were not designed for across the board Applications groups. Instead they perform in specialized areas; i.e., GIMS Review Board.

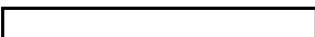
Recommendation:

Until across the board enforcement of (soon to be) standards is implemented, it is difficult to determine whether the need for such groups will become more evident or possibly diminish. If such groups are determined to be needed, their productiveness will be dependant on strong enforcement of standards.

Provide direct clerical SCRIPT keying support to analysts (10)

Improve secretarial force

Work being done in this area:

 has been tasked with establishing the needs of Applications personnel in the area of word processing. The following is her understanding of the task.

The need for standardization regarding clerical and secretarial support becomes more apparent in ODP everyday. It is my objective to initiate this standardization by first establishing the needs of the managers, programmers and analysts in the area of word processing support and office automation. At the same time, the secretarial skills existing will be reviewed along with the secretaries' requirements and specifications for meeting the work requests of the Divisions.

Word processing in Applications is currently done in SCRIPT. By writing macros, adapting some current software (i.e., DOC) and modifying SCRIPT, word processing will become more relevant to the secretaries and this will encourage wider use of it.

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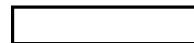
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As a long range goal, there is the possibility of acquiring some stand-alone word processors for use in Applications on an experimental basis. Also, as standardization progresses, there will be the need for educating all concerned, from secretarial to top management. Classes will be designed and tailored to the needs arising at that time.

Recommendations:

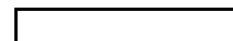
Continue the work presently underway.

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1. Establish and publicize a library of software available in-house. This would include both software developed in-house and held currently by small groups of individuals and all commercial software packages.

a. Present environment:

SPD maintains the ZDISK which is accessible by VM users.

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maintains a collection of routines considered to be of general interest for use in applications programming. This library, called DLIB, is currently on PANVALET. The library includes an index (IC320000) to DLIB routines. The DLIB facility was announced at a Professional Development session. At this time software routine contributions were requested. To date, no contributions have been received. Within Division B, maintains an inventory of available graphics packages and an inventory of statistics software.

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b. Work being done in this area:

Both the ZDISK and DLIB facilities are available to users and contributions are encouraged.

c. Recommendation:

Explore the feasibility of making DLIB a more viable tool. In order to do this an individual would be designated to maintain, publicize, and coordinate new additions to the library. The individual would have a percentage of his time allocated specifically for these functions in order to ensure the success of the software library.

Investigate the feasibility of establishing and maintaining a current inventory of software packages available to the Applications programmer.

2. Establish a library of completed applications and systems enhancements. Such an inventory would be helpful to a programmer, analyst, or project leader embarking upon a new project. It would enable him to avoid redundancies and prevent any "reinventing of the wheel."

a. Present environment:

The CLS (Centralized Library System) maintains copies of most completed applications on PANVALET, but there is no index to

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facilitate the use of CLS as a central library source for the analyst/programmer.

b. Work being done in this area:

None

c. Recommendation:

Explore the feasibility of adapting PANVALET to serve as an inventory tool for the Applications analyst/programmer. This would involve the incorporation of indices of people, projects, and project descriptions. Ideally, the user would have on-line access to the library and a keyword search capability.

Another avenue for exploration is the adaptation of the ADTRACK System to serve as an inventory of completed applications. There is a file available in ADTRACK (PAS/SAS) which is not currently being utilized for this purpose. This file might possibly be implemented to satisfy the inventory requirement.

3. Develop generalized systems for routine applications. This mechanism should cut down considerably on the implementation time of such systems as well as facilitate their maintenance.

a. Present environment:

Applications has initiated the development of systems which can be used or easily adapted by any component for its use. D Division has developed a generalized Registry System which is being implemented for components throughout the Agency.

b. Work being done in this area:

B Division is currently developing a generalized property accountability system for use throughout the Agency by individual components. B Division is also developing Agency-wide graphics capabilities and is working with the Office of Finance to develop a financial accounting system (FAB) for use in overseas field stations. D Division is involved in the development of Agency-wide generalized word processing capabilities and a production management system to be implemented throughout the NFAC components.

c. Recommendations:

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Continue the work presently underway and investigate other possible applications which lend themselves to generalized system development.

Explore the possibility of developing a keyword index of 930 requests to facilitate the determination of applications suitable for generalized system development.

4. Develop a functional directory of resources available to the Applications analyst/programmer within ODP.

a. Present environment:

There is currently no directory for ODP resources outside of Applications. Some junior programmers are not aware of the functions of other ODP components or of the facilities available to them through the components.

b. Work being done in this area:

None

c. Recommendations:

We should publish and maintain a functional directory of resources within ODP available to the Applications analyst/programmer. Additionally, the directory should be issued to all incoming programmers. This might be a continuing part of the "Introduction to ODP" course support.

5. Make available to the analyst/programmer tools to assist in the performance of his responsibilities. Primary emphasis should be placed on the following aspects of the role of the analyst/programmer:

- o Project Planning
- o Automated Requirements Definition
- o System Definition
- o Design Methodology
- o Project Implementation
- o Documentation

Project Planning

a. Present environment:

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The NASAPERT/EZPERT Scheduling System is available to the analyst to facilitate project planning. This system is composed of two programs, NASAPERT and EZPERT. Although some analysts are aware of this facility and find it a useful tool, many analysts are either not cognizant of its existence or have not taken the time to familiarize themselves with the software.

b. Work being done in this area:

The SPRINT Project in B Division is tasked to significantly upgrade Agency-wide project planning capabilities and support, starting with OC.

c. Recommendations:

SPRINT should be extendible to the ODP Applications project level use.

Automated Requirements Definition and
System Definition

a. Present environment:

There is no automated requirements definition tool or system definition tool currently used by the Applications analyst/programmer.

b. Work being done in this area:

ORD has brought a software package in-house called Problem Statement Language/Problem Statement Analyzer (PSL/PSA). This system, which runs interactively under the VM system, is a tool which facilitates automated requirements definition, system definition, and system documentation. B Division is currently testing the facilities available through PSL/PSA.

currently on rotation to OER, has been investigating the SDM/70 software package.

c. Recommendations:

Continue the work being done. Consider alternate packages which might better fit ODP requirements.

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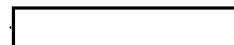
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Design Methodology

a. Present environment:

There is currently no design methodology tool used within Applications.

b. Work being done in this area:

PSL/PSA are usable during design, but have not been applied as yet.

c. Recommendations:

We should employ PSL/PSA on an experimental basis, probably as a follow-up to its use on requirements.

We should initiate a study to investigate the design methodology software available on the commercial market.

We should explore the feasibility of employing a program design language which is structured to bridge the gap between the analyst and the customer.

Project Implementation

a. Present environment:

The programmer/analyst has available to him various implementation tools, including several programming languages, two data base management systems, and the facilities of both a batch and an interactive system. Additional facilities are available with the proliferation of minicomputer applications.

b. Work being done in this area:

Work is in progress on the GIMINI System (An adaptation of the GIMS System for the IBM 4300 series minicomputer.)

A Division has contracted a study to compare several commercially available data base management systems. Project SAFE is currently investigating various text search data base management systems.

c. Recommendations:

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- (1) Increase the awareness and use of generalized routines written in-house, as well as commercially written generalized systems, to perform routine tasks.
- (2) Perform a study of the available data base management systems. A comparison should be made between our current DBMS's and those available outside of the Agency.

Documentation

a. Present environment:

There are no Applications-wide documentation tools. C Division developed an on-line documentation tool called the Human Resources (HRS) Data Element and Documentation System. HRS is composed of two programs, DATADOC for defining data elements and PROGRAMDOC for identifying data elements in specific programs. This system was developed by the PERSIGN II Development Team and made available to the Division for its use. Additional documentation tools available in-house include SCRIPT, AIM, and SYSPUB.

b. Work being done in this area:

STAT is gathering information about data dictionaries available on the commercial market. He plans to write a summary of his findings with a recommendation to purchase the data dictionary most appropriate for Logistics Integrated Management System use.

c. Recommendations:

Perform a study of the documentation tools available on the commercial market.

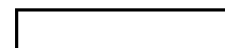
NOTE: A major consideration in the choice of a documentation tool is that it must interface with the tools used during the project development and implementation phases. In lieu of this, the study of tools available to the analyst/programmer might best be accomplished by considering tools to facilitate the totality of the project development and implementation cycles.

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1. Develop in-house course on project planning, use people from all divisions as instructors.

Present environment:

STAT Presently there is a System Analysis Workshop course offered by for a five-day duration. The course is workshop oriented with live problems presented for separate team solution. Included in the course is a portion on project planning.

We presently use part-time instructors from other divisions in Applications and Processing to supplement course requirements. These have proven to be very satisfactory solutions for some of our problems.

There are self-study courses on video tape of the Training Staff's System Analysis course and two self-study courses available relating to project planning. They are "System Analysis Training" produced by Advanced Systems, and "Managing the Application Development Process" produced by IBM.

Suggestions:

Use of personnel from all divisions could be one solution if the time and desire to participate is indicated. It would require development of materials, scheduling of classrooms, enrollment of students and prep time for the instructors.

2. Test personnel for qualifications before enrolling them in classes.

Present environment:

Presently required prerequisites or comparable experience are stated on the enrollment notices that are sent to individuals. There are prerequisite requirements for all courses with the exception of IEDP, BVM, and reading JCL.

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In lieu of testing, it has been left to the discretion of the supervisor to enroll personnel that they feel are qualified and are in need of the proposed training.

Suggestions:

Supervisors should scrutinize their personnel to make sure that they are in fact being enrolled in courses that will be utilized for their current and proposed tasks and do have appropriate background.

3. Increase curriculum, both internal and external.

Present Environment:

The Training Staff offers a variety of 30 courses that are taught internally. Most of these same courses are also available at the self-study lab on video tape for students' convenience.

In addition to the above courses, the Training Staff sponsors Systems Analysis Workshop, Project Management, and Project Implementation from outside vendors. These courses are scheduled based on needs and funds available. Normally these courses are scheduled one to two times a year.

Special courses are also offered from outside sources as the needs arise; i.e., Computer Graphic Display, Delta Data Operation, Basic Programming Language for use on the Delta Data Minicomputer and Technical Writing. The Basic Programming Language course will become part of the Training Staff's normal schedule in the near future after Delta Data fulfills their instruction obligation.

Another available source is local universities for those people interested in evening programs. Most available is UVA where courses are offered at Hqs and taught by Agency instructors.

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Operations Division presently has 20 Computer Aided Instructions courses that run on the VM/370 System. The courses are utilized to train personnel in the operations field. Included in the 20 courses are three that the Training Staff is in the process of evaluating to determine if they would be useful for Applications personnel. The three are BVM, JCL, and Basic PL/I. A pilot program relating to the above mentioned courses will be forthcoming.

Suggestions:

Courses that are desired should be brought to the attention of individual Division Chiefs, Deputy Division Chiefs or Project Leaders. These requests could then be forwarded through present channels for appropriate evaluation and action.

4. Need in-house training more related to Applications' needs.

Present Environment:

Courses that are presently being offered are geared to current software and hardware needs of the divisions. The courses cover both current and future system requirements.

The courses are aimed at computer and user personnel that are deemed necessary for successful completion, maintenance, and execution of systems.

Suggestions:

Same as referenced in item 3 above.

5. Need training courses to be offered part-time vice full-time.

Present Environment:

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At present all courses are scheduled on a full-time basis. This procedure allows ample time for scheduling of instructors, students, preparation of materials, and most importantly, obtaining adequate classroom facilities.

One course, Introduction to EDP has been scheduled in some instances for half-day sessions spread over a five-day period. When this is done two classes run, one in the morning and one in the afternoon. This method has worked fairly well for Introduction to EDP and could be utilized for other courses in special circumstances. However, given the limited numbers of instructors, classrooms, and the varying lengths of courses, it would be impractical to schedule the full range of Training Staff courses on a part-time basis. Also, most of the Training Staff courses are designed to teach specific skills in a relative short period of time.

Suggestions:

If more classrooms and instructors were available, this concept might be utilized more in future courses.

6. Need training courses on high interest current topics, advanced subjects, and the newest techniques for (software and hardware development).

Present Environment:

The Training Staff presently offers a bi-weekly Career Development Program that includes movies on some of the latest EDP techniques and tools available within the industry. The movies are supplemented by a 30-minute presentation from personnel from Applications and Processing Divisions relating to topics that should be of interest to ODP personnel.

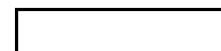
Prior to setting the agenda for each Applications Professional Career Development Program series, topics, speakers, and personnel desires are solicited to try and obtain ideas for presentation of material that would be of interest and helpful to ODP personnel.

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Suggestions:

Prior to scheduling the next series of the bi-weekly programs, an increased effort to solicit and evaluate ideas for content should be implemented.

7. Provide requirements definition training.

Present Environment:

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Presently this topic is included in the  System Analysis Workshop course that is offered twice a year.

This topic is also included in the video tape courses offered by the Training Staff for the self study program.

Outside training for this type of course is also available at local universities.

8. Use Training Staff to teach advanced topics instead of basic user courses.

We have in the past developed courses in Advanced PL/I and Ramis topics at the request of Applications. However, when the courses were presented, there was very poor attendance from Applications personnel.

Present Environment:

The Training Staff presently offers courses on intermediate levels of PL/I, VM and writing JCL. A five-part course on GIM II and a four-part course on RAMIS are also offered. Each part is based on completion of the proceeding course.

To enroll in the above courses, basic courses or equivalent experience is required.

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Another reason for basic courses is that current systems are being designed for users to enter and process data required to run their systems. These requirements are part of the system documentation that state certain type training must be made available for users to participate in implementation and execution of the the system.

Suggestions:

Implement procedures wherein user offices instruct some of the basic courses for their own office needs. Example being the Office of Communications and OT&E have in the past taught Basic VM and SCRIPT courses aimed at their individual needs.

9. Provide continued training for analysts/programmers in structured techniques.

Present Environment:

Structured techniques for programming in Basic and Intermediate PL/I are presently being taught.

Applications has produced a document on guidelines and standards that relates to software development that is geared to this idea. The document was created by selected individuals from all divisions of Applications. The paper is currently being evaluated by managers from Applications prior to release.

10. Have publications and briefings on generalized software development in all divisions.

Present Environment:

Publications are available in the Training Staff on software, hardware, tools, and techniques that are utilized and being proposed within the EDP world.

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Briefings can relate back to question 6 which gives information about the Applications Career Development Program.

Suggestions:

Individual divisions should become more aware of what publications would be useful to their needs and applications.

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APPENDIX G
ENVIRONMENT

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1. Provide sufficient terminal support.

a. Present environment:

By far the most discussed environmental problems are the lack of terminals and the amount of downtime associated with communications facilities and computers. Personnel are very easily frustrated when terminal support is unavailable. In some cases, the individual must leave his/her normal working area to find an available terminal. This deprives them of any incoming phone calls or office visitors while away. However, the biggest frustration comes about when because of either communication or computer hardware problems, there are no or a significantly reduced number of terminals. Be it right or wrong, considerable time is spent while "cruising" for a terminal that works or "kabitzing" with fellow workers about the present situation.

b. Work being Done in this area:

None.

c. Recommendation:

When lines are available, more terminals are required.

2. Travel

a. Present environment:

Our distance from Hdqs. appears to be the second most popular item of discontent. The majority of this deals with having to travel to meet with customers. A significant portion of time is spent traveling between buildings as well as waiting for the next shuttle. Most of us appear to be reluctant to ask the customer to travel. We are also deprived of personal contact with ODP components in Hdqs.; e.g., CSS, SPD, CLS, ODP Admin., and the front office.

b. Work being done in this area:

None.

c. Recommendation:

Official management guidance should be forthcoming to encourage Applications personnel to request the customer to travel.

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ENVIRONMENT

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[Redacted]

3. Office facility.

a. Present environment:

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Not much was reported about the actual physical environment of [Redacted]. There were scattered complaints about noise, typewriters, and the Design 100's.

b. Work being done in this area:

STAT

[Redacted] have been ordered for the Design 100's.

c. Recommendations:

STAT

[Redacted]

4. Better print support.

a. Present environment:

For Applications personnel creating documents requiring quality printing, there is approximately a 24-hour wait.

b. Work being done in this area:

At this time, no TEMPEST-approved, high-quality, high-speed printers are available for [Redacted]

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c. Recommendations:

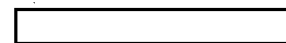
When available, acquire [Redacted] high-speed, high-quality printer. STAT

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APPENDIX H
END USER DEVELOPMENT

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1. Make software available which will allow the end user to do applications development and relieve ODP of applications maintenance responsibilities.

a. Present environment:

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End user applications development is being done in some offices (OER, OPA, OF, OCR, NPIC, OD&E, OSWR, OCO, OSR, OGSR) where small staffs of user personnel have been trained in the use of VM, BASIC, RAMIS, CP/CAM, and sometimes PLI. These groups are capable of creating and maintaining simple multi-file systems independent of ODP professionals. Many other people in the user community have learned the RAMIS report language and are able to create reports from RAMIS and GIMS data bases. What is lacking is the capability to do simple applications development without conventional programming (PLI, BASIC) or hierarchical file design (RAMIS) and with a maximum of two or three days of training.

b. Work being done in this area:

(1) Several offices (OER, OLC, OL) are interested in obtaining an applications generation software package called INFO which runs under VM/CMS and which will have terminal interfaces for both the 5260 and 7260 Delta Data terminals.

(2) ORD is working closely with Relational Software, Inc. in the development of ORACLE (See Section 3, below), a relational data base management system which will have a version that runs under VM by late 1981 and which is supposed to eventually have many user friendly features, such as interactive forms creation, interactive report creation, and flat file structures.

(3) Applications is gradually implementing a policy which requires that offices that have ODP personnel on rotation assume PAS responsibility for their applications.

c. Recommendations (930):

(1) Define an office policy on the support of user developed applications and the use of applications development software.

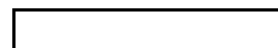
(2) We should study user reaction to and use of INFO and ORACLE and determine if these products can be used to offload some of the smaller application development tasks to the user.

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END USER DEVELOPMENT

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- (3) Evaluate other products such as National CSS's NOMAD.
 - (4) Plan for the replacement of older, high maintenance systems. If this can be done through the use of applications generation software and/or data base systems, maintenance will be reduced.
 - (5) Train users to use applications generation software like INFO so that they can replace obsolete systems. User created systems should be maintained by the user.
2. Obtain software which will facilitate the creation of prototype systems for user review prior to expending the resources for major system development tasks.
 - a. Present environment:

We have no capability of this kind.
 - b. Work being done in this area:

None.
 - c. Recommendation:
 - (1) Send Applications people to Guide/Share and task them to look for solutions to specific issues (targets).
 - (2) Explore the applicability of the software identified in Section 1 above to this requirement.
 3. Obtain additional graphics capabilities, such as TELAGRAF:
 - a. Present environment:

DISSPLA and TELAGRAF are available to VM users. OGSR owns a Genagraphics interactive graphics device.
 - b. Work being done in this area:
 - (1) of B Division has been tasked to define requirements for a family of graphics terminals, some of which will support interactive graphics development software.
 - (2) OL has a near term requirement to develop an in-house graphics creation capability to replace a contractor graphics development service which terminates the end of FY

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END USER DEVELOPMENT

1 May 1981



81. OL is coordinating their effort with  and ODP
Engineering Division.

STAT

c. Recommendation:

Continue the work presently underway.

UNCLASSIFIED

APPENDIX I

17 March 1981

MEMORANDUM FOR: Deputy Director for Applications

STAT FROM : [REDACTED]
CAMS Project Manager

SUBJECT : CAMS2 Development Facility

REFERENCES : 1. "Accommodating Staff with a Friendly Facility",
Computer Decisions, March, 1981.

2. Software Package Human Factors in Computers
and Information Systems, [REDACTED] STAT

3. "Technology Update Ergonomics: The Human
Factor", Output, March, 1981.

1. The quality and quantity of programmer workspace has a profound impact on programmer productivity. Inadequate workspace causes needless stress, strain, and fatigue resulting in costly turnover, tension, and inaccuracy, bug-filled software, and missed target dates. A study at IBM Santa Teresa Laboratory showed a 50% decrease in programming errors after they moved their programmers into a facility designed to meet programmer needs. Last year, in the new facility, [REDACTED] programmers produced a record-breaking amount of this more error free code. At [REDACTED], a 40% increase in productivity was obtained from a 50% increase in workspace. While 30 sq. ft. of workspace per data entry person is adequate, 95-100 sq. ft. is needed per programmer. These figures exclude common areas. Such experiences as mentioned above have convinced [REDACTED] Information Systems to construct a new facility to house 700 programmers. Although [REDACTED] is keeping specific predictions in house, they have stated publicly that they expect "a significant rise in programmer productivity". STAT

2. Approximately 165 person years of effort on the CAMS2(P/S) Development project is programmer time. The total cost for this over the life of the project is projected to be well over \$16 million. A 50% change in efficiency could significantly affect project costs and/or our ability to meet specific IOC dates.

3. Regardless of the location of the CAMS2 Development facility (i.e., GFE or contractor provided), the information summarized in the above paragraphs (and explained in detail in the references) demonstrates that special attention should be given to the ergonomic features for the new facility. Consideration should include:

- a. Workspace -- 95-100 sq. ft. per person, including sufficient conference room areas.
- b. Accessibility -- Location, parking, convenient to public transportation.
- c. Lighting -- Reducing eyestrain will reduce fatigue, stress.
- d. Privacy -- Keeping interruptions to a minimum will allow for completeness of thought.
- e. Work Area Layout -- Including secure storage, desks, files, etc.
- f. Communications -- Secure phone service to every desk is mandatory - reliable communications for remote terminals, printers, etc.

4. Considering the physical space history of the CAMS Project, 7 cramped locations in 6 years, and our emphasis on productivity, I believe the time is ripe to create a good working facility for the CAMS Project Office. Therefore, I intend to pursue this course of action unless otherwise directed.

[Redacted Signature]

STAT

Distribution:

- 0 - Adse
- 1 - DD/ODP
- 1 - [Redacted] Chairman, Applications Productivity Working Group
- 1 - C/AD/ODP

STAT

APPENDIX J

COMPUTER APPLICATIONS REQUEST/ACTION FORMS

SEE INSTRUCTIONS ON BACK OF SET

Approved For Release 2003/08/26 : CIA-RDP84-00933R000100050001-7

TO: Director of Data Processing ODP 2D-0105
 ATTN: Deputy Director For Applications ATTN: Chief, Production Division

1. REQUESTING OFFICE DD/A/ODP 2. REQUESTER'S CONTROL NO. STAT J-1

3. REQUESTER'S NAME 4. EXTENSION 5. DATE 1 May 1981

6. SERVICES REQUESTED (use additional sheets if necessary)
Develop an overall methodology and standard approach for applications development (incorporating requirements, design, implementation, and documentation) and management. Implement the methodology by developing, as required, automated support for requirements and design analysis/specification, by developing and upgrading implementation and documentation tools, and by providing necessary management tools. Portions may be accomplished under contract.

7. TYPE OF REQUEST
PRODUCTION MODIFICATION PROGRAM FIX NEW REQ'T ONE TIME OTHER (specify)

8. PROJECT NAME 9. COST NOT TO EXCEED

10. COST-OTHER THAN ADP \$ 11. TARGET DATE 12. APPROVED BY

DO NOT WRITE BELOW THIS LINE - TO BE COMPLETED BY ODP

CUST. CODE	PRISM NO. + SUB. NO.	ACTIVITY	DATE RECEIVED	DATE COMPLETED	PRODUCTION DATE	
		FEASIBILITY	DESIGN	PRE-PRODUCTION	DESCRIPTION	
		PROPOSAL	DETAIL DESIGN	OTHER		
		EST. MANHOURS	EST. MACH. COST	TOTAL COST	TARGET DATE	
1.						
2.						
	TEAM MEMBERS (#1 leader)	START DATE	EST. END DATE	TEAM MEMBERS	START DATE	EST. END DATE
1.				6.		
2.				7.		
3.				8.		
4.				9.		
5.				10.		

REMARKS

DATE APPROVED BY

SEE INSTRUCTIONS ON BACK OF SET

Approved For Release 2003/08/26 : CIA-RDP84-00933R000100050001-7
COMPUTER APPLICATIONS REQUEST/ACTION FORM

TO: Director of Data Processing ODP 2D-0105
 ATTN: Deputy Director For Applications ATTN: Chief, Production Division

1. REQUESTING OFFICE DD/A/ODP 2. REQUESTER'S CONTROL NO. J-2

3. REQUESTER'S NAME [] 4. EXTENSION [] 5. DATE 1 May 1981

6. SERVICES REQUESTED (use additional sheets if necessary)
Develop standardized metrics for resource utilization and productivity. Integrate the collection and processing of these metrics with Applications' management and development methodologies

7. TYPE OF REQUEST: PRODUCTION, PROGRAM FIX, ONE TIME, MODIFICATION, NEW REQ'MT, OTHER (specify)

8. PROJECT NAME 9. COST NOT TO EXCEED

10. COST-OTHER THAN ADP \$ 11. TARGET DATE 12. APPROVED BY

DO NOT WRITE BELOW THIS LINE - TO BE COMPLETED BY ODP

CUST. CODE	PRISM NO. - SUB. NO.	ACTIVITY	DATE RECEIVED	DATE COMPLETED	PRODUCTION DATE	
		FLASIBILITY	DESIGN	PRE-PRODUCTION	DESCRIPTION	
		PROPOSAL	DETAIL DESIGN	OTHER		
		EST. MANHOURS	EST. MACH. COST	TOTAL COST	TARGET DATE	
1.						
2.						
	TEAM MEMBERS (#1 leader)	START DATE	EST. END DATE	TEAM MEMBERS	START DATE	EST. END DATE
1.				6.		
2.				7.		
3.				8.		
4.				9.		
5.				10.		

REMARKS

DATE APPROVED BY

SEE INSTRUCTIONS ON BACK OF SET

Approved For Release 2003/08/26 : CIA-RDP84-00933R000100050001-7

COMPUTER APPLICATIONS REQUEST/ACTION FORM

TO: Director of Data Processing ODP 2D-0105
 ATTN: Deputy Director For Applications ATTN: Chief, Production Division

1. REQUESTING OFFICE: DD/A/ODP
 2. REQUESTER'S CONTROL NO.: J-3
 3. REQUESTER'S NAME: [] 4. EXTENSION: [] 5. DATE: 1 May 1981

6. SERVICES REQUESTED (use additional sheets if necessary)

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Develop a software engineering tools library. Provide tools and techniques to implement incentives for contributions, training and maintenance. Collect tools and initiate the library.

7. TYPE OF REQUEST: PRODUCTION, MODIFICATION, PROGRAM FIX, NEW REQ'T, ONE TIME, OTHER (specify)
 8. PROJECT NAME: \$ 9. COST NOT TO EXCEED: \$
 10. COST-OTHER THAN APP: \$ 11. TARGET DATE: 12. APPROVED BY: \$

DO NOT WRITE BELOW THIS LINE - TO BE COMPLETED BY ODP

CUST. CODE	PRISM NO. - SUB. NO.	ACTIVITY	DATE RECEIVED	DATE COMPLETED	PRODUCTION DATE		
		FEASIBILITY	DESIGN	PRE-PRODUCTION	DESCRIPTION		
		PROPOSAL	DETAIL DESIGN	OTHER			
		EST. MANHOURS	EST. MACH. COST	TOTAL COST	TARGET DATE		
1.							
2.							
		TEAM MEMBERS (#1 leader)	START DATE	EST. END DATE	TEAM MEMBERS	START DATE	EST. END DATE
1.					6.		
2.					7.		
3.					8.		
4.					9.		
5.					10.		

REMARKS

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DATE: _____ APPROVED BY: _____

SEE INSTRUCTIONS ON BACK OF SET

Approved For Release 2003/08/26 : CIA-RDP84-0933R000100050001-7

TO: Director of Data Processing ODP 2D-0105
 ATTN: Deputy Director For Applications ATTN: Chief, Production Division

1. REQUESTING OFFICE DD/A/ODP		2. REQUESTER'S CONTROL NO. J-4
3. REQUESTER'S NAME []	4. EXTENSION []	5. DATE 1 May 1981

6. SERVICES REQUESTED (use additional sheets if necessary)
Develop an inventory and index of software applications, referencing people, projects and keywords.

7. TYPE OF REQUEST	PRODUCTION	PROGRAM FIX	ONE TIME
	MODIFICATION	<input checked="" type="checkbox"/> NEW REQ'T	OTHER (specify)
8. PROJECT NAME			9. COST NOT TO EXCEED
10. COST OTHER THAN ADP \$	11. TARGET DATE	12. APPROVED BY	

DO NOT WRITE BELOW THIS LINE - TO BE COMPLETED BY ODP

CUST. CODE	PRISM NO. - SUB. NO.	ACTIVITY	DATE RECEIVED	DATE COMPLETED	PRODUCTION DATE
		FEASIBILITY	DESIGN	PRE-PRODUCTION	DESCRIPTION
		PROPOSAL	DETAIL DESIGN	OTHER	
		EST. MANHOURS	EST. MACH. COST	TOTAL COST	TARGET DATE
1.					
2.					
TEAM MEMBERS (#1 leader)		START DATE	EST. END DATE	TEAM MEMBERS	
1.				6.	
2.				7.	
3.				8.	
4.				9.	
5.				10.	

REMARKS

DATE _____ APPROVED BY _____