MANAGEMENT

A BIBLIOGRAPHY FOR NASA MANAGERS

A selection of annotated references to unclassified reports and journal articles that were introduced into the NASA scientific and technical information system during 1984.

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Management gathers together references to pertinent documents -- reports, journal articles, books -- that will assist the NASA manager to be more productive. Items are selected and grouped according to their usefulness to the manager as manager. A methodology or approach applied to one technical area may be worthwhile for a manager in a different technical field.

Individual sections can be quickly browsed. Indexes will lead quickly to specific subjects or items.
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"PAGE MISSING FROM AVAILABLE VERSION"
HIGHLIGHTS AND ITEMS
OF INTEREST

Several changes have been incorporated into the organizational subject categories for this year's bibliography. Citations are grouped into ten categories. One category from last year's bibliography (RESOURCE MANAGEMENT) has been dropped. Two new categories, INDUSTRIAL MANAGEMENT AND MANUFACTURING (03) and COMPUTERS AND INFORMATION MANAGEMENT (05), have been added. Other changes and additions to the category scope notes appear in the Table of Contents below.

Human Factors And Personnel Issues. Personnel issues -- management, development, selection, allocation, etc. -- are now covered in this category. Organizational behavior is discussed in terms of temporary task teams (A84-31212) and the relationship between social support and performance (N84-24098). Devitalization of workers is seen as an important motivational and morale problem for management (N84-13013); two theses explore the relationships between motivation and performance (N84-27584, N84-27441). Successful interaction between employee and computer may depend on long-range educational programs (N84-22357). Others work to investigate and improve the actual software interfaces (A84-21640, N84-20181, N84-14795).

Management Theory and Techniques. The general management literature ranges from the overview and the theoretical (A84-23989) to the practical and the methodological (A84-15600). Similarly, many papers treat the theory and mathematics of decisions and decision making models (A84-33465, A84-19141, N84-22342, N84-21395, etc.); others discuss pragmatic, "how-to-do-it," approaches to decision making (N84-28466, N84-25503, etc.). Closely related to studies of decisions are explorations of leadership and leadership styles (A84-42622, N84-28448, N84-28414, etc.). Among numerous analyses of organizational structures and processes, several authors focus on the concept of "organizational climate" (N84-27595, N84-19132, N84-16068).

Industrial Management and Manufacturing. The relationships between science, technology, government, industry and academia are complex and varied (N84-23319, N84-19605, N84-10353, N84-10351). A recent factor influencing such relationships is the microcomputer; one of several industries benefiting from the microprocessor is construction (N84-14701, N84-14700, N84-11053, etc.). Problems and challenges facing manufacturers now encompass the rigors of outer space (A84-22344, A84-24632). Many authors discuss industrial productivity (N84-23318, N84-18449, N84-18448, etc.); some offer specific advice, such as "keeping your fingers crossed won't help" (N84-14702).

Robotics and Expert Systems. Robotics represents a burgeoning arena for the applications of automation advancements; however, the reactions of the robots' coworkers -- the humans -- need serious consideration (N84-32826, N84-15805). Artificial intelligence techniques benefit a variety of applications, including management of models and support of decisions (N84-25357), networking (N84-31743), information retrieval (N84-11821), scheduling (N84-13867), and maintenance (N84-20730). Computer-aided-design (CAD) and computer-aided-manufacturing (CAM) are the subjects of numerous papers (A84-28014, N84-20867, N84-16829, etc.).
Computers and Information Management. An understanding of microcomputers and software is becoming increasingly important to managers. Practical suggestions and principles are offered by some authors (N84-34316, N84-23150). Numerous papers document the details of software acquisition (A84-10015, N84-35131), software development and engineering (A84-24449, N84-14730, N84-12747, N84-11781), and software management (A84-26710, N84-13818). An important related conceptual area is that of configuration management in a computer context (A84-26713, A84-16633, A84-15309, N84-14742). Many computer and ADP facilities are members of networks (A84-49262, A84-31351, N84-17927). And computers must learn to talk to each other (N84-27457, N84-19179, N84-16432). Important information about the management enterprise may be stored on or retrieved from a database system (N84-22316, N84-20438, N84-19176). Information should be well organized and presented in the proper format (A84-45572, A84-33153, N84-16831). And many writers express the need for improving information security (N84-30736, N84-26317, N84-21402).

Research and Development. An essential tool of today’s successful R&D manager is the knowledge of contracts and contract management (A84-15304, N84-32297, N84-23315), as well as general project management principles (N84-23369, N84-14965, N84-11977). Technology transfer is the subject of many papers this year (A84-42620, N84-25528, N84-11035, etc.), as is the related issue of support for invention and innovation (N84-11043, N84-11042).

Economics, Costs and Markets. Outer space provides many outlets for private investment and commercialization (A84-29881, A84-20599, A84-17063, A84-11739, N84-15165, N84-10108, etc.) and opportunities for competition (A84-29883, N84-23321, N84-23320, etc.). Microcomputers, statistical packages, and databases are becoming more essential to those seeking to control costs and maximize productivity (A84-31794, N84-22287, N84-20444, N84-14697). Closely related to the control of costs are the management of risk (N84-23335, N84-23304, N84-23301) and the analysis of value (A84-15320, N84-25504).

Logistics and Operations Management. The computer continues to influence the techniques and models of logistical management (N84-28671, N84-18108, N84-15884, N84-14711). The microcomputer, especially, holds great promise for the handling of spare parts (N84-23353, N84-21112), the monitoring and maintenance and repair (A84-46582), and the modeling of the transportation system (N84-33067).

Reliability And Quality Control. Important applications of recent quality control efforts include the creation of software engineering standards (A84-24450, A84-10028, N84-21129, N84-21128, etc.) and the application of quality assurance techniques (A84-15597, N84-30778, N84-23361). Such attempts illustrate the idea that “quality is not a dirty word” (N84-12510) -- in spite of past practices and international competition (N84-23363).

Legality, Legislation, and Policy. What are the effects on the aviation industry of deregulation (A84-36942, A84-25033, A84-20675, N84-14070)? How does recent legislation affect space commercialization activities (A84-29868, A84-29865, A84-17055, N84-34329, N84-11069)? And how has the insurance industry responded to opportunities in the space market (A84-20646, A84-16892)?

*For abstracts of the indicated items refer to the accession number index.
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<th>Category 01</th>
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<td></td>
<td>Includes organizational behavior, employee relations, employee attitudes and morale, personnel management, personnel development, personnel selection, performance appraisal, training and education, computer literacy, human factors engineering, ergonomics, human-machine interactions.</td>
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<td>Includes management overviews and methods, decision theory and decision making, leadership, organizational structure and analysis, systems approaches, operations research, mathematical/statistical techniques, modeling, problem solving, management planning.</td>
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<td>Includes artificial intelligence, robots and robotics, automatic control and cybernetics, expert systems, automation applications, computer-aided design (CAD), computer-aided manufacturing.</td>
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<td>Includes information systems and theory, information dissemination and retrieval, management information systems, database management systems and databases, data processing, data management, communications and communication theory, documentation and information presentation, software, software acquisition, software engineering and management, computer systems design and performance, configuration management (computers), networking, office automation, information security.</td>
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<td>Includes contracts and contract management, project management, program management, research projects and research facilities, scientific research, innovations and inventions, technology transfer and utilization, R&amp;D resources, agency, national and international R&amp;D.</td>
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<td>Includes costs and cost analysis, cost control and cost effectiveness, productivity and efficiency, economics and trade, financial management and finance, investments, value and risk (monetary), budgets and budgeting, marketing and market research, consumerism, purchasing, sales, commercialization, competition, accounting.</td>
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Category 08 Logistics and Operations Management
Includes inventory management and spare parts, materials management and handling, resources management, resource allocation, procurement management, leasing, contracting and subcontracting, maintenance and repair, transportation, air traffic control, fuel conservation, operations, operational programs.

Category 09 Reliability and Quality Control
Includes fault tolerance, failure and error analysis, reliability engineering, quality assurance, wear, safety management and safety, standards and measurement, tests and testing inspections, specifications, performance tests, certification.

Category 10 Legality, Legislation, and Policy
Includes laws and legality, insurance and liability, patents and licensing, legislation and government, regulation, appropriations and federal budgets, local, national, and international policy.

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Rather than continuing to focus on software development projects per se, the system dynamics modeling approach outlined is extended to investigate a broader set of issues pertaining to the software development organization. Rather than trace the life cycle(s) of one or more software projects, the focus is on the operations of a software development department as a continuous stream of software products are developed, placed into operation, and maintained. A number of research questions are "ripe" for investigating including: (1) the efficacy of different organizational structures in different software development environments, (2) personnel turnover, (3) impact of management approaches such as management by objectives, and (4) the organizational/environmental determinants of productivity. B.G.
01 HUMAN FACTORS AND PERSONNEL ISSUES


A84-14980 CONFLICTS AMONG EMPLOYEES AND WAYS OF RESOLVING THEM [KONFLIKTY V TRUDOVOM KOLLEKTIVE I PUTI IKH RAZRESHENIIA]

A84-14981 THE INFLUENCE OF FORMS OF WORK ORGANIZATION ON PERSONAL RESPONSIBILITY IN PRODUCTION WORK [VLIIANIE FORM ORGANIZATSII TRUDA NA OTVESTVENNOST' LICHNOSTI NA PROIZVODSTVE]

A84-19309# TIMELY APPLICATION OF ADVANCED HUMAN FACTORS TEST AND EVALUATION TECHNIQUES DURING THE ACQUISITION OF NEW AIR FORCE SYSTEMS

A model is proposed for the transfer of human factors technologies for test and evaluation of modern Air Force systems. A two-pronged effort is recommended to ensure the availability of appropriate technology for new Air Force acquisitions: revise Air Force policies indicated in Air Force Regulation 800-15 and ensure timely state-of-the-art human factors technology flow which parallels the major system acquisition process. An essential element in the model is to establish liaison activities between the system test and evaluators and the advanced developers and researchers.

D.H.

A84-21640 DMS - A SYSTEM FOR DEFINING AND MANAGING HUMAN-COMPUTER DIALOGUES
R. W. EHRICH (Virginia Polytechnic Institute and State University, Blacksburg, VA) Automatica (ISSN 0005-1098), vol. 19, Nov. 1983, p. 855-862. refs

A84-23706 SOCIAL-PSYCHOLOGICAL PROBLEMS IN THE EVALUATION OF ENGINEERING PERSONNEL IN AUTOMATED SYSTEMS FOR THE CONTROL OF DEVELOPING ENTERPRISES [SOTSIAL'NO-PSIKHOLOGICHESKIE PROBLEMY DIAGNOSTIKI INZHENERNYKH KADROV V AVTOMATIZIROVANNYKH SISTEAMA K UPRAVLENIIA RAZRABATVAYUSHCHIKH PREDPRIIATII]
E. S. CHUGUNOVA (Leningradskii Gosudarstvenny Universitet, Leningrad, USSR) and N. A. VIKTOROV Psikhologicheskii Zhurnal, vol. 4, July-Aug. 1983, p. 87-95. In Russian. refs

A84-23990 MANAGING CREATIVE INDIVIDUALS IN HIGH-TECHNOLOGY RESEARCH PROJECTS
W. B. ZACHARY (San Jose State University, San Jose, CA) and R. M. KRONE (Southern California, University, Los Angeles, CA) IEEE Transactions on Engineering Management (ISSN 0018-9391), vol. EM-31, Feb. 1984, p. 37-40. refs

A84-29482 DEVELOPMENT AND APPLICATION OF A CRITERION TASK SET FOR WORKLOAD METRIC EVALUATION

In order to optimize the design and operation of modern military aircraft systems, methods are needed to measure the mental workload of the human operator. While numerous candidate metrics are now available for this purpose, little prescriptive information exists to guide their selection and application. This paper describes the development of a standardized methodology for the evaluation of workload measures against several theoretical and practical criteria. The central feature of this methodology is a set of representative loading tasks selected to place demands on primary information processing resources of the operator. Results are reported from an initial evaluation study in which a subset of these standardized tasks were employed to assess the characteristics of a behavioral workload measure.

A84-23990

A84-23990

MARCH 1985
01 HUMAN FACTORS AND PERSONNEL ISSUES

A84-31212
A STUDY OF TEMPORARY TASK TEAMS
C. P. HELMS (Teledyne Brown Engineering Co., Huntsville, AL) and R. M. WYSKIDA (Alabama, University, Huntsville, AL) IEEE Transactions on Engineering Management (ISSN 0018-9391), vol. EM-31, May 1984, p. 55-60. refs

The formation of temporary task teams necessary to solve complex technical problems is analyzed via a questionnaire. Responses were acquired from 125 high technology individuals who had participated in temporary task teams. The questionnaire data was analyzed utilizing the Chi-square approximation statistic. Results indicate that the task team which develops team spirit early in the task team lifetime is more likely to produce a high quality result. There is a strong indication that the leaders' instructions play a significant role in developing this team spirit.

Author

A84-32353
SIGNIFICANCE OF ALLOWING FOR INDIVIDUAL DIFFERENCES IN ORGANIZING THE WORK SHIFT IN MONOTONOUS PRODUCTION WORK (O ZNACHIMOSTI UCHETA INDIVIDUAL'NYKH RAZLICHII PRI RASSTANOVKE RABOCHEEI SMENY NA MONOTONIZIROVANNYKH PROIZVODSTVAKH)

A84-41555
PSYCHOLOGY AND THE STUDY OF 'HUMAN FACTORS' IN MANAGEMENT (PSIKHOLOGIIA I IZUCHENIE 'CHELOVECHESKOGO FAKTORA' V UPRAVLENII)
A. V. Filippov (Moskovskii Institut Upravljeniya, Moscow, USSR) Psychologicheskii Zhurnal (ISSN 0033-2941), vol. 5, Jan.-Feb. 1984, p. 35-44. In Russian. refs

N84-12713# Committee on Science and Technology (U. S. House).

BIOLOGICAL CLOCKS AND SHIFT WORK SCHEDULING

A variety of problems which hold consequences for labor, management, and the general public result for shift work scheduling that is not based on research in circadian rhythm. Representatives of airline pilots, nurses, police, factory workers, and nuclear power plant operators delineate the physiological, psychological, and social effects of rotating shifts. Pilot fatigue and desynchronosis as factors in aircraft accidents is examined as well as management efforts to address problems of biological rhythms and shift work scheduling.

A.R.H.

N84-13013# California Univ., Livermore. Lawrence Livermore Lab.

REVITALIZATION: AN ORGANIZATIONAL PROGRAM FOR THE INDIVIDUAL

Progressive devitalization is a malady that afflicts many workers resulting in tremendous costs to organizations. This malady has long been recognized by management but little has been done to treat it. A new approach to the problem has been instituted at Lawrence Livermore National Laboratory, in the form of a group program called Revitalization. Early results have been very encouraging. The program will continue to be designed and improved in the hope of bringing more productivity to the organization and self-esteem to the individual.

DOE

N84-14683# Army Research Inst. for the Behavioral and Social Sciences, Alexandria, Va.


This handbook is designed to assist training developers and evaluators in structuring their collection of feedback. Six methods of collecting feedback are described, and practical guidelines for their application are offered. Issues in the management and analysis of feedback are also discussed.

Author (GRA)

N84-14713# Navy Personnel Research and Development Center, San Diego, Calif.

P. H. MCCANN Aug. 1983 21 p (Contract SF57525001) (AD-A132657; NPDG-TR-83-29; REPT-17-83-8) Avail: NTIS HCA02/MFA01 CSCL 05H

Numerous examples have been cited of deficiencies in the user-computer interface on Navy computers, both ashore and aboard ship. The computer system designer often overlooks the user's perspective in his desire to provide the user with a system that is a faster and more powerful tool. In this document requirements of the personal computer user are identified and contrasted with computer designer perspectives towards the user. The user's psychological needs are described so that the design of the user-computer interface may be designed to accommodate them. Development of the user-computer interface is discussed in terms of the user's physical, perceptual, and conceptual contacts with the system. The ideals of system design - transparency and visibility to the user - are described. Further research is suggested that will explore the characteristics of efficacious menu selection, develop a theory of the operator, determine the best locus of control for dialogue features, provide guidelines for improving system documentation, and improve user work station habitability.

GRA


MODELING THE USER IN INTELLIGENT USER INTERFACES

A methodology for explicitly defining a model of a program's users and for evaluating the effectiveness of the user interface is presented. The development of an explicit user model will reduce user costs by both reducing the cost of software development and increasing user productivity. The components of the methodology are described, and an example of using the methodology in the development of an expert consultant system is given. The methodology is useful in preliminary design and testing of such interactive software as electronic mail, information retrieval systems, editors, and management information systems.

DOE

N84-15796# Army Training Development Inst., Fort Monroe, Va.

R. AVANT, C. A. JOHNSON, and P. BEST 30 May 1983 114 p. (AD-A133052; TDI-TR-83-4) Avail: NTIS HCA06/MFA01 CSCL 05I

The Organizational Effectiveness Center and School (OEC/S) at Ft Ord, CA, has been the training center for the Army's Organizational Effectiveness Consultants since 1975. The effectiveness of such consultants appears to be dependent upon...
soft skills interpersonal competencies, rather than specific tasks which are performed. In 1979, OEC/S and the Army Research Institute contracted with McBer and Co. to develop a model of the competencies which distinguish the superior from the average consultant. Eighteen of the 33 competencies identified in the McBer model were considered by OEC/S to be potentially trainable in the course. The success of the training requires an understanding of the competencies and an ability, on the part of the trainers, to recognize if and when the competencies are being demonstrated. Author (GRA)

N84-16059#  University of Southern California, Los Angeles. Center for Effective Organizations. PERFORMANCE APPRAISAL REVISITED E. E. LAWLER, III, A. M. MOHRMAN, JR., and S. M. RESNICK Mar. 1983 27 p (Contract N00014-81-K-0048) (AD-A132841; G-83-7-(38); TR-11) Avail: NTIS HCA03/MFA01 CSCL 05I

This report examines a series of studies concerned with performance appraisal effectiveness. It identifies those conditions which are associated with effective appraisals and the relationship between such things as pay discussions and performance appraisal effectiveness. GRA

N84-16066#  University of Southern California, Los Angeles. Center for Effective Organizations. ORGANIZATIONAL OUTCOMES OF CREATIVITY M. A. VONGLINOW and S. KERR Jun. 1983 21 p (Contract N00014-81-K-0048) (AD-A132826; G-83-11-(42); 13) Avail: NTIS HCA02/MFA01 CSCL 05A

It is an assumption not an established fact, that creative individuals and organizations are more productive in terms of commonly used financial and productivity criteria, and once an individual has become creative, the firm will benefit. However, descriptions of the organizational outcomes of this creativity is general and this paper has attempted to determine whether most people have specifics in mind when speaking of these outcomes and the need for creativity in the organization. Author (GRA)

N84-16067#  University of Southern California, Los Angeles. Center for Effective Organizations. THE DESIGN OF EFFECTIVE REWARD SYSTEMS E. E. LAWLER, III Apr. 1982 57 p (Contract N00014-81-K-0048) (AD-A132859; G-83-9-(39); TR-12) Avail: NTIS HCA04/MFA01 CSCL 05A

Reward systems are one of the most prominent and frequently discussed features of organizations. This chapter will focus on the design choices that are involved in managing a reward system and their relationship to organizational effectiveness rather than on specific pay system technologies. The underlying assumption is that the reward system of an organization can be a key contributor to organizational effectiveness. However, for this to occur careful analysis needs to be made of the role that reward systems can and should play in the strategic plan of the organization. GRA


This report presents the thesis that the results of human factors research and development should be delivered as discrete products, not merely as a collective technical report. It describes 35 potential products useful for this purpose. Examples of the products are: drawings; handbooks; algorithms; evaluation data; task analysis results; methods; and criteria. GRA

N84-17842#  University of Southern California, Los Angeles. Center for Effective Organizations. MOTIVATION AND PERFORMANCE APPRAISAL BEHAVIOR A. M. MOHRMAN, JR. and E. E. LAWLER, III 1981 34 p (Contract N00014-81-K-0048) (AD-A134311; G-81-12-(19); REPT-14) Avail: NTIS HC A03/MF A01 CSCL 05J

This paper is concerned with what motivates the behavior involved in carrying out performance appraisals (PA) in organizations. Typically, research and theory concerned with motivation has focused on how PA effects the subsequent work behavior of the appraiser; here we will focus on what motivates the PA behaviors themselves. Conducting a PA involves a set of behaviors performed by organizational members. As such, PA behaviors are simply one subset of the total set of role behaviors they perform. Thus, they can be analyzed as any other organizational behavior. PA behavior is a particularly interesting and important type of behavior to study. The particular purposes of PA create contexts that give PA behaviors unique and complex meanings that are worthy of study for what they can teach us about motivation and assessment. In addition, as we come to understand more about the results of certain PA behaviors (such as allowing participation in the process by appraisees) and as we become more concerned with the quality of PA behaviors (e.g., bias in measurement), we also need to be more concerned about what motivates such behaviors so they can be managed. Seeking to manage performance behaviors through PA will come to nought unless these PA behaviors themselves can be managed. Author (GRA)


The results of many human-computer interaction studies are often not generalizable because the task environment in which they are run does not possess characteristics common to other interfaces. In this paper we describe a generalized task environment that is directly applicable to several interesting real-world tasks, and that contains elements appearing in almost every system having a human-computer interface. The environment is implemented through a software system called GENIE (Generic Environment for Interactive Experiments), and is based on controlling the motion of vehicle through three-dimensional space. Aside from providing a task with common characteristics, GENIE's implementation was designed to allow for adaptation to a variety of studies. The user's interface to the system has been constructed in such a way as to minimize the effort necessary for change. The paper first describes the development of the GENIE software system and then presents its structure. The user's view of the system is discussed followed by a presentation of the facilities available to the experimenter. Software components of the system are described from a functional level, and finally, three example experiments that use the system are described. Author (GRA)
AN INTRODUCTION TO HUMAN FACTORS FOR ENGINEERING MANAGERS: FRAMEWORK FOR A TEACHING UNIT Final Research Note

(Contract MDA903-81-C-0541; DA P R O J . 2 0 1 - 6 2 7 2 2 - A - 7 9 1 ) (AD-A135958; ARI-RN-83-50) Avail: NTIS HC A07/MF A01 CSCL 05J

The materials provided in this document represent an attempt to capture and convey in a concise way some of the basic characteristics of human factors work that managers of military system development projects need to know so that such managers can do their jobs more effectively. A framework is presented that can be used in the planning and presentation of a short course or workshop, or that can be used as a unit in a sustained program of instruction.

Author (GRA)


D. MEISTER and R. E. BLANCHARD Nov. 1983 44 p
(Contract F57-526) (AD-A136918; NPRDC-TR-84-4) Avail: NTIS HC A03/MF A01 CSCL 05E

This report describes the functional specifications for the development of a human factors engineering (HFE) data retrieval system to be used by system acquisition managers, designers, and HFE specialists. The system is organized around the following requirements: system must be responsive to the needs of a variety of users, include data of the type presently available in MIL STD 1472C plus quantitative estimates of human performance, maintenance and logistics data, specifications and standards, and analytical and evaluation techniques, include data from operational Navy sources not presently found in any HFE data base, be formatted in three tracks, with Track 1 consisting of abstracts of individual studies, Track 2 containing data from the same sources but in a highly synthesized form, and Track 3 containing all other ancillary information such as HFE specifications and standards.

Author (GRA)

CONCERTED EFFORT FOR NATIONWIDE COMPUTER LITERACY


Education in computer science and techniques is outlined. The advantages of computer technology and methods for effective use of the devices available are discussed. It is suggested that the teaching of computer technology must be organized effectively in public education, the teaching of informatics must be developed further in higher education, and computer technology information should be organized. Long range programs to organize this activity are examined.

E.A.K.

HUMAN ENGINEERING GUIDELINES FOR MANAGEMENT INFORMATION SYSTEMS. CHANGE 1

(AD-A137808; AD-E900298) Avail: NTIS HC A08/MF A01 CSCL 05E

These guidelines are intended to be an aid for the inclusion of human factors considerations in the design of Management Information Systems (MIS). The US Army Material Development and Readiness Command (DARCOM) is faced with a problem of continuing growth in workload combined with constrained or decreasing numbers of personnel. Like many other corporate entities, DARCOM has decided to accelerate the growth of computer utilization in order to increase the productivity of the workforce. In addition to increased computer utilization, there is emphasis toward distributive processing. Distributive processing places computer power in the hands of the functional used which allows the user to interact with (manipulate) the data. Unfortunately, empirical evidence indicates that expenditures on computers are not accompanied, necessarily, by the expected rises in productivity. The paper resulting from this research from this research presented selected personnel data relevant to the design of computer systems and problems of human-computer interaction divided into eight areas: the system design process, system downtime, training, input, data manipulation or retrieval, output, the work station, and communication. (Hendricks, D.E., Man/Computer Interaction in DARCOM. A paper presented at the 1980 AMEDD Psychology Symposium at Walter Reed Army Medical Center, Washington, DC, October, 1980.) Appendix A contains a list of three problems. With an overview of systems and user characteristics, the research team combined that information with the results of an extensive literature search to develop these guidelines for inclusion of human factors considerations during system development or system improvement.

Author (GRA)
PROJECTING MANPOWER TO ATTAIN QUALITY


Availability: NTIS HC A15/MF A01 CSCL 09B

The resulting model is useful as a projection tool but must be validated in order to be used as an on-going software cost engineering tool. A procedure is developed to facilitate the tracking of model projections and actual data to allow the model to be tuned. Finally, since the model must be used in an environment of overlapping development activities on a progression of software elements in development and maintenance, a manpower allocation model is developed for use in a steady state development/maintenance environment. In these days of soaring software costs it becomes increasingly important to properly manage a software development project. One element of the management task is the projection and tracking of manpower required to perform the task. In addition, since the total cost of the task is directly related to the initial quality built into the software, it becomes a necessity to project the development manpower in a way to attain that quality. An approach to projecting and tracking manpower with quality in mind is described. Author (GRA)

PROJECTING MANPOWER TO ATTAIN QUALITY


Availability: NTIS HC A24/MF A01 CSCL 15E

Government, industry, and academia can make and are making great strides toward establishing a professional acquisition workforce. Prerequisite to achieving that goal is that each component do everything it can individually as well as collectively. Presently, there are tremendous barriers to establishing a professional work force and an additional danger of losing ground already gained. Too much is made of some gains that on the surface appear significant. However, by working together the goal of a professional workforce can be achieved, but failing to work together will keep it beyond grasp. Author (GRA)

PROJECTING MANPOWER TO ATTAIN QUALITY

G. T. NIKOLAS In AF Business Research Management Center Proc. of the Fed. Acquisition with Theme p 99-104 1983

Availability: NTIS HC A24/MF A01 CSCL 15E

Federal Managers in the procurement career series have become concerned that there appears to be a need to increase the skill level in career field. The Office of Personnel Management has demonstrated a perception of the procurement career field, as less professional and more administrative in nature, by their efforts in revising the job standards. This perception and current emphasis will highlight the subject matter of this paper. The author utilizes data researched from the Federal Acquisition Institute on the educational level of the Government procurement careerist to arrive at his conclusions. The statistical data is supplemented by discussions conducted with industry and Government leaders during recent National Contract Management Association (NCMA) meetings and symposiums. The author makes certain recommendations to improve the overall development of the procurement career professionals. Author (GRA)

PROJECTING MANPOWER TO ATTAIN QUALITY


Availability: NTIS HC A24/MF A01 CSCL 05A

This computer simulation captures the contributions of inexperience and experienced personnel to overall effectiveness in a typical research and development organization. The model is appropriately responsive to changes in experience, level, Systems Program Office (SPO) leadership, priority, funding, and other factors. Given a fixed number of total personnel authorizations and fixed percentage of inexperienced personnel, the model indicates that assigning the inexperienced to the lower priority SPOs results in a maximum organizational measure of effectiveness (MOE). It also shows that an assignment policy based upon both priority and funding level may have only small impact upon this high MOE. Similarly, assigning all of the inexperienced to the high priority SPOs results in a relatively low MOE. Improving the SPO leadership increases the value of the MOE, but cannot compensate for high percentages of inexperience. The model can also be used to assign SPO leaders. Author (GRA)
01 HUMAN FACTORS AND PERSONNEL ISSUES

N84-23313# Oklahoma City Air Logistics Center, Tinker AFB, Okla.
TRAINING ACQUISITION PERSONNEL THROUGH A LOCAL COLLEGE Final Report

There are two important keys to effective and cost conscious acquisition of goods and services for the Air Force: The first is a work force trained in current acquisition skills; the second is a reservoir of qualified people for entry into the acquisition career field. To enlarge the pool of qualified people and to provide training opportunities for people in the career field, our Directorate initiated action to establish an Associate Degree Program in Purchasing and Contracting at Oscar Rose Junior College. The program is now in being and a number of our people, both clerical and professional, are attending classes offered through this program. Author (GRA)

RESEARCH IN MAN-MACHINE INTERACTION DISCUSSED

Research in human factors engineering is examined. Emphasis is placed on labor management and productivity and how they relate to various man/machine systems. An overview of the current research is included. M.A.C.

N84-24008# Washington Univ., Seattle, Dept. of Psychology.
This is the Final Report of a research project carried out between June 1, 1980 and December 31, 1983. Nine technical reports and fourteen articles resulted from the project. The research dealt with social support, its assessment, relationship to performance, and stability over time. The findings showed that social support is related to performance, interpersonal skills and relationships in a complex organization. Social support provided in a performance situation was found to be especially helpful for individuals who perceived low levels of support in their personal lives. Author (GRA)

N84-25277# Committee on Science and Technology (U. S. House).
BIOLOGICAL CLOCKS AND SHIFT WORK SCHEDULING

The current status of research on the effects of rotating shift work on human performance is examined. A brief survey on circadian rhythms and the problems experienced by workers on rotating shifts is presented. Suggestions for work schedules that minimize some of the problems such as insomnia, chronic fatigue, physiological ailments, and reduced alertness are included with provisions for management training in the understanding of biological clocks. M.A.C.

N84-25524# Argonne National Lab., Ill. Computing Services Div.
GUIDE TO REPORTING TIME IN THE FINANCIAL INFORMATION SYSTEM AT ANL

Operation of a new system for the full cost recovery service centers of the Laboratory report employee time, whether the time is charged to another organization or to an internal function are described. Most service centers of the laboratory report employee time to the financial information system (FIS) via time cards or timesheets, which are routed to the Data Entry group of the administrative data processing operation where the time records are keyed. With this new system, the service center assumes primary responsibility for the keying and management of time charges. The system provides these benefits to the service center: a choice of processing period and month end boundary, printed timesheets with history of charges by employee, prevailing of charges, thus fewer rejected charges, and computer readable file of current and prior charges for analysis. The controller's office plans to implement the time reporting system on a division by division basis until most service centers assume responsibility for their time charges. DOE

N84-26303# Army Test and Evaluation Command, Aberdeen Proving Ground, Md.
HUMAN FACTORS ENGINEERING. PART 2: HEDGE (HUMAN FACTORS ENGINEERING DATA GUIDE FOR EVALUATION) 30 Nov. 1983 397 p (AD-A140391; TOP-1-2610-PT-2) Avail: NTIS HC A17/MF A01 CSCL 05E

The purpose of the information in HEDGE is to expand test capabilities in considering the human element. It will provide a strategy for viewing an item which is undergoing testing from the standpoint of the soldier who must ultimately operate, maintain, or otherwise utilize it. The use of these materials, in addition to standard Task and Design Checklists and Questionnaires, will tailor HFE subtest to a specific item. These materials are intended to support test engineers not design engineers. They were designed with specific tasks in mind, i.e., preparing a Test Plan, conducting a test, analyzing and interpreting test data, and generating the test report. They were prepared under the cognizance of the TECOM Human Factors Engineering Directorate. GRA

N84-26710# Army Research Inst. for the Behavioral and Social Sciences, Alexandria, Va.

This paper is an accumulation and categorization of training systems research issues which are critical in making training device design decisions. The training system research issues are organized around an Instructional Systems Development (ISD) type framework, and the research literature on these issues is reviewed. A means for accumulating new and existing data as well as accessing the empirically derived information and generating training device guidance is proposed. Author (GRA)

N84-27441 Claremont Graduate School, Calif.

The topic of motivation and work performance in organizations has received increased attention in recent years among practicing managers and organizational researchers. Several major theories of motivation and related organizational factors were analyzed in a comparative fashion, and then integrated with research and
practical applications. The implications of managerial practice in dealing with motivation in organizational settings were considered. In the course of four major discussions, motivation was defined and its importance to organizations was stressed. Motivation theories were reviewed, and the managerial applications suggested by these theories were discussed. The relationship of motivation to the broader concerns of organizational behavior was emphasized. Knowledge concerning the role of motivation in an organizational setting was reviewed, analyzed and compared.

Dissert. Abstr.

N84-27584 Indiana Univ., Bloomington.
Avail: Univ. Microfilms Order No. DA8406793

While it was recognized that task performance and self reports of satisfaction are a function of the manner in which the task is designed, few researchers have demonstrated the effects of task design on task behavior through systematic manipulation of task properties. Two important task properties - task variability and sensory reinforcement - were systematically varied, and their effects on task behavior under various monetary reward contingencies were examined. The results showed that both task variability and sensory reinforcement increased satisfaction and intrinsic motivation. The offer of monetary rewards, however, did not have an effect on satisfaction or intrinsic motivation. Moreover, it was found that the piece-rate subjects performed at a higher rate than the unexpected reward subjects. In addition, sensory reinforcement was found to decrease performance in early trials. Finally, the performance satisfaction relationship was found to be moderated by task variability as well as sensory reinforcement. The results are discussed in terms of their relevance for task design as well as current theories of job motivation.

Dissert. Abstr*.

N84-28410# Colorado Univ., Colorado Springs.

An AWOL reduction program, which utilized peer counseling, was conducted with two randomly selected companies from a mechanized infantry battalion at Fort Carson, Colorado. Two randomly selected companies from the same brigade served as static control units. Employing the Taylor-Johnson Temperament Analysis (T-JTA), AWOL-prone soldiers were identified and were counseled initially by the unit chaplain and subsequently by platoon leaders. Platoon leaders identified situational aspects of AWOL-prone soldiers and interacted as mediators between environmental situations (e.g., money problems) and personal factors identified by the T-JTA. As a function of the intervention, the treated group showed a significant decline in AWOL rates while the control group did not. Results were discussed in terms of the efficiency of employing the Taylor-Johnson Temperament Analysis in conjunction with peer counseling to reduce AWOL rates.

N84-28411# Air Force Academy, Colo.
EVALUATION OF THE BCT (BASIC CADET TRAINING) PARAPROFESSIONAL COUNSELOR TRAINING AT THE UNITED STATES AIR FORCE ACADEMY P. R. BROWN and J. L. RAY In its Proc. of the 9th Symp. on Psychol. in the DOD p 40-44 Apr. 1984 (AD-P003244) Avail: NTIS HC A99/MF A01 CSCL 05J

This study evaluated the competence of USAF Academy paraprofessional counselors in communicating a helpful response to assess the success of counselor training. The purpose of this study was to evaluate, by objectively measuring counseling ability, training for paraprofessional counselors who worked as cadre in Basic Cadet Training (BCT) at the United States Air Force Academy. BCT is a six-week training program for cadets entering the Academy, designed to provide military instruction and experience to transition the basic cadet from civilian to military life and provide a foundation for future military development. To meet the individual-specific needs caused by the strenuous environment, the USAF Academy uses upperclass cadets as paraprofessional counselors to the basic cadets.

GRA


The more arduous the task, the greater the intensity of force which must be applied per unit of time to overcome resistance or achieve rate. Intensity is commonly called workload with magnitude expressed in appropriate units of power. Two complex factors determine the limits for which an individual can produce energy and generate the requisite power: (1) capacity to utilize oxygen, and (2) ability to generate muscular tension. The former is called aerobic power and the latter strength. From the foregoing discussion it can be seen that it is impossible to replicate the significant components of physically demanding occupations. If a test can be demonstrated to represent important job components it is valid to use the test in applications such as preemployment screening. Nevertheless, because of the legal guidelines and changing professional standards surrounding test validation, there are some important issues to consider in order to firmly establish the defensibility of a physical performance test.

GRA

N84-28425# Colorado Univ., Denver.
AFFECTIVE DETERMINANTS OF JOB PERCEPTIONS K. KRAIGER In AF Academy Proc. of the 9th Symp. on Psychol. in the DOD p 112-116 Apr. 1984 (AD-P003258) Avail: NTIS HC A99/MF A01 CSCL 05J

The Job Characteristics Model of Hackman and Oldham (1976) has served as a useful guide for designing jobs to be more motivating and satisfying. It is argued, however, that the job perceptions of incumbents may be biased or influenced by internal affective states or moods. This assertion is supported by the results of two studies. The first was a laboratory study in which job perceptions were more favorable when subjects were artificially placed in a good mood. In the second study, the overall job perceptions of a sample of city government workers were found to be predictable from both their job satisfaction and mood states.

Author (GRA)

N84-28447# Air Force Hospital, Lackland AFB, Tex.

The present study is the first of a series of investigations to assess the effects of stress management on selected psychological and biochemical risk factors for cardiovascular disease. We wanted to sample emotional, behavioral, physical and biochemical measures which might be sensitive to the changes of an effective stress management program. GRA
The failure detection task and the Sternberg perceptual condition. The availability of up-to-date and reliable data on the substance and funding of Research and Development efforts within the Manpower Personnel and Training community, and the valid linkage of such data through a systems approach, are important aids to researchers and managers in the Department of Defense. The Manpower and Training Research Information System (MATRIS) is a computerized, information-sharing and Decision Support System (DSS) designed to provide such aids to those involved with the conduct and/or fiscal management of Department-of-Defense-sponsored, people-related Research and Development pursuits. Although already in operation, the evolution of MATRIS continues within the framework of the prototype development model. The prototype development process of MATRIS, the structure and content of its data base, and the services and products which the system makes possible, are described.

The microcomputer revolution in management information systems now allows almost instant access to millions of bits of information to predict, trend, or even recall past activities. Additionally, the access to this information is now being accomplished by placing the computer on desktops everywhere. Often these computers are user friendly and little or no computerese is needed to operate them. These desktop computers have been human engineered from the software point of view but often the actual human engineering development and evaluation is lacking. This paper takes a general look at the lack of human engineering development and evaluation and suggests items that should be addressed in these two areas.

Human operators are increasingly being called upon to function as monitors of automatic systems. System monitors, as opposed to active controllers, do not necessarily experience lower workload levels during task performance. In fact, prior research has suggested that workload demands may not be reduced but rather shifted to a functionally separate processing pool according to a structure specific view of human attention. Selective attention is a crucial component of task performance in virtually every man-machine system. Thus, theoretical and practical considerations relating to attention should be a primary focus in several domains within the human engineering of such systems. In the realm of design, a general psychological understanding of attentional capacities and mechanisms should guide the development complex systems. In systems evaluation, limitations in the ability to attend to multiple information sources should be a primary consideration in judging the merits of various prototypes. In the selection of operations personnel for complex systems, individual differences in the ability to selectively attend to relevant information channels can be an important factor in the prediction of future performance. Research on the relation of human event-related brain potentials to selective attention has made contributions to our theoretical understanding of attentional capacities and has yielded several methods for the practical application of ERPs to human engineering problems.

Provided in this presentation is a description of progress in a unique research effort examining the utility of learning rate measures as predictors of learning abilities. Complex Experimental Learning Tasks (CELTs) have been developed in response to the challenge of developing technology for measuring learning rate. CELTs provide a real-time sample of learning performance on criterion-free, face-valid memory tasks. Microcomputer-based administration affords detailed records of learning activities while facilitating efficient data management. Subjects' performance is described by plotting performance indices (e.g., accuracy, speed of responding) over time. Slope and intercept parameters from these functions hold promise as valid measures of learning rate. Efforts are underway to: (1) determine relationships between traditional aptitude measures and learning rate measures from CELTs, and (2) explore the predictive value of these rate measures for classroom performance.
HUMAN FACTORS AND PERSONNEL ISSUES

01

The impacts of technology, and the ability of man to control or manage technology, will be based on the findings and practice of behavioral science. This paper presents technology as a human activity, capable of being managed. This capability is subject to better understanding and use of human behavior factors involved. The face of technology is usually painted with a mechanistic mien, and pessimistic predictions are made that technology is ruling man in contemporary organizations. This is especially hard in defense organizations and related industrial settings. This paper will look at technology from the management view, and examine some options for improving man’s use of technology. Those options will be based on the findings and practice of behavioral science.

GRA

THE IMPACT OF A COMPUTERIZED NETWORK ON THE QUALITY OF WORK LIFE IN TWO COLLEGE OF ADVANCED EDUCATION LIBRARIES IN NEW SOUTH WALES M.S. Thesis M. COFFEY 1982 160 p

R. L. PEPPER  In AF Academy Proc. of the 9th Symp. on Psychol. in the DOD p 672-676 Apr. 1984


(Contract N00014-79-C-0658) Avail: NTIS HC A05/MF A01 CSCL 05H

N84-28464# Walter Reed Army Medical Center, Washington, D.C.

AGE EFFECTS ON ACTIVE DUTY ARMY MMPI (MINNESOTA MULTIPHASIC PERSONALITY INVENTORY) PROFILES

F. J. FISHER and S. C. PARKISON In AF Academy Proc. of the 9th Symp. on Psychol. in the DOD p 575-579 Apr. 1984

(A-D-P003343) Avail: NTIS HC A99/MF A01 CSCL 05J

Age effects on response patterns to the Minnesota Multiphasic Personality Inventory have been recognized by the creation of separate norms for adolescent, adults, and aged adults. This study examined the effects of age within a normal Army adult male population on MMPI response pattern. Of the validity and clinical scales only scales L, 3 (Hysteria) and 5 (Masculinity-Feminity) showed no significant age effects. Scale means and percentage of respondents scoring above 70T (non-K-corrected Minnesota Adult Norms) across age groups both showed scale age clusters which substantiate the need for age appropriate norms within the adult Army male population.

Author (GRA)

N84-28465# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

EVALUATION OF THE HARDMAN COMPARABILITY METHODOLOGY FOR MANPOWER, PERSONNEL AND TRAINING

W. ZIMMERMAN, R. BUTLER, V. GRAY, and L. ROSENBERG 29 Feb. 1984 182 p

(Contract NAS7-918) (NASA-CR-173733; JPL-PUBL-84-10; NAS 1.26:173733; ARI-13AR119; ARI-13AR183-35) Avail: NTIS HC A09/MF A01 CSCL 05H

The methodology evaluation and recommendation are part of an effort to improve Hardware versus Manpower (HARDMAN) methodology for projecting manpower, personnel, and training (MPT) to support new acquisition. Several different validity tests are employed to evaluate the methodology. The methodology conforms fairly well with both the MPT user needs and other accompanying manpower system models. Analysis of three completed HARDMAN applications reveal only a small number of potential problem areas compared to the total number of issues investigated. The reliability study results conform well with the problem areas uncovered through the audits. The results of the accuracy studies suggest that the manpower life-cycle cost component is only marginally sensitive to changes in other related cost variables. Even with some minor problems, the methodology seem sound and has good near term utility to the Army. Recommendations are provided to firm up the problem areas revealed through the evaluation.

M.A.C.

N84-28467# Baltimore Univ., Md.

BEHAVIORAL ISSUES IN THE MANAGEMENT OF TECHNOLOGY

V. LUCHSINGER In AF Academy Proc. of the 9th Symp. on Psychol. in the DOD p 605-609 Apr. 1984

(A-D-P003349) Avail: NTIS HC A99/MF A01 CSCL 05J

Considerable discussion today reflects pessimism concerning the effects of technology and the ability of man to control or manage technology. This paper presents technology as a human activity, capable of being managed. This capability is subject to better understanding and use of human behavior factors involved. The face of technology is usually painted with a mechanistic mien, and pessimistic predictions are made that technology is ruling man in contemporary organizations. This is especially hard in defense organizations and related industrial settings. This paper will look at technology from the management view, and examine some options for improving man’s use of technology. Those options will be based on the findings and practice of behavioral science.

GRA

N84-28474# Naval Ocean Systems Center, San Diego, Calif.

NOSC (NAVAL OCEAN SYSTEMS CENTER)-HAWAII PERCEPTUAL SCIENCES RESEARCH PROGRAM

R. L. PEPPER In AF Academy Proc. of the 9th Symp. on Psychol. in the DOD p 672-676 Apr. 1984

(A-D-P003361) Avail: NTIS HC A99/MF A01 CSCL 05J

The broad objective of our group is to develop an understanding of the dynamic interaction which occurs between the human operator and the sensors, controls, and displays of remotely manned systems (teleoperators). The emphasis is placed on establishing a fundamental understanding of man’s perception of information received from sensors and displays and his performance using control systems and their associated manipulator devices, in order to produce increasingly intelligent, skilled performance across a variety of specified tasks. In order to accomplish this objective, we have begun to develop a general model of remote operator performance that will ultimately have broad predictive ability. A fundamental prerequisite for the development of this model is a data base of performance derived both from empirical tests as well as from predictions based on existing models of perception and motor-skill performance.

GRA

N84-28480# Army Research Inst. for the Behavioral and Social Sciences, Alexandria, Va.

VIDEO GAMES: A HUMAN FACTORS GUIDE TO VISUAL DISPLAY DESIGN AND INSTRUCTIONAL SYSTEM DESIGN

D. J. BOBKHO In AF Academy Proc. of the 9th Symp. on Psychol. in the DOD p 712-716 Apr. 1984

(A-D-P003368) Avail: NTIS HC A99/MF A01 CSCL 05I

Electronic video games have many of the same technological and psychological characteristics that are found in military computer-based training. For these reasons, the video game is a fascinating object of study and a valuable experimental apparatus. The results of two on-going research programs, both of which employ video games as experimental stimuli, are presented here. The first research program seeks to identify and exploit the characteristics of video games in the design of game-based training devices. The second program is designed to explore the effects of electronic video display characteristics on perceptual judgments. The empirical results of these two programs are shown to have practical application in training device design and visual display design.

Author (GRA)

N84-29792# New South Wales Univ., Sydney (Australia),

THE IMPACT OF A COMPUTERIZED NETWORK ON THE QUALITY OF WORK LIFE IN TWO COLLEGE OF ADVANCED EDUCATION LIBRARIES IN NEW SOUTH WALES M.S. Thesis M. COFFEY 1982 160 p

Avail: NTIS HC A08/MF A01

The objective was to gather preliminary data on the impact of a computerized network (CLANN Limited) on the quality of work life of library staff in two college libraries. The expectation of this study was that network membership would affect the level of autonomous decision-making, the organizational structure, and the
type and number of cataloguing staff required. Furthermore, the
evaluating organizational climate and the method of implementing
the technology were expected to be significant factors in the quality
of the work experience. The case study method was selected.
Data was gathered by way of semi-structured interviews with staff
at all organizational levels of the two libraries, and with the CLANN
office staff. The case studies confirmed the potential of the
technology to influence the factors described above. However,
the mission of the library and its management philosophy emerged
as more significant than the technology.

R84-30768# Sofftech, Inc., Waltham, Mass.
ADA (REGISTERED TRADEMARK) TRAINING CURRICULUM.
ADA (REGISTERED TRADEMARK) FOR SOFTWARE
MANAGERS, L201. TEACHERS’ GUIDE: VOLUME 1
May 1984 245 p 2 Vol.
(Contract DAA07-83-C-K514)
(AD-A142430) Avail: NTIS HC A11/MF A01 CSCL 051
Course outline for the 3 days. Section 1, is a refresher on a
basic Ada system; sections 2-16 present each Ada feature in
greater detail with short exercises interspersed; section 17, then
uses this Ada knowledge in a larger exercise aimed at Ada design
and code assessment; section 18, formalizes the discoveries of
section 17; and section 19, summarizes the entire course by putting
Ada into its primary design purpose: more reusable and portable
software.

R84-30769# Sofftech, Inc., Waltham, Mass.
ADA (REGISTERED TRADEMARK) TRAINING CURRICULUM.
ADA (REGISTERED TRADEMARK) FOR SOFTWARE
MANAGERS, L201. TEACHERS’ GUIDE: VOLUME 2
(Contract DAA07-83-C-K514)
(AD-A142431) Avail: NTIS HC A14/MF A01 CSCL 051
The training curriculum for Ada is described and directed
inward the instruction of software managers. Topics include Tasks:
Generics; Input/output; Exceptions; Stubbins; Visibility and Scope;
Overloading; Pragmas; Low-Level Features; and Summary of Uses
of Ada Features.

R84-30770# Sofftech, Inc., Waltham, Mass.
ADA (REGISTERED TRADEMARK) TRAINING CURRICULUM.
SOFTWARE ENGINEERING FOR MANAGERS. M101:
TEACHERS GUIDE
May 1984 955 p
(Contract DAA07-83-C-K514)
(AD-A142432) Avail: NTIS HC A16/MF A01 CSCL 051
The training curriculum for the improvement of software through
optimized software engineering is presented. Topics include Background; Software Engineering and Its Goals; Achieving Software Engineering Goals; and Software Engineering and Ada.

R84-31164# Sofftech, Inc., Waltham, Mass.
ADA (TRADEMARK) TRAINING CONSIDERATIONS
C. L. BRAUN In ASD Proc. Papers of the 2nd AFSC Avionics
Standardization Conf., Vol. 1 p 545-559 Nov. 1982
(Contract DAA00-81-C-0187)
(AD-P003560) Avail: NTIS HC A25/MF A01 CSCL 051
The government has instituted the Ada program with the
objective of reducing its rapidly-increasing software development
costs. Ada will do this by providing programmers with modern
capabilities that have been demonstrated to promote more
cost-effective software development. Clearly, the government’s
objective can be met only if programmers actually learn to use
these capabilities effectively. This requires significant change from
the way they are used to working, and poses a massive retraining
requirement. SofTech has been working with the U.S. Army to
assess the training needs of various segments of the industry
government work forces, to identify training issues and effective
techniques for addressing them, and to recommend a training
approach. This effort has resulted in development of a complete
recommended Ada curriculum. The curriculum provides training in
the Ada language, the environment, and modern development
methodologies. It consists of a set of modular building blocks that
can be configured to meet varying individual or organizational
needs, adapted to different organizations’ practices, and packaged
to meet scheduling needs. This approach answers many of the
difficult questions that have been asked about Ada training, and
presents a realistic roadmap to widespread industry competence
in Ada.

Author (GRA)

REALIZATION OF HUMAN WORK CAPACITY:
INTERDISCIPLINARY PROBLEMS Abstract Only
B. S. MARYENKO, K. R. KOPYSTYANSKAYA, and N. A. TITOVA
(JPRS-UB8-84-012) p 31 6 Jun. 1984 6
(AD-P003451) Avail: NTIS HC A17/MF A01 CSCL 051
Approaches to utilization of human work capacity are discussed
from a psychophysiological and organizational point of view. In
addition to relying on physiological and psychological testing of
applicants for a position to determine their suitability, factors such
as creating favorable work environments and rational work
assignment and management are important. Optimum production
and productivity can only be expected when all the factors pertinent
to a given work situation are scientifically analyzed and evaluated.
This also implies the need for periodic reassessment of both the
health and attitudes of the workers, and of the changing job
requirements.

E.A.K.

R84-32231# Boeing Military Airplane Development, Wichita,
Kans.
CONCURRENCY OF DESIGN CRITERIA: A KEY TO TRAINER
READINESS
J. CASPERSON and J. JONAS In American Defense
Preparedness Association Proc. of the 5th Interservice/Ind.
Training Equipment Conf., Vol. 1 p 60-63 16 Nov. 1983
(AD-P003454) Avail: NTIS HC A17/MF A01 CSCL 051
The benefits associated with combat crew readiness are
obvious. What may not be so obvious are the benefits associated
with timely acquisition and availability of training and training
devices. As new aircraft programs develop and present aircraft
programs mature, the crews must either train on the operational
equipment or wait until the associated trainers are developed or
updated. If the trainers are developed and updated in concert
with the aircraft program, the Air Force is provided not only with
combat-ready crews at the correct time, but also at the correct
cost. The key to keeping the training devices in concert with the
aircraft is Concurrency Program. On the B-1B program, a complete
concurrency program is being addressed. By complete, it is meant
a program which addresses the two major issues associated
with keeping the trainer concurrent with the aircraft. (1) Cost-effective
development and distribution of the required design criteria data.
(2) Inherent flexibility designed into the training device to
accommodate changes in a cost-effective manner.

Author (GRA)

R84-32232# Honeywell, Inc., West Covina, Calif.
DETERMINING COST AND TRAINING EFFECTIVENESS
TRADEOFFS FOR TRAINER DESIGN: TEST OF AN
EXPERIMENTAL MODEL
R. A. WIENCLAW and J. ORLANSKY (IDA, Alexandria, Va.) In
American Defense Preparedness Association Proc. of the 5th
Interservice/Ind. Training Equipment Conf., Vol. 1 p 64-73 16
Nov. 1983
(AD-P003455) Avail: NTIS HC A17/MF A01 CSCL 051
This paper reports the status of an ongoing project to develop
a macro model describing the decisions involved in developing
training equipment. The purpose of the model is to assist managers
in making such decisions by providing information concerning the
tradeoffs between the cost and effectiveness of training provided
by different configurations and choices of equipment. The goals of
the current phase of the study were to determine the feasibility
of collecting data to empirically test the model and turn it into a practical tool to be used in making decisions relating to trainer design and development, and to perform a preliminary test of the model. Results of the field data collection led to the conclusion that the data necessary to test the model can be obtained. However, such measures need to be refined before the model can be turned into a practical tool. The preliminary test of the model performed in this study resulted in no major modifications of the model. Author (GRA)

**N84-32234** Air Force Human Resources Lab., Williams AFB, Ariz.

**TRAINING CAPABILITIES: THE FACILITY PART OF THE EQUATION**


(AD-P003457) Avail: NTIS HC A17/MF A01 CSCL 13M

The theme of increased readiness through training has an inherent assumption that adequate facilities either exist, can be modified, or can be built to house computerized training devices. Too often adequate facilities do not exist or require long lead times to acquire. Training capabilities can become a myth to the realities of not having an adequate facility or of having modern training equipment fail because of facility deficiencies such as high temperatures and power spikes. But what are adequate facilities for computerized training devices, and how do we acquire them? This paper will review the time phasing and types of funding available within the Department of Defense for construction projects, design concepts of a flexible modular training building including security and environmental considerations. Without understanding the time phasing for acquisition of training devices, the effectiveness of training devices can be reduced to zero.

Author (GRA)

**N84-32241** AAI Corp., Baltimore, Md.

**MANAGING A LOW QUANTITY, HIGH TECHNOLOGY TRAINER DEVELOPMENT PROGRAM**


(AD-P003464) Avail: NTIS HC A17/MF A01 CSCL 05A

To effectively manage a low quantity, high technology trainer development program, the program management team must consider a variety of trade-offs during the development cycle. These trade-offs stem from the fact that a limited production trainer is neither a prototype nor a production line unit. This paper presents the issues and trade-offs which should be addressed by the program management team prior to and during the trainer development program.

Author (GRA)

**N84-32260** Veda, Inc., Dayton, Ohio

**SOME MANAGEMENT INITIATIVES TO IMPROVE EMBEDDED COMMERCIAL COMPUTER AND TRAINING DEVICE LIFE CYCLE SUPPORT**


(AD-P003494) Avail: NTIS HC A17/MF A01 CSCL 05A

This paper discusses some of the problems associated with the use of commercial off-the-shelf computer systems in aircrew training devices and offers some suggestions for improving the life cycle management of commercial computer systems in such military training devices. The impacts of commercial practices and computer capacity limitations are addressed as well as acquisition and logistics management considerations. Improved planning and management effectiveness will be needed in the 1980s to ensure that computer systems are supportable and/or replaced during the life cycle of training devices systems. Both acquisition and logistics support agencies will need to recognize that the life cycle of commercial computer systems may be limited by the lack of computer and peripheral vendor support and by the lack of expansion capability. Accordingly, training devices will need to be designed and developed to accommodate computer expansion or replacement. Computer system expansion or replacement will need to be anticipated to minimize training device to weapon system configuration differences caused by a lack of computer system supportability or capacity. This process could be termed Pre-Planned Product Preservation (P4).

Author (GRA)


**PROCEEDINGS OF THE 5TH INTERSERVICE-INDUSTRY TRAINING EQUIPMENT CONFERENCE, VOLUME 2**


(AD-A142775) Avail: NTIS HC A12/MF A01 CSCL 05I

The theme of this conference is increased readiness through training. Certainly, meeting this challenge becomes more difficult year by year as our weapon systems become more capable and also more complex. Multi-million dollar weapon systems demand the ultimate in training to ensure that crews are ready to operate them at their maximum effectiveness. Otherwise, we may have wasted valuable dollars buying increased capability that, for the lack of training, we cannot use effectively. This, then, is our readiness through training challenge. The purpose of these conferences is to promote the interchange of information between government and industry. It is only when industry thoroughly understands the government need and government thoroughly understands industry's capability that we can work together and function effectively as a team.

Author (GRA)

**N84-32276** Illinois Univ., Urbana-Champaign

**THE RELATIONSHIP BETWEEN ADMINISTRATIVE STYLE AND THE USE OF COMPUTER-BASED SYSTEMS: AN ATTITUINAL STUDY OF ACADEMIC LIBRARY PROFESSIONALS Ph.D. Thesis**

J. N. OLSGAARD 1984 230 p

Avail: Univ. Microfilms Order No. DA8408822

The relationships between the attitude of academic library professionals toward the level of participative management used by immediate supervisors in academic libraries in the United States, and the attitude of professional academic library employees toward computer-based systems is studied. The null hypothesis was that no statistically significant relationship exists between these variables. The alternative hypothesis was that a statistical relationship does exist. In order to explore the above hypotheses a mail survey was conducted of two populations. It was determined that a statistically significant nonlinear relationship does exist between the variables, that is, that the alternative hypothesis was supported. It was further determined that a model explaining the variation of the attitude of academic librarians toward computer-based systems could be constructed. This model was tested by instituting a logarithmic transformation of both the data reflecting the level of participative management, and of the data of a variable reflecting exposure to computer-based systems. By imposing additional refinements, over 80 percent of the variance of the dependent variable could be explained through the use of this proposed model.

**N84-33252** Air Command and Staff Coll., Maxwell AFB, Ala.

**DETERMINATION OF FACTORS AFFECTING PERFORMANCE AND PRODUCTIVITY IN AN ENGINEERING/DESIGN ENVIRONMENT**


(AD-A143315; ACSC-84-2225) Avail: NTIS HC A06/MF A01 CSCL 05A

Within all organizations there exist opportunities for constructive change, e.g., improving employee motivation, increasing management effectiveness, and enriching the quality of work life. This study attempts to generalize employee perceptions towards their organization and through inductive reasoning offer a basis for strategy selection to maximize the effects of the constructive change they are being sought. This study delves into the structure of a Real Property Maintenance Activity, its people and their perceptions of the work environment. It attempts a critical analysis not for the
01 HUMAN FACTORS AND PERSONNEL ISSUES

purpose of censure but rather to introduce one method that can precede constructive change in order to realize the full potential of the change.

GRA

N84-34162#  Minnesota Univ., Minneapolis. Dept. of Psychology.
D. J. WEISS Dec. 1983 29 p
(Contract N00014-76-C-0243; RRO-4204)
(AD-A144065) Avail: NTIS HC A03/MF A01 CSCL 09B

The research program's objectives are described, and the research approach is summarized and related to the sixteen technical reports completed under this contract. Fifteen major research findings are presented. The implications of the research findings and methods for future research in computerized testing and adaptive testing are described. Also included are abstracts of the sixteen technical reports. Author (GRA)

N84-34169#  Air Force Human Resources Lab., Brooks ABF, Tex.
S. K. GARCIA Mar. 1982 41 p
(Contract AF PROJ. 7719)
(AD-A144067; AFHRL-TP-84-11) Avail: NTIS HC A03/MF A01 CSCL 051

Relative-time-spent rating scales are used as the primary measuring device in task-oriented job inventories. These scales permit incumbents to report the amount of work time spent on each task performed relative to time spent on other tasks. Measures of relative time spent are currently being collected by the Air Force and other governmental agencies; however, no consensus has been reached regarding the optimal scale format to use in obtaining time spent-performing data. The general lack of consensus regarding the optimal scale has stemmed primarily from the difference among scientists in their opinions about scaling procedures, scale construction, application of scales and validity of scales. This paper summarizes the results of a feasibility study conducted to validate various relative-time-spent scale formats. The criterion for validation was collected via direct field observations. The primary objective of this investigation was to determine the relative validity of binary (perform/not perform), 9- and 25-point scales using actual time spent and frequency of observed task performance results. Results of this investigation indicated that the 9-point relative-time-spent scale provided the optimal format for use in the Air Force occupational analysis program. Author (GRA)

N84-34317#  Naval Postgraduate School, Monterey, Calif.
AN ANALYSIS OF THE EFFECTIVENESS OF THE PROBLEM SOLVING SKILLS FOR MANAGERS TRAINING PACKAGE-USCG M.S. Thesis
D. J. IHNET Mar. 1984 137 p
(AD-A144017; AD-E751074) Avail: NTIS HC A07/MF A01 CSCL 05A

This thesis examines the Problem Solving Skills for Managers training package, piloted by the Coast Guard Leadership and Management School in April 1983. Four questionnaire instruments developed by the company which produced the training package were analyzed to determine the effectiveness of the training program. A quasi-experimental pre-test/post-test/control group research design was used by the Coast Guard project manager and this thesis used a regression procedure to counter-act any regression effect. The results of the analysis suggest that the training program was not effective as given and suggests further study to determine why it was not effective. Author (GRA)

02 MANAGEMENT THEORY AND TECHNIQUES


A84-15220  FUZZY-NETWORK PLANNING - FNET

Currently used network planning techniques, such as PERT/CMP and their derivatives, assume that, in a graph of known structure, the duration of its activities is known either with certitude or at least with some probability. However, in many applications the structure of the graph and the duration of its activities are imprecise. This paper shows how the application of fuzzy sets to such problems can yield quasideterministic results obtained from imprecise input data. Author

A84-15312  METHODS AND PRACTICES OF PLANNING - PHYSICAL PLANNING, RESOURCES, FINANCIAL SIMULATION

Techniques used to analyze quantitatively the risks involved in technological development programs are reviewed and illustrated. The general problem of risk assessment (RA) in decision making processes is introduced, and a typology of uncertainties is set forth. Two principal approaches to RA are characterized - a technique which starts from the work breakdown structure of the project and is especially well adapted to the initial design-study phase, and a technique which assumes knowledge of the hierarchy of the tasks to be accomplished and is best employed in the development phase. Both analytical and simulation methods are considered, and formulas, sample calculations, and graphs are included. Consideration is also given to methods used to collect the input data for the RA calculations, including both subjective (expert, group-of-experts, and Delphi) and objective (analogy and Freiman-analysis) techniques. The impact of RA on definition, estimation, planning, and contractual politics is indicated. T.K.

A84-15322  RISK ASSESSMENT [LA PRISE EN COMPTE DES RISQUES]

Techniques used to analyze quantitatively the risks involved in technological development programs are reviewed and illustrated. The general problem of risk assessment (RA) in decision making processes is introduced, and a typology of uncertainties is set forth. Two principal approaches to RA are characterized - a technique which starts from the work breakdown structure of the project and is especially well adapted to the initial design-study phase, and a technique which assumes knowledge of the hierarchy of the tasks to be accomplished and is best employed in the development phase. Both analytical and simulation methods are considered, and formulas, sample calculations, and graphs are included. Consideration is also given to methods used to collect the input data for the RA calculations, including both subjective (expert, group-of-experts, and Delphi) and objective (analogy and Freiman-analysis) techniques. The impact of RA on definition, estimation, planning, and contractual politics is indicated. T.K.

A84-15599  IDENTIFYING OPERATIVE GOALS BY MODELING PROJECT SELECTION DECISIONS IN RESEARCH AND DEVELOPMENT
M. J. STAHL (Clemson University, Clemson, SC) and A. M. HARRELL (South Carolina, University, Columbia, SC) IEEE Transactions on Engineering Management (ISSN 0018-9391), vol. EM-30, Nov. 1983, p. 223-228. refs

In an R&D laboratory, Behavioral Decision Theory was used to identify operative goals as a method of organizational analysis. Six goals were used as criteria in a decision-making exercise wherein 69 managers made decisions about hypothetical projects. Two goals accounted for 84 percent of the explainable variance and were deemed operative goals. Furthermore, a lack of
two-stage model consisting of situation assessment and response selection stages as well as interconnections with the rest of the organization. The information processing and decision-making load of each team member and the measure of organizational performance are depicted in the performance-workload space as implicit functions of the decision strategies of each individual member. The approach to evaluating organizational structures using the methodology for analysis of an organization consisting of two decisionmakers with bounded rationality.

A84-23989
INTEGRATED MANAGEMENT IN MATRIX ORGANIZATION
Because project management requires the integration of all planning and management control activities, planning must encompass tactical, strategic and operational considerations, functionally oriented efforts must constitute a unified whole, and a project's technical performance, cost, and schedule parameters must be integrated into a systemic composite. Integrated management has, accordingly, both an organizational and a program component that are distinct and yet interrelated. Attention is presently given to the conceptual basis of these two components of integrated management from a systemic viewpoint, with a view to their interrelationships.

A84-25008
ANALOGY IN SYSTEMS MANAGEMENT - A THEORETICAL INQUIRY
Analogy is frequently treated in the systems management literature as the archetypical intuitive-complex process in which experts exercise (analogy and disanalogy) judgments in the absence of adjuvants and in which little or no opportunity for structuring is possible. Yet many influential decisions are made via analogical reasoning, and it seems desirable to probe and attempt to understand the process from a more rigorous perspective. This theoretical analysis of the intuitive and diffuse characteristics of analogical reasoning processes is the first step in a research effort intended to lead to (1) understanding of common (and possibly costly) errors, pitfalls, travails, and problem-solving impediments; (2) possible recommendations for improvements to organizational structures, control and coordination processes, and management information flows; and (3) guidelines for a generalized analogical reasoning support framework (e.g., a handbook, a knowledge bank design, and/or even a software package/artificial intelligence program).

A84-31213
ENGINEERING TRADEOFF PROBLEMS VIEWED AS MULTIPLE OBJECTIVE OPTIMIZATIONS AND THE VODCA METHODOLOGY
This paper summarizes a rational model for making engineering tradeoff decisions. The model is a hybrid from the fields of social welfare economics, communications, and operations research. A solution methodology (Vector Optimization Decision Convergence Algorithm - VODCA) firmly grounded in the economic model is developed both conceptually and mathematically. The primary objective for developing the VODCA methodology was to improve the process for extracting relative value information about the objectives from the appropriate decision makers. This objective was accomplished by employing data filtering techniques to increase the consistency of the relative value information and decrease the amount of information required. VODCA is applied to a simplified hypothetical tradeoff decision problem. Possible
use of multiple objective analysis concepts and the VODCA methodology in product-line development and market research are discussed.

Author

A84-31781# NETWORK ANALYSIS UTILIZING COMPUTER GRAPHICS

The use of computer graphics for network analysis is proposed, laying some groundwork for the application of a graphics to problems such as maximal flow, minimum cost flow, critical path method, program evaluation and review technique, decision analysis, and interpretive structural modelling. The storage of graphs in a computer is briefly explained, the network calculations are presented, and the Dijkstra algorithm for the shortest path problem is presented. Numerical results for G = (15, 34) obtained from 1 computer are given. The essentials and analytical steps of the shortest path procedure in a particular display unit are explained.

C.D.

A84-33463 ARIADNE - A KNOWLEDGE-BASED INTERACTIVE SYSTEM FOR PLANNING AND DECISION SUPPORT
A. P. SAGE and C. C. WHITE, Ill (Virginia, University, Charlottesville, VA) IEEE Transactions on Systems, Man, and Cybernetics (ISSN 0018-9472), vol. SMC-14, Jan.-Feb. 1984, p. 35-47. refs

(Contract N00014-80-C-0542)

The development of an interactive planning and decision support process for multiple criteria alternative selection situations is discussed. Probabilities, utility scores for the lowest level attributes, and attribute trade-off weights, i.e., the parameters, can be imprecisely described by set inclusion. Within a specified structural model of the decision situation, the process allows the decisionmaker to iteratively select the mix of parameter value precision and alternative ranking specificity. By selecting this mix, the decisionmaker is able to direct the alternative selection process in an interactive manner, using alternative selection strategies based on behaviorally meaningful dominance search strategies. Emphasis is placed on the motivation of the research and the behavioral relevance of the support process. References in the bibliography provide further analytical and behavioral discussions related to this process.

Author

A84-33465 THE MULTIOBJECTIVE MULTISTAGE IMPACT ANALYSIS METHOD THEORETICAL BASIS
F. A. C. GOMIDE (Centro Tecnologico para Informatica, Sao Paulo, Brazil) and Y. Y. HAIMES (Case Western Reserve University, Cleveland, OH) IEEE Transactions on Systems, Man, and Cybernetics (ISSN 0018-9472), vol. SMC-14, Jan.-Feb. 1984, p. 88-98. Research supported by the Conselho Nacional de Pesquisas. refs

(Contract NSF ENG-79-03605; DE-AC01-80RA-50256)

Multiojective multistage decisionmaking problems are addressed in the light of multiojective multistage optimization problems for finite-dimensional deterministic systems. Because of the structure of these problems, the concept of a stage trade-off (a dynamic multiojective trade-off) is introduced. The stage trade-off concept generalizes the usual trade-off concept used in static multiojective optimization problems and leads to the notion of impact analysis. The theoretical basis for a newly developed method - the multiojective multistage impact analysis method - (MMIAM) - is presented.

Author

A84-42619 ORGANIZATIONAL CORRELATES OF PERCEIVED ROLE PERFORMANCE IN THE RESEARCH LABORATORY
F. HARRISON (Southern Connecticut State University, New Haven, CT) IEEE Transactions on Engineering Management (ISSN 0018-9391), vol. EM-31, Aug. 1984, p. 118-121. refs

It is the aim of this paper to show, through an empirical study, that scientists perceive themselves at higher levels of role performance in research laboratories managed through the so-called 'organic' system identified by Burns and Stalker (1966). More specifically, it is the hypothesis of this paper that the more organic system of management, the higher the perceived role performance of the individual scientist. The study underlying this paper involved surveys of staff scientists who held faculty rank in a state university and who for the most part were performing basic and applied research in the physical sciences. The findings of this study replicate the empirical results of previous studies which have shown that scientists tend to perceive themselves at high levels of role performance in laboratory settings managed through the organic system. The evidence indicates that perceived and, presumably, actual role performance in the research laboratory will be significantly improved if the individual scientist is encouraged and permitted to participate actively and regularly in the setting of objectives and the making of decisions that affect his research projects. The potential benefits appear to justify much further study of this subject.

Author

THE EFFECTIVENESS OF PROJECT MANAGERS - IMPLICATIONS OF A POLITICAL MODEL OF INFLUENCE
D. D. DILL (North Carolina, University, Chapel Hill, NC) and A. W. PEARSON (Manchester, Victoria University, Manchester, England) IEEE Transactions on Engineering Management (ISSN 0018-9391), vol. EM-31, Aug. 1984, p. 138-146. refs

The decision situation of R&D laboratory reorganizations is addressed to enhance the authority and effectiveness of project managers, in the interest of cost reduction and cost effectiveness, are often guided by the 'rational actor model' of organizational reality. This model makes critical assumptions about the relationships among authority, power, and managerial effectiveness and skill. Attention is given to an alternative model, that of 'organizational politics', which study results in a variety of settings indicate to be a superior description of R&D project manager effectiveness. Implications for management development are discussed.

O.C.

A84-43469# CONFIGURATION CONTROL METHODOLOGY FOR SYSTEMS PERFORMANCE ENHANCEMENT

(AIAA PAPER 84-1942)

A new methodology is introduced where the variation of the system configuration parameters are considered as contributions to the control efforts which are considered as decision effects and robust controllers that enhance the system performance. A relation between the desired-shift-in-the-eigen values and the variation in the system configuration parameters is established. Also a direct relation between the control gain matrix and the variation in the eigen values is established. As an application to the present methodology the configuration control of an aircraft performing a lateral maneuver is worked out.

Author

M84-11978# Motivating Managers: A Guide to Performance Targeting and Performance-Based Pay in State and Local Governments
H. P. HATRY, J. M. GREINER, R. GOLLUB, K. STEIL (Public Technology, Inc.), and M. QUAGLIANA (Public Technology, Inc.) A84-42619

The assumptions behind performance targeting programs, and appropriate criteria for measuring their success are discussed. Also the impacts resulting from actual trials of the approach are presented along with findings from an examination of four trial programs. The issues and tactics which should be considered if performance targeting is to be instituted in an organization are discussed. The entire presentation emphasizes theories of
motivation and increased input into decisionmaking that affect work performance.


DISJUNCTIVE PROGRAMMING AND A HIERARCHY OF RELAXATIONS FOR DISCRETE OPTIMIZATION PROBLEMS

E. BALAS Jun. 1983 43 p

(Contract N00014-82-K-0329; NR PROJ. 047-607) (AD-A132004; MSHR-492; WP-69-B2-63) Avail: NTIS HC03/MFA01 CSCL 12A

The author discusses a new conceptual framework for the convexification of discrete optimization problems, and a general technique for obtaining approximations to the convex hull of the feasible set. The concepts come from disjunctive programming and the key tool is a description of the convex hull of a union of polyhedra in terms of a higher dimensional polyhedron. Although this description was known for several years, only recently was it shown by Jerislow and Lowe to yield improved representations of discrete optimization problem as the intersection (conjunction) of unions of polyhedra, and define an operation that takes one such expression into another, equivalent one, with fewer conjuncts. Then introduced is a class of relaxations based on replacing each conjunct (union of polyhedra) by its convex hull. The strength of the relaxation increases as the number of conjuncts decreases, and the class of relaxations forms a hierarchy that spans the spectrum between the common linear programming relaxation, and the convex hull of the feasible set itself. Instances where this approach presents advantages include critical path problems in disjunctive graphs, network synthesis problems, certain fixed charge network flow problems, etc. The author illustrates the approach on the first of these problems, which is a model for machine sequencing.

Author (GRA)


RIS ASSESSMENT TECHNIQUES: A HANDBOOK FOR PROGRAM MANAGEMENT PERSONNEL

Jul. 1983 255 p refs

(Contract MDA903-82-G-0055) (AD-A131586; ISI-V-3836-05) Avail: NTIS HC A12/MF A01 CSCL 06A

The primary objectives of this handbook are to make the reader aware of the risk assessment techniques being used by Department of Defense organizations, to alert the reader to the advantages and disadvantages of these techniques, and to assist him in applying risk assessment to his acquisition program. The handbook is intended to be a practical guide and reference for program management personnel - not a textbook dealing with the theories supporting risk assessment. This package is intended as a user's manual for applying any particular techniques. Thus, the handbook is organized to address, in summary, the most important questions to program management personnel, i.e., Why do a risk assessment? What techniques are available? How do I select and implement a technique? These questions are answered in the first six chapters. This summary-level material is supported by a series of Appendices that provide detailed discussions of the techniques in use, the service regulations pertaining to risk assessments, a glossary of terms, and a structured bibliography.

Author (GRA)

N84-14062# Naval Postgraduate School, Monterey, Calif.

KNOWLEDGE BASE MANAGEMENT FOR MODEL MANAGEMENT SYSTEMS M.S. Thesis

G. W. WATSON, JR. Jun. 1983 111 p

(AD-A132211) Avail: NTIS HCA06/MFA01 CSCL 05A

This study examines the issues involved in bringing qualitative and quantitative techniques to bear upon unstructured managerial decisions. Furthermore, this work reviews the problems of user interface and data base interfaces as they relate to aspects of model base managements. The focus of this study is to identify some organizations of knowledge about models within the Decision Support System. In support of this goal, this report investigates what knowledge is, how it is structured, and how it is accessed.

Author (GRA)

N84-14705# South African Inst. of Civil Engineers, Pretoria.

IS CRITICAL PATH PLANNING THE ANSWER

A. FLEISCHMANN (Critical Path Planning Services) In its Symp. on Computers in Construction 20 p 1982 Avail: NTIS HC A08/MF A01

The development of an inhouse computer to provide integrated budget control and cash flow forecasting facilities including inflation forecasts is discussed. The programs had to have a direct link to an additional critical path suite of programs. Past and current project management industry trends and problems are analyzed and the system design criteria and management objectives are defined highlighting the interaction of inflation, time, cost and management strategy. Examples of solutions which take cognizance of these factors are included.

Author

N84-14966# Naval Postgraduate School, Monterey, Calif.

A CALCULATOR ADAPTATION OF THE MARKOV CHAIN MODEL FOR MANPOWER ANALYSIS M.S. Thesis

J. K. SAPP Jun. 1983 114 p

(AAD-A132990) Avail: NTIS HCA06/MFA01 CSCL 05A

This thesis provides a foundation for the application of fundamental Markov analysis to manpower modeling in the Armed Services or in other similar organizations. A handheld calculator software package is introduced to assist students, military analysts, and others who model manpower systems. Markov analysis methods are incorporated in program software to permit discrete time investigation of the Navy's manpower structure. A user program guide for application to a broad range of manpower issues is also presented.

Author (GRA)

N84-14969# Los Alamos Scientific Lab., N. Mex.

BENCHMARKING UNSTRUCTURED SYSTEMS


Systems developed without the advantage of structured techniques are discussed. When an unstructured system is identified, management must decide if it should be rewritten according to modern standards. Management decision making in one data processing shop is described. To be judged successful, a system should be friendly, useful and easily maintainable. It is shown that psychologically complex programs are more expensive to maintain than those developed with structured techniques, free from such complexity. Three suspect systems were statistically measured against a base system. When a suspect system proved at least as psychologically complex as the base system, future maintenance costs were assumed to be at least as high as for the benchmark system. The study provided management with a more accurate view of programmer work habits. Programmers previously judged to be extremely competent created a high level of psychological complexity which is expected to result in high maintenance costs when other programmers become responsible for the system.

DOE

N84-16068# School of Aerospace Medicine, Brooks AFB, Tex.


(Contract DA PROJ. 7930) (AD-A132898; SAM-TR-83-24) Avail: NTIS HCA02/MFA01 CSCL 05A

Identifying salient climate dimensions and determining their generality across a variety of organizational settings is important aspects of the study of organizational climate. The purpose of this study was to determine the conceptual similarity among a sample of organizational variables and to ascertain the adequacy of a new seven-dimension organizational-climate taxonomy to account for these variables. Twelve judges independently classified 105 organizational variables from 14 research investigation, using
the new climate taxonomy. Nearly 70% of the 105 variables were classified within the framework of the climate taxonomy by a criterion of agreement of six or more judges. Complete classification agreement across all possible pairs of judges was found for nearly 50% of the 105 variables. On the average, 7 of the 12 judges agreed on the classification of the 105 organizational variables. These findings demonstrate that considerable conceptual similarity exists among the types of organizational variables found in a sample of the research literature and that the new taxonomy has sufficient utility to warrant further development.

G. S. FISHMAN Aug. 1983 26 p (Contract N00014-76-C-0302) (AD-A134255; UNC/ORSA/TR-83/5) Avail: NTIS HC A03/MF A01 CSCL 12A

This paper describes a new procedure for estimating parameters of a stochastic activity network of N arcs. The parameters include the probability that path m is the longest path, the probability that path m is the shortest path, the probability that arc i is on the longest path and the probability that arc i is on the shortest path.


A subset selection procedure R for binomial populations is considered for the problem of selecting the best of k vendors whose manufacturing processes have the probabilities p1, ..., pk sub i's, sub k of turning out an item which conforms to specifications. The operating characteristics (i.e., selection probabilities and expected size of the selected subset) of this rule are related to the underlying p sub i's, the common sample size n, and d. Formulae (both exact and asymptotic) are given for these quantities for slippage as well as equi-spaced parametric configurations. Tables and graphs relating these quantities are presented for three specific slippage configurations. Numerical illustrations are given to show the use of the tables in determining the sample size n and the constant d to be used in the rule R.


A procedure for constructing experimental designs for use in estimating main effects, and detecting the presence of interactions. Numerical illustrations are given to show the use of the tables in determining the sample size n and the constant d to be used in the rule R.

M. D. MORRIS and T. J. MITCHELL Nov. 1983 35 p refs (Contract W-7405-ENG-26) (DE84-002997; ORNL/CSD-126) Avail: NTIS HC A03/MF A01 CSCL 12A

A major obstacle to understanding organizational behavior is a lack of highly reliable instruments to assess the principal dimensions of an organization's climate. The analysis reported here was undertaken to improve the precision of a set of organizational-climate measures grounded on a new theoretical-conceptual model of human and organizational uncertainty within the Department of Defense Panel Sessions covered these topics: methods and models; budgeting and contracting risk; computer aids in decision making; management view of acquisition risk; behavior under risk and uncertainty; risk analysis; advanced theory; and issues in risk and uncertainty.
effectiveness, and to provide a related taxonomy of climate dimensions. The data base for the analysis consisted of approximately 1,000 U.S. Air Force scientist-engineers working in five separate Government research and development organizations. Internal consistency analysis and factor analysis were used to assess reliability and dimensional purity, while correlational analysis was used to establish relations with selected performance and job-satisfaction criteria. The organizational-climate measures demonstrated promising psychometric characteristics. Generally high reliabilities (.80 to .95), satisfactory factor structure, and encouraging validities provide a sound foundation for further refinement.

A NORMATIVE MODEL OF WORK TEAM EFFECTIVENESS

J. R. HACKMAN Nov. 1983 74 p
(Contract N00014-80-C-0555)
(AD-A136398; AD-E000556; SOM-TR-2) Avail: NTIS HC A04/MF A01 CSCL 05A

Descriptive research on group performance has produced neither a set of empirical generalizations sturdy enough to guide the design and management of work teams, nor interventions that reliably improve team effectiveness. As an alternative, a normative model of group effectiveness is proposed and discussed. The model identifies potentially manipulable aspects of the group and its context that are particularly potent in promoting team effectiveness, and organizes those factors to make them useful in diagnosing the strengths and weaknesses of task-performing teams. The final section of the paper explores the implications of the normative model, and outlines the beginnings of an action model for creating and maintaining effective work groups in organizations.

TOWARD AN INTERPERSONAL PARADIGM FOR SUPERIOR-SUBORDINATE COMMUNICATION Ph.D. Thesis

T. L. BANGS Nov. 1983 205 p
(AD-A135863; AFIT/G/HR-83-77D) Avail: NTIS HC A10/MF A01 CSCL 05J

The purpose of this dissertation is to report formulative research on an interpersonal paradigm for superior-subordinate communication. The suggested paradigm goes beyond traditional structural approaches to leadership and rests on the interpersonal perception theory of Laing, Phillipson, and Lee. The following theoretical propositions were tested: (1) Highly confirming behavior, as perceived by a subordinate, is related to a high degree of subordinate feedback. (2) Highly confirming behavior by a superior, as that behavior is perceived by a subordinate, is related to greater communication of creativity from the subordinate to the superior. (3) High superior disclosure, as perceived by a subordinate, is related to a high degree of creativity from the subordinate to the superior. (4) A high degree of superior accessibility, as perceived by a subordinate, is related to greater communication of creativity from the subordinate to the superior. (5) A high degree of inferior accessibility, as perceived by a subordinate, is related to a high degree of subordinate feedback.

ON THE FACIAL STRUCTURE OF SCHEDULING POLYHEDRA

E. BALAS Aug. 1983 56 p
(Contract N00014-82-K-0322; NSF ECS-82-05425; NR PROJ. 047-607)
(AD-A136983; MSRR-496; WP-16-83-84) Avail: NTIS HC A04/MF A01 CSCL 12A

A well-known job shop scheduling problem can be formulated as a disjunctive program. Given a graph with node set N and with directed and undirected arcs, an orientation of the undirected arcs that minimizes the length of a longest path in G. The author treats the problem as a disjunctive program, without recourse to integer variables, and gives a partial characterization of the scheduling polyhedron P(N), i.e., the convex hull of feasible schedules. In particular, he derives all the facet inducing inequalities as follows. Given a graph G with node set N and with directed and undirected arcs, find an orientation of the undirected arcs that induces a facet of P(N). One of our results is that any inequality that induces a facet of P(H) for some H properly included in K, that induces a facet of P(N). Another one is a recursive formula for deriving a facet inducing inequality with p positive coefficients from one with p-1 positive coefficients. The author also addresses the constraint identification problem, and gives a procedure for finding an inequality that cuts off a given solution to a subset of the constraints.

KNOWLEDGE-BASED SUPPORT SYSTEMS FOR LONG RANGE PLANNING

D. W. KOSY and V. DHAR Dec. 1983 45 p
(AD-A137311; CMU-RTR-83-21) Avail: NTIS HC A03/MF A01 CSCL 05A

Long range planning is the process by which an organization assesses its future environment and develops specific plans of action to respond to, or change, that environment to achieve its goals. This report presents the results of a study of long range planning practices at one plant of a large U.S. computer firm, focusing on current and potential decision support systems (DSSs) for the quantitative aspects of the planning process. While it appears that the clerical tasks in the process can be computerized using current DSS technology, this technology does not help managers evaluate the credibility or quality of the plans made. An architecture is described for a system incorporating a much richer store of knowledge about planning variables which would allow the system itself to validate, explain, and justify its results. A concrete realization of such a system, called ROME, has been designed and is currently under development. Design goals for ROME are presented and potential uses of the system are illustrated.

A DECISION THEORY: INDIVIDUAL BIASES AND THEIR EFFECT ON FORECASTING IN AN ORGANIZATION M.S. Thesis

T. L. BANGS Aug. 1983 50 p
(AD-A135863; AFIT/G/HR-83-77D) Avail: NTIS HC A10/MF A01 CSCL 05J

There has been a great deal written about how individual cognitive biases effect decision making. However, there is little empirical evidence to show how such heuristic patterns affect...
decision making within organizations. This thesis reviews the literature concerning heuristics and behavioral decision theory and then examines budgetary forecasting decisions within two large organizations to see if these biases can be observed in forecasts produced within organizations. 

Author (GRA)

N84-22166# Institute for Perception RVO-TNO, Soesterberg (Netherlands). Experimental Psychology Group.

SOCIETAL VERSUS INDIVIDUAL DECISION MAKING: HOW THEY MIGHT DIFFER
S. LICHTENSTEIN and W. A. WAGENAAR Oct. 1983 43 p

(IZF-1983-20; TDCK-78678) Avail: NTIS HC A03/MF A01

The situation in which a societal decision maker (SDM) is responsible for making decisions whose effects fall primarily or exclusively on other people is discussed. The causes of differences between the decisions made by the SDMs and the preferences of the affected individuals and ways to resolve such discrepancies are considered. Discrepancies are traced to different perspectives on the problem, different values, or differences in the customary methods that people use when making decisions. For resolving decision discrepancies, the SDM should first make the decision and then, before implementing it, make a meta-analysis of that decision and its potential for generating disagreements. Once the possible source or sources of disagreements are found, resolution can be sought. 

Author (ESA)

N84-22342# University of Southern California, Los Angeles. Social Science Research Inst.

EQUAL WEIGHTS, FLAT MAXIMA, AND TRIVIAL DECISIONS

(Contract N00014-79-C-0038) (AD-A138506; AD-F630004; SSRI-RR-80-2) Avail: NTIS HC A03/MF A01 CSCL 12A

Most predictions are intended as a basis for decision making. The point of this paper is that prediction and decision require different methods. Equal weights, while often useful for prediction, are less useful for decision making. The action options available in any decision problem fall into three classes: sure winners, sure losers, and contenders. Sure winners and sure losers are defined by dominance, accepting sure winners and rejecting sure losers is trivial. Good decision rules should discriminate well among contenders. In the familiar pick-1 decision problem, options on the Pareto frontier (i.e., undominated options) almost always show negative correlations among attributes. Such negative correlations make equal weights inappropriate. This paper extends that result to the case in which a decision maker must pick k options out of n, with the case of set of sure winners is usually not empty. It develops general procedures for identifying the set of contenders, given the options, k, and n. This set is a generalized Pareto frontier, of which the traditional kind is a special case. Simulations show that attribute intercorrelations among contenders are substantially depressed and typically negative, even if the intercorrelations in the whole set are positive. Such negative correlations among contenders strongly question the usefulness of equal weights for decision making.

GRA

N84-22302# Air Force Business Research Management Center, Wright-Patterson AFB, Ohio.

DECISION TECHNOLOGY: THE CATALYST FOR ACQUISITION IMPROVEMENT Final Report

(AD-P002755) Avail: NTIS HC A24/MF A01 CSCL 15E

It is possible to manage all activities in a weapon acquisition with a system that predicts and achieves desired results. DECISION TECHNOLOGY provides the Program Manager with the exact information he needs to synthesize all program elements to accurately predict performance probability without compromising management style or objectives. It embraces a basic language that simplifies understanding and communication and applies a fundamental logic that clarifies the implications of each management action. It presents the RISK and CONSEQUENCE visibility in a format that enables the Program Manager to make necessary decisions and confidently defend them knowing they will achieve the results expected. Therefore, all the weapon system expectations are precisely known at all times. DECISION TECHNOLOGY applied in over seventy applications has resulted in significant savings in cost and time along with achievement of predictable outcomes. 

Author (GRA)

N84-23305# Army Armament Research and Development Command, Dover, N. J.

AN ANALYSIS OF THE ACQUISITION STRATEGY DECISION PROCESS ALONG THREE DIMENSIONS OF THE ACQUISITION IMPROVEMENT PROGRAM Final Report

(AD-P002758) Avail: NTIS HC A24/MF A01 CSCL 15E

This study investigates the acquisition strategy decision process as it relates to the major themes of the Acquisition Improvement Program (AIP). Further, it examines a wide spectrum of acquisition, program, operating, and industry considerations. The study isolated variables critical to the AS decision process, defined their causal relationships, and produced a causal model. Findings support the notion that a program's effect on the industrial base, readiness/sustainability, and cost can be pre-determined from a specific number of program factors. Further, their effects can be enhanced or otherwise altered by a few, key AS approaches/factors. The findings also suggest that programs with limited competition at the subsystem level fare better than those predicted on the extremes of either open competition with component breakout or restricted to a sole source of the systems level; that a moderate, middle-of-the-road AS approach is more effective for most programs.

GRA

N84-23333# University of Southern California, Los Angeles.

AN APPLICATION OF THE CAUSAL-INTEGRATIVE MODEL Final Report

(AD-P002766) Avail: NTIS HC A24/MF A01 CSCL 15E

Historical analyses of program acquisitions indicate that the probability of cost growth and/or schedule slippages is high. Many research efforts have been directed at predicting the causal factors leading to these changes in program performance. Much of the research has been devoted to modeling the acquisition process with the goal being a more effective control of program performance. A common observation of researchers is that the acquisition process is a complex and interrelated set of events. As such, any comprehensive model that claims to represent this process must reflect these interrelated activities, many of which can be described by feedback loops. This paper discusses one such model that utilizes the Systems Dynamic approach to simulation to portray the processes that form collectively the program acquisition cycle. The Causal-Integrative Model (CIM) was just presented in its conceptual form at the Management of Risk and Uncertainty Symposium in February, 1981, at the U.S. Air Force Academy, Colorado. This paper reports on the computer-based operational form of the CIM. The results of applying the computerized model to one acquisition program are presented.

Author (GRA)
A CONCEPT FOR MISSION-ORIENTED PLANNING FOR SYSTEM ACQUISITION AT THE DEFENSE COMMUNICATIONS AGENCY Final Report

(AD-P002823) Avail: NTIS HC A24/MF A01 CSCL 15E

The Defense Communications Agency (DCA) is responsible for a broad range of system acquisition functions for Department of Defense (DoD) command, control, and communications (C3) programs as well as analytic and automatic data processing (ADP) support to the Joint Chiefs of Staff (JCS) and the Office of the Secretary of Defense (OSD). To better accomplish these functions DCA has begun a corporate-wide system integration initiative based on mission planning consistent with Department of Defense Directive (DoDD) 5000.1, Major System Acquisition. The initiative has three objectives: higher quality mission analysis, a better bridge from mission analysis into system acquisition, and more effective consideration of supportability of C3 systems and equipments. This paper describes DCA’s planning initiative, its implementation approach, and the current status. The initiative, a mission-oriented planning concept, is currently under development and trial implementation within DCA. Author (GRA)
02 MANAGEMENT THEORY AND TECHNIQUES

a detailed example of a hypothetical organization is presented.

N84-24493# Texas A&M Univ., College Station. Dept. of Management.
THE NATURE AND USE OF FORMAL CONTROL SYSTEMS FOR MANAGEMENT CONTROL AND STRATEGY IMPLEMENTATION
R. L. DAFT and N. B. MACINTOSH Feb. 1984 63 p
(Contract N00014-83-C-0025)
(AD-A139063; TR-ONR-DG-06) Avail: NTIS HC A04/ MF A01
CSCL 05A

Management control research from organization theory, accounting and business policy is reviewed, and a two-stage qualitative study of management control systems (MCS's) is reported. The study identified four MCS components—budget, policies and procedures, performance appraisal system, and statistical reports—that were used at the middle management level in business organizations. Each MCS component played a role during the control cycle of target setting, monitoring, and corrective feedback. The findings were used to propose two models—one model links the MCS to business-level strategy implementation, and the other model defines primary and secondary roles for RCS components in the management control process. Author (GRA)

RESEARCH ON FACTOR SCREENING IN COMPUTER SIMULATION Final Technical Report
C. A. MAURO and D. E. SMITH Mar. 1984 17 p
(Contract N00014-79-C-0550)
(AD-A139825; TR-113-15) Avail: NTIS HC A02/ MF A01
CSCL 12A

The object of this research program has been to evaluate and compare the performance of factor screening procedures for use in computer simulation experiments. Factor screening methods are statistical methods that attempt to identify, efficiently and economically, the set of most important factors. Once the most important factors have been identified, further simulation (or real-world) experimentation can focus on these particular factors. This eliminates experimentation with relatively unimportant factors, which can needlessly consume resources. This report briefly discusses the problem background, summarizes the research goals, and provides a reference list of all technical reports, journal publications, and presentations prepared under this contract. Author (GRA)

N84-25403# National Research Inst. for Mathematical Sciences, Pretoria (South Africa).
INTERACTIVE DECISION ANALYSIS AND MODELLING
(CSIR-TWISK-294) Avail: NTIS HC A12/ MF A01

The lectures fall into two categories. The first category surveys the field of multiple criteria decision making and developments therein. The second category deals more with computer interaction in the design, construction and implementation of decision support models. M.A.C.

N84-25503 International Inst. for Applied Systems Analysis, Laxenburg (Austria).
DECISION SUPPORT FOR INNOVATION MANAGEMENT: APPLICATION TO THE LIGHTING INDUSTRY
H. D. HAUSTEIN and M. WEBER Dec. 1983 75 p refs

In today's turbulent economic environment, every decision affecting the development of industry necessarily carries an increased risk that the anticipated economic and social goals will not be achieved. The description of decision making does not always include the notion of risk. Sometimes the volatility of cost factors or changing economies of scale (innovation being the primary reason for the change) are held responsible for uncertainty about future development. These phenomena are also used to explain the decline in capital formation and in decisions to invest that we are currently witnessing. The economic and decision sciences are trying to cope with this situation by devising more sophisticated methods and procedures for supporting decision making. Methods that are applicable to the analysis of innovation patterns, with the aim of basing the necessary decision on more sound reasoning are reviewed. The application of some of these methods to innovation management in the lighting industry are described. Author

N84-26001 Case Western Reserve Univ., Cleveland, Ohio.
OPTIMIZATION METHODS IN HIERARCHICAL HOLOGRAPHIC MODELING Ph.D. Thesis
J. THADATHIL 1983 406 p
Avail: Univ. Microfilms Order No. DA8405260

The mathematical formulation of the hierarchical holographic modeling and solution methodology are explored. The hierarchical multiobjective optimization (HMO) methods that have been developed so far are useful mostly for the analysis of large scale systems which are controlled and managed by one planning group only. The mathematical representation of the HHM in a generic case and the effects of multiple decompositions on the decision vectors, multiobjective vectors and constraints vectors in three HHS models are considered. The solution methodology of two hierarchical holographic submodels (HHS) is considered. Two algorithms, namely the Hierarchical Holographic Overlapping Coordination algorithm and the Hierarchical Holographic Feasible scheme are proposed for generating pareto optimal solutions of the HHSs. The coupling resource allocation problem faced by the upper level group, between two HHSs is addressed. The applicability of the HHM scheme to a hypothetical river basin related land resource management problem is explored. Author

N84-26345# Massachusetts Univ., Amherst. Dept. of Electrical and Computer Engineering.
T. E. DJAFERIS 17 Oct. 1983 7 p
(Contract AF-AFOSR-0155-80; AF PROJ. 2304)
(AD-A140496; AFOSR-83-1122TR) Avail: NTIS HC A02/ MF A01
CSCL 05A

Stable Hybrid Model Reference Adaptive Control Algorithms are suggested which are then extended to deal with the presence of bounded disturbances. The question of unmodelled dynamics is also addressed. Simpler adaptive control algorithms are developed in the context of pole placement, by first considering systems with known parameters. Such algorithms do not require a minimum phase assumption. The foundation is laid for a much broader investigation of robust design methods for systems with structured uncertainties. Author (GRA)

N84-26429* National Aeronautics and Space Administration, Washington, D. C.
MANAGEMENT, A CONTINUING BIBLIOGRAPHY FOR NASA MANAGERS, WITH INDEXES
Mar. 1984 150 p
(NASA-SP-7500(18); NAS 1.21:7500(18)) Avail: NTIS HC
$16.00 CSCL 05A

This bibliography lists 594 reports, articles and other documents introduced into the NASA scientific and technical information system in 1984. Author

N84-27591# Naval Postgraduate School, Monterey, Calif.
THE INTRODUCTION OF UNCERTAINTY TECHNIQUES TO THE PRODUCTIVITY INVESTMENT FUND M.S. Thesis
E. A. LENIO Mar. 1984 130 p
(AD-A140864) Avail: NTIS HC A02/ MF A01
CSCL 05A

Each year the Defense Productivity Program Office (DPPO) disburse funds for Productivity Investment Projects (PIFs). The purpose of these projects is to increase productivity within the Department of Defense (DOD). To enhance these efforts, DPPO requested a study to be conducted to determine if methods of risk or uncertainty will affect the results obtained by the current
procedure. This study applies various principles of uncertainty to this procedure and examines their impacts on the project rankings. A background of DPPO and PIFs is presented together with this procedure and examines their impact on the project rankings. Authors (GRA) further research are presented. Authors (GRA)

**N84-27592#** Naval Postgraduate School, Monterey, Calif. CONTROL SYSTEMS M.S. Thesis J. M. MARTIN Dec. 1982 56 p (AD-A140901) Avail: NTIS HC A04/MF A01 CSCL 05A

Managers are responsible for identifying the need for control and for designing control systems that are appropriate for each set of conditions. This thesis examines the nature of organizational control and discusses historical approaches to organizational control. Structural and behavioral control system theories are presented and analyzed. Four alternatives to control system design are documented and an approach to control system design is offered. Author (GRA)

**N84-27593#** Technische Hochschule, Aachen (West Germany). Schriften zur Informatik und Angewandten Mathematik. STOCHASTIC BOUNDS ON DISTRIBUTIONS OF OPTIMAL VALUE FUNCTIONS WITH APPLICATIONS TOPERT, NETWORK FLOW AND RELIABILITY G. WEISS (Tel Aviv University) Oct. 1982 27 p refs Sponsored by DAAD (REPT-81) Avail: NTIS HC A03/MF A01

Networks or general clutter systems with nodes 1, ...,n, paths 11, ...,k, cuts 1j, ...,jl, and with random weights 1j, ...,kn possessing marginal distributions F1, ...,Fn are considered. The optimal value functions M, L, and T, (critical path length, the maximal flow and the system lifetime) random variables such that M(n) sup s is convexly larger, L sup s concavely smaller, and T sup s sub s stochastically larger (smaller) than M, L, T respectively, over all joint distributions of the given marginals are constructed. These bounds are sharp and can be obtained by solving relatively easy mathematical programs. Author (ESA)


An investigation is made of the relationships between personality and perception of organizational climate, as well as the relationships between level in the organization and perception of organizational climate. Also, evidence of an organization specific dimension of climate is investigated and measurement of this dimension attempted through the use of questionnaires. A more detailed investigation of two personal correlates of organizational climate personality and position in the organization is discussed. The EPPS personality characteristics - autonomy, dominance, and achievement - accounted for almost 22% of the variation in perceived organizational climate. Those managers with relatively high EPPS scores in the personality characteristics of achievement, aggression, autonomy, and dominance, were found to perceive their organizational climate as being positively related. Managers with high scores in the personality characteristics of affiliation, succorance, and order were observed to perceive their organizational climate to be positively related. Dissertation. Abstr.


- As organizational situations become increasingly complex, the essential connection between how researchers and managers interpret them becomes increasingly difficult to make. It is hypothesized that managerial schemata serve as the basis for understanding how managers perceive the success of planned organizational change and can reveal indices of success useful to managers but not necessarily obvious to researchers. These hypotheses are tested by applying the theoretical system to the application of an extensive Management By Objectives program in a large federal agency. Interview and survey data were gathered from seventy-two senior managers within sixteen different organizations in the agency to determine what issues were important from their perspectives for the success of the program and how the issues were related to one another. A model comparison approach is used to test the hypotheses and the extent to which managerial schemata do indeed exhibit rational and causal contraventions and yield useful indices of success for the MBO program. Dissertation. Abstr.


For several years organization theorists have debated the magnitude of the impact of size and technology on dimensions of organization structure. Also, management theorists have shown the importance of structure on organization goal attainment. However, no consensus was reached concerning the relationship among size structure and technology. Apparently much of the disagreement among theorists is a result of mixing levels of analysis, inadequate specification of variables, use of inadequate or inappropriate research tools and lack of controls for potentially confounding variables. The purposes were: (1) to provide a better understanding of the complex interrelationships among size, technology and structure; (2) to use regression analysis in an effort to better depict the relationships among those variables; and (3) to attempt to bridge some of the findings of other researchers that disagree among themselves. Dissertation. Abstr.

**N84-28404#** Mitre Corp., Bedford, Mass. ENVIRONMENTS FOR EVALUATING PERFORMANCE OF C3I (COMMAND, CONTROL, COMMUNICATIONS, AND INTELLIGENCE) SYSTEMS E. J. KIRK In AF Academy Proc. of the 9th Symp. on Psychol. in the DOD p 4-8 Apr. 1984 (AD-P003237) Avail: NTIS HC A99/MF A01 CSCL 05J

Some environments and methods which have been used to evaluate C3I (Command, Control, Communications and Intelligence) systems are outlined. A series of specific controlled tests that were conducted during recent (1982-83) developmental tests of Joint Service message standards are also described. This type of test may be seen as a cost-effective method to evaluate certain system capabilities in addition to or in place of large-scale field tests.

**N84-28413#** Texas A&M Univ., College Station. FACTOR STABILITY AND CONSTRUCT VALIDATION OF YUKL'S MBS (MANAGERIAL BEHAVIOR SURVEY) FOR MILITARY LEADERSHIP D. D. VANFLEET and G. A. YUKL In AF Academy Proc. of the 9th Symp. on Psychol. in the DOD p 49-52 Apr. 1984 (AD-P003246) Avail: NTIS HC A99/MF A01 CSCL 05J

The purpose of this paper is to present some evidence regarding the factor stability and construct validity of the new taxonomy for
military leadership. In doing this, a second step will be taken in that a comparative analysis of data from two points in time will be performed rather than merely using cross sectional data as in the past. The data presented here strongly suggest that Yukil's Managerial Behavioral Survey (MBS) possesses both factor stability and construct validity as well as previously demonstrated reliability. This means that the MBS can, indeed, be used with military samples to extend our knowledge about effective leader behavior. Such extensions will be even more meaningful, of course, if the research strategies used go beyond single method, single time strategies. If future research were to use this more realistic, complex taxonomy in more useful and more complex research strategies, much could be learned about leadership in general and military leadership in particular which can be particularly useful in selection, evaluation, training, and development of future military officers. 

EXPLORING THE INTERACTION OF THE VROOM/YETTON MODEL AND LEADERSHIP STYLE (LPC) (LEAST PREFERRED COWORKER) AS IT PREDICTS PERFORMANCE


The purpose of this research is to explore the relationship between leaders' decision-making behavior on the Vroom/Yetton problem set and performance in an actual organizational setting. Additionally, leadership style as measured by Fiedler's Least Preferred Coworker (LPC) scale is tested as a personality variable that may moderate the problem set to actual leader performance relationship. A group of 98 third year cadets at the U.S. Military Academy were administered a military version of the Vroom/Yetton thirty problem set and Fiedler's LPC scale. Military development ratings made by their Tactical Officers were used as measures of their performance. Results suggest that information resulting from their performance on the problem set is related to their performance evaluations in an actual setting. Additionally, the magnitude of the relationship is larger for low LPC cadets and disappears for high LPC cadets. 

SUBORDINATE PERCEPTIONS OF CONTINGENT LEADERS: DO FOLLOWERS ACCEPT OUR THEORIES?


Two studies were conducted to investigate assumptions made by recent management leadership theorists about subordinates. Paper and pencil instruments provided situations in which a leader followed or failed to follow the prescription of Vroom's contingency theory. Subjects were asked to take the role of subordinate, evaluate the decision making process, offer prognosis about the outcomes, and assess the leader. Three groups of subjects were identified by their responses. Only one of the three groups accepted the leader when s/he acted according to the prescription of contingency theory. The groups were differentiated by characteristics such as income, occupational prestige, and number of subordinates. The findings suggest that individuals, while acting as subordinates, may fail to accept the prescription of contingency theory. 

TO THE WILDERNESS AND BEYOND: THE APPLICATION OF A MODEL FOR TRANSFORMAL CHANGE

R. C. GINNETT In AF Academy Proc. of the 9th Symp. on Psychol. in the DOD p 63-67 Apr. 1984 (P-093249) Avail: NTIS HC A99/MF A01 CSL 05J

Much of the ongoing management and development in modern organizations could be considered transactional in nature, and as long as the organization is operating reasonably effectively and efficiently, this style may be most appropriate. However, there may also be organizations in which transformal leadership or development is needed. A model for transformal change was applied in such an organization with qualitatively successful outcomes. The model and its application are described as well as a discussion of the dilemma of evaluation for efforts of this nature. 

LEADERSHIP, MANAGERSHIP, AND COMPUTERS IN TODAY'S AIR FORCE

W. E. MCCARRON and D. R. HARVEY In its Proc. of the 9th Symp. on Psychol. in the DOD p 615-619 Apr. 1984 (P-093351) Avail: NTIS HC A99/MF A01 CSL 05E

Managership is quantifiable and measurable while leadership is qualitative and personal. Though the two concepts are not opposed to each other, there are differences. This paper discusses specific Air Force situations to show that leadership extends beyond managership, particularly in computer applications areas. For a mere manager, computers make decisions; for a leader a computer is only one tool in decision-making. Exclusive managerships lead to narrow thinking and predictable tactics. Leadership includes people, weapons, and a consequent dynamism which yields innovative thinking and tactics. 

A field study involving 79 army combat officers in middle echelon leadership positions was conducted to evaluate the role of relevant experience and intellectual ability in predicting leadership performance. Biographical and organizational data were the primary measures used to ascertain the relevance of leader experience. This represents a departure from previously used methodology which considered only the leaders' organizational tenure in determining experience levels. Results shed light on the components of Fiedler's Contingency Model of Leadership Effectiveness supporting the hypothesis that task- and relationship-motivated leaders make effective use of their experience only in situations which match their leadership personality. The study also suggests a plausible relationship between the leader's cognitive resources and leader behaviors. 

TRAINING DECISION-MAKERS TO BE CREATIVE: A MANAGEMENT PROCESS MODEL

B. A. MARTIN, K. STROM-GUZOWSKI, and R. L. TAYLOR In AF Academy Proc. of the 7th Symp. on Psychol. in the DOD p 595-599 Apr. 1984 (P-093347) Avail: NTIS HC A99/MF A01 CSL 05A

The predictable structure of our military bureaucracy reinforces traditional decision-making processes. At the same time, complex technologies and environments suggest more creative decisions. This research focuses on how experienced decision-makers can be trained to be more creative. Our purpose is twofold. First we examine how decisions are made. Examining models of decision making may help us to better understand the nature of what we do and where creativity fits in. Second our task is to study the research in creativity, developing a model that relates it to decision making. The major focus is integrating the two models—decision-making and creativity—in a theoretical framework. This is a first step; before a training program can be developed, the theoretical roots must be verified. 

TRAINING DECISION-MAKERS TO BE CREATIVE: A MANAGEMENT PROCESS MODEL

B. A. MARTIN, K. STROM-GUZOWSKI, and R. L. TAYLOR In AF Academy Proc. of the 7th Symp. on Psychol. in the DOD p 595-599 Apr. 1984 (P-093347) Avail: NTIS HC A99/MF A01 CSL 05A

The predictable structure of our military bureaucracy reinforces traditional decision-making processes. At the same time, complex technologies and environments suggest more creative decisions. This research focuses on how experienced decision-makers can be trained to be more creative. Our purpose is twofold. First we examine how decisions are made. Examining models of decision making may help us to better understand the nature of what we do and where creativity fits in. Second our task is to study the research in creativity, developing a model that relates it to decision making. The major focus is integrating the two models—decision-making and creativity—in a theoretical framework. This is a first step; before a training program can be developed, the theoretical roots must be verified.
This report provides a limited review of the literature on organizational structure, processes, and associated problems that are amenable to diagnosis and remediation by either leaders or organizational consultants. Within this limited scope, dominant organizational process antecedents. Author (GRA)

The broad question addressed by this research is: How good are humans at balancing the costs and benefits of their information acquisition? Do they buy those, and only those, sources of information whose acquisition cost is outweighed by the improvement in decision quality that their use makes possible? The evidence reported here, together with that reviewed earlier, suggests that the answer is not encouraging. Specifically, the present findings extend those noted earlier in suggesting: (1) That the pattern of overpurchase for low-consequence decisions, and underpurchase for high-consequence decisions, is robust to both methodology and theory to specific Air Force situations. GRA

The purpose of this research was to look for the critical source/sources of variance in local Army unit functioning as perceived by answers to specific questions regarding structural issues in the Air Force. GRA

The evidence reported here, together with that reviewed earlier, shows that the pattern of overpurchase for low-consequence decisions, and underpurchase for high-consequence decisions, is robust to both methodology and theory to specific Air Force situations. GRA

The evidence reported here, together with that reviewed earlier, shows that the pattern of overpurchase for low-consequence decisions, and underpurchase for high-consequence decisions, is robust to both methodology and theory to specific Air Force situations. GRA
The paper proposes a series of intuitively appealing assignment rules for making equitable workload assignments to personnel. Further, it is shown that these rules satisfy the simple criterion that cumulative differences among groups are small. Differences in the properties of these rules are investigated by focusing on two-person case to the n-person case. The extension of the proposed rules under a fairly weak set of requirements is discussed briefly and some initial results are presented.

Author (GRA)


EQUITABLE ASSIGNMENT RULES Technical Summary Report
P. W. GLYNN and J. L. SANDERS May 1984 38 p
(Contract DAAG29-80-C-0041)
(AD-A142809; AD-E401119; MRC-TSR-2685) Avail: NTIS HC A03/MF A01 CSCL 12A

This paper investigates the formalization of an important class of management decision problems. The problems considered are those of making equitable workload assignments to personnel. The paper proposes a series of intuitively appealing assignment rules, including random assignment, fixed assignment, block rotation and rules that reverse inequities caused by the last period's assignments. It is shown that in the two-person case none of these rules satisfies the simple criterion that cumulative differences of workload assignments among personnel become small. Differences in the properties of these rules are investigated under three additional but less strenuous criteria. It is shown that a new assignment rule called the counter-current rule does satisfy the criterion stated above; further, it is shown that it is an optimal rule under a fairly weak set of requirements. The extension of the results from the two-person case to the n-person case is discussed briefly and some initial results are presented.

GRA

N84-32139# National Academy of Sciences - National Research Council, Washington, D. C.

WORKSHOP ON SYSTEMS ANALYSIS Final Summary Report
Apr. 1984 115 p Workshop held in Jakarta, Indonesia, 8-12 Feb. 1983
(PB84-194661; R-84-2) Avail: NTIS HC A06/MF A01 CSCL 12B

The use of systems analysis S/A is given as a tool for attaining development goals. Particular focus is given to illustrative studies focusing on Indonesian concerns with solid waste management, urban transportation, and the food system. Addressing these concerns are scientists, engineers, development specialists, administrators and educators.

GRA

N84-33253# Air Command and Staff Coll., Maxwell AFB, Ala.

MATRIX MANAGEMENT IN DOD: AN ANNOTATED BIBLIOGRAPHY
D. A. WIEDERHOLD Apr. 1984 40 p
(AD-A143316; ACSC-84-2780) Avail: NTIS HC A03/MF A01 CSCL 05A

This report collectively examines the department of defense's (DOD) literature on matrix management from 1973 to spring 1984. This report also annotates 36 references and classifies them by: (1) author's opinion, experience; (2) literature review; (3) data/survey results; and (4) official guidance. The document discusses general impressions regarding each group and provides synthesis.

B.W.

N84-33293# Texas A&M Univ., College Station. Dept. of Management.

AN EXPLORATORY ANALYSIS OF THE RELATIONSHIP BETWEEN MEDIA RICHNESS AND MANAGERIAL INFORMATION PROCESSING
(Contract N00014-83-C-0025)
(AD-A143503; TR-DG-08-ONR) Avail: NTIS HC A04/MF A01 CSCL 17B

A dilemma exists between technical information designers and students of managerial information behavior. A richness model is proposed that uses the concepts of media richness and communication learning requirements to integrate the two perspectives. The concepts and model were tested in a four-stage research program, and they were generally supported. Managers tended to prefer rich, oral media when learning requirements were high and less rich, written media when learning requirements were low.

Author (GRA)


A SYSTEM FOR EMBEDDING DATA DISPLAYS IN GRAPHICAL CONTEXTS
A. C. MORSE Jul. 1984 36 p Prepared in cooperation with Visual Intelligence Corp., Amherst, MA
(Contract N00014-83-C-0495; R18-688)
(AD-A143630; TR-84-7-1) Avail: NTIS HC A03/MF A01 CSCL 09B

This report describes an interactive computer tool for data analysis that facilitates the graphical encoding of both the data and the domain-related cues. That is, the system allows the decision-maker to draw figures (e.g., schematics) that depict the problem domain, and to embed dynamic data displays within those figures. (For instance, the system enables the user to draw the schematic of a process and insert data displays - dials, strip charts - at various points in the schematic.) These dynamic data displays can either be selected from a library of predefined display formats (e.g., bar chart), including several formats not usually found in graphing packages (e.g., face display), or they can be created interactively by the user. To accomplish the latter, the systems includes the ability to define dynamic attributes of graphical objects, where the attributes change as a function of the data being analyzed.

Author (GRA)

N84-34308# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).

DIFFICULTIES OF SCIENTIFIC AND TECHNOLOGICAL PLANNING (DIFICULDADES PARA PLANEJAR CIENCIA E TECNOLOGIA)

Problems involved in scientific and technological planning are examined. The components of planning, implementation and control of planning, and deficiencies of scientific endeavors are discussed. Some of the common problems resulting in deficient planning are: (1) failure to articulate intellectual requirements; (2) insufficient knowledge of methodology; (3) lack of clarity of plans; and (4) unclear objectives, monitoring, enforcement, and communication. Successful execution of a plan entails detailed description of the final product, listing of methods to be used to achieve desired results, satisfying clientele, timely completion of the project, and project completion within the allotted budget.

Transl. by B.G.
The impact of management techniques on automatic production control is examined. The decision making process is described with emphasis on production efficiency, and interrelated, automated, subsystems. The roles of data processing, organizational analysis, and personnel management in decision making are also discussed. M.A.C.

03 INDUSTRIAL MANAGEMENT AND MANUFACTURING


A84-10399# THE INDUSTRIAL JUST RETURN PRINCIPLE [LE PRINCIPE DE 'JUSTE RETOUR INDUSTRIEL']

Methods for ensuring a just share for government and industries participating in ESA space projects are outlined. A global technique involves determining, at the signing of contracts, the exact percentage shares in the specific project to be undertaken, with consideration given to annual inflation rates in each country. Shares are modified on the basis of the percentage of commonly shared equipment and the need to fund ESA operations. A formulation has been devised for assigning a coefficient of participation to the signatories supporting each project. It is noted that over the cost of a program contracts are assigned to subcontractors and also that adjustments in shares are needed due to a changing level of participation, both in the projects and ESA, and to modifications in the scales of participation. M.S.K.

A84-11274 THE FINE ART OF ACCEPTING AN AIRLINER

The management practices typical of airline acceptance of new aircraft from a manufacturer are presently exemplified by Air Europe’s relationship with Boeing during the assembly and predelivery inspections of a 757 airliner. The airline’s representative will, over the five and one-half months from keel-laying to flyaway, search for fabrication and assembly details that do not conform to the aircraft’s engineering drawings as well as for accurately executed design features which may give rise to problems during aircraft operation or maintenance. Minor design changes are in the latter case incorporated. O.C.

A84-15319 DESIGN TO COST [LA CONCEPTION ACOÛT OBJECTIF]

The decisions which will be necessary in order to direct the Ariane space activities to cost-effective, commercial development of industrial-scale production of hardware for launch vehicles and satellites are discussed. A master program is described, setting goals, financial sources, accounting for delays, and assigning responsibilities. Each subprogram will require a feasibility study that will also consider the program organization. Technical reviews will be performed of necessary technologies and of the capabilities of current industrial concerns to produce the desired hardware alone and in cooperation. The stage of mass production will only be reached when the industries have submitted documentation of their abilities to produce the hardware on a design-to-cost basis. It is stressed that detailed design studies are required before granting the production contracts in order to assure that the components and systems can actually be manufactured cost-effectively, with acceptable modifications, with the existing materials, expertise, and industrial capabilities. M.S.K.

A84-19449# AEROSPACE TECHNOLOGY AND COMMERCIAL NUCLEAR POWER; PROCEEDINGS OF THE WORKSHOP CONFERENCE, WILLIAMSBURG, VA, NOVEMBER 18-20, 1981

An attempt has been made to compare the technologies, institutions and procedures of the aerospace and commercial nuclear power industries, in order to characterize similarities and contrasts as well as to identify the most fruitful means by which to transfer information, technology, and procedures between the two industries. The seven working groups involved in this study took as their topics powerplant design formulation and effectiveness, plant safety and operations, powerplant control technology and integration, economic and financial analyses, public relations, and the management of nuclear waste and spent fuel. Consequential differences are noted between the two industries in matters of certification and licensing procedures, assignment of responsibility for both safety and financial performance, and public viewpoint. Areas for beneficial interaction include systems management and control and safety system technology. No individual items are abstracted in this volume O.C.

A84-22344# PROFITABILITY OF MANUFACTURING IN SPACE IN VIEW OF LUNAR INDUSTRIAL DEVELOPMENT AND GEO-SOCIO-ECONOMIC BENEFITS

Comprehensive industrialization of cis-lunar space for humanity and earth’s biophil environment can evolve only through utilization of the technophil lunar environment and its resources. The high O2-content renders about 6/7 of O2/H2 propellant for cis-lunar traffic available at a fraction of the energy needed for terrestrial supplies, resulting in high cost savings that can speedily supersede the cost of lunar operations if cost-effectiveness, day/night productivity and growing self-sufficiency are stressed in lunar development. A two-phase transportation system development for low-cost surface access and concepts for the selection and installation of nuclear power plants are presented. Examples are given for the growth of space manufacturing and the enhancement of its profitability through improved availability of oxygen, raw materials in various forms, semi-finished and finished products.

Author
prototype program (using electrophoresis) being developed by McDonnell Douglas in cooperation with the Ortho Pharmaceutical Corporation and NASA. The organizational structure of the program is outlined, and the successful production tests carried out with the STS are briefly described and illustrated with photographs and drawings. First test flight of a production-scale prototype is planned for 1985, to be followed by an unmanned free-flying program and/or manned program on the space station. The economic advantages of the manned mode are seen in ease of maintenance, lower transportation costs (raw materials and products only rather than vehicles or modules), and more rapid development of new products.

T.K.

A84-32774

EVALUATION IN AEROSPACE ENGINEERING ORGANIZATION
J. T. STAMPER  Aerospace (UK) (ISSN 0305-0831), vol. 11, April 1984, p. 5-14.

An historical account is given of the growth and changing structure of aeronautical design engineering organizations, with attention to the character of such structures before and after the Second World War in Great Britain. While a typical prewar design organization encompassed only 50-100 staff members, the early 1950s witnessed a growth in staff to 300-500 members, and by the end of that decade, 500-1000 member staffs were required to effectively cope with the complexity of such projects as the Comet, which was the world's first jet airliner. The pyramidal scheme of engineering design organizations also underwent considerable change, ultimately yielding to a 'matrix' organizational structure.

O.C.

A84-38468#

THE WORKLOAD OF EUROPEAN SPACE INDUSTRY - CURRENT SITUATION AND FORESEEABLE TRENDS
C. LAVENN (ESA, Directorate of Administration, Paris, France) and M. TOUSSAINT (Euraspace, Paris, France) ESA Bulletin (ISSN 0376-4265), no. 38, May 1984, p. 31-35.

The results of a 1983 survey of 51 space industry firms in 12 European countries on their interfirm cooperative connections, employment characteristics, and workload are summarized and illustrated with graphs and tables. The surveys employed 51 percent of the 31,000 Europeans engaged in space activities and report an average increase of 7 percent/yr for the period 1977-1983 despite some recruitment problems. The total turnover during the period grew by 16.7 percent/yr and is predicted to grow by 12.3 percent/yr during 1984-1988. The more rapid growth of the firms' commercial sales (44 percent/yr for 1977-1983) is expected to continue. The share of ESA, national, and commercial contracts are predicted as 33, 22, and 45 percent, respectively, for 1988. For the space community as a whole (including the national space agencies, ESA itself, and the university and institutional laboratories), however, the predicted share is 40, 30, and 30 percent.

T.K.

A84-44927#

ENGINEERING ASPECTS OF INTERNATIONAL COOPERATION IN AERONAUTICS

International cooperation, and the joining of complex engineering functions for the benefit of aerospace programs, are discussed. Consideration is given to organizational approaches to compensate differences in national characteristics and language, and suggestions concerning the coordination of technology, when various government and industrial partners are involved, are presented. The assignment of responsibility within such a consortium is stressed, and a suggestion is made on how it might work. Companies such as Airbus and Ariane have shown favorable results through international cooperation despite increased complexity. The pursuit of such forms of activity by the aerospace community is recommended.

J.P.

N84-10350#

MEASURES TO STEP UP PRACTICAL USE OF SCIENTIFIC WORK DISCUSSED

To achieve significant acceleration of scientific-technical progress and bring all sectors of the economy to the most advanced frontiers of science and technology was proposed as one of the paramount tasks of our time. Much was done by scientists of Uzbekistan for the development of the multisectoral economy of the republic and for the creation of progressive technology in industry, capital construction, and in agriculture, especially in cotton production. Every year scientific organizations complete and turn over for practical use more than 33 different development projects with an economic impact of more than 600 million rubles. Thanks to their introduction, technical equipmentization has grown, technological processes were improved, the volume of production has increased, and the quality of output has improved.

Author

N84-10351#

EFFECTS OF SCIENCE, TECHNOLOGY ON STRUCTURE OF PRODUCTION PROCESS

Author

The structure of the production process, patterns in its organization and the classification of production processes are considered. On the basis of an analysis of the dialectical interconnectedness among stages of the production process - preparation and direct production - and the singing out of the type of production systems and the stages of their development, the organizational content of the scientific and technical revolution is determined. Practical recommendations are given for improving the organizational structure of industry.

Author

N84-10353#

USE OF SCIENTIFIC POTENTIAL IN INDUSTRY DISCUSSES

Author

The practical application of results of basic research, which are considered to be concentrated in scientific establishments of the Academy of Sciences, general technical establishments, and sectorial higher educational institutions in the republic are discussed. Today they are deservedly viewed as a component part and, moreover, as the leading part of the scientific potential of physical production sectors. These scientific systems have begun to work closely on current national economic and sectoral problems as a result of consistent implementation of the party's course toward an integral combination of science, technology and production. The Experiment Plant Biology Institute and the Physical Technical Institute of the Uzbek SSR AN (Academy of Sciences), the Tashkent Polytechnical Institute and the Tashkent Agricultural Irrigation and Mechanization Institute are working productively in this direction, but the level of use of and results of the scientists' activity still cannot be considered sufficient.

Author

N84-10356#

SCIENTISTS DISCUSS INCREASED PRODUCTION WITH FEWER WORKERS

Author

After the group from the sector of methodology planning and organization of applied research of the Social Economic Problems Institute of the USSR Academy of Sciences had completed this research, A. L. Merson, senior scientific associate of the institute and candidate of economic sciences, met with V. A. Semenov.
The initiative of scientists of the Scientific Production Association of the Central Scientific Research and Planning and Design Boiler and Turbine Institute imeni I. I. Polzunov on fulfilling five-year plan tasks with fewer workers is described. Today, however, the idea of how this important initiative works and what hinders its creative introduction in other collectives is considered. This research was conducted in a number of Leningrad's scientific organizations.

N84-11053# Puerto Rico Univ., Mayaguez.

MICROCOMPUTERS: A TOOL FOR PLANNING AND SCHEDULING CONSTRUCTION PROJECTS

The availability of low cost microcomputers, which are small in size and large in computing capacity, make computer based techniques for planning scheduling, and control of construction projects accessible to construction contractors. A prototype microcomputer implementation of CPM (Critical Path Method) and a full CYCLONE (Cyclic Operations Network) are presented. The CPM implementation is based on precedence networks. It supports many features of CPM programs found in large computers. CYCLONE is a method for the analysis of construction operations. It focuses on how, rather than when, to carry out a construction operation. The CPM and CYCLONE systems discussed are implemented on the TRS-80 and Commodore microcomputers.

Author (GRA)

N84-12051# Synergy, Inc., Washington, D.C.

DEVELOP A NORMATIVE OR DESCRIPTIVE MODEL OF THE INTERNATIONAL/DOMESTIC CIVIL AVIATION INDUSTRY, VOLUME 3 Final Report

This appendix deals with the regulatory environment that the civilian air fleet has faced in the past and will likely face in the future. A brief history of the different regulatory agencies involved with civilian air travel is presented first, followed by a more in-depth analysis of the changing regulatory environment brought about by the Airline Deregulation Act of 1978, and its possible consequences on the structure of the civilian air fleet in the future.

Author (GRA)

N84-12052# Synergy, Inc., Washington, D.C.

DEVELOP A NORMATIVE OR DESCRIPTIVE MODEL OF THE INTERNATIONAL/DOMESTIC CIVIL AVIATION INDUSTRY, VOLUME 2 Final Report

Volume 2 is composed of four major sections that provide the bulk of the analysis. The first section deals with the regulatory framework, followed by a section dealing with the association framework, and a third section that deals with the industry components and demographics. The fourth section addresses the financial performance of the industry.

Author (GRA)

N84-12053# Synergy, Inc., Washington, D.C.

DEVELOP A NORMATIVE OR DESCRIPTIVE MODEL OF THE INTERNATIONAL/DOMESTIC CIVIL AVIATION INDUSTRY, VOLUME 1: EXECUTIVE SUMMARY Final Report

Volume 1 of this report provides an overview of the U.S. civil aviation industry, focusing on the immediate term and the future. Its purpose is to provide a summary for identifying the implications of the projected future aircraft fleet mix on the civil/military aircraft system in the 1990 time period. The project is a direct result of the current turbulence in the airline industry and the uncertainty of the future airlift system. The results of the study provide a foundation to support the development of an analytical modeling system of the Air Staff to project alternative future configurations of the civil air fleet given alternative scenarios of future conditions in the industry. This particular phase of the effort focuses on four areas including: the regulatory framework existing in the industry and that projected to exist in the future; the association network that has developed for the civil aviation industry and its importance to the development of future air industry structure; the components of the industry itself, including the number and types of airframes, engines, support functions within the industry such as travel agents, air freight forwarders, etc.; and the industry demographics, including operating behavior, route competition, fares, etc.

Author (GRA)

N84-13595# Laboratorio de Acustica e Sonica, Sao Paulo (Brazil).

TECHNIQUES OF CONDITION MONITORING AND FAULT DIAGNOSIS IN INDUSTRY

The philosophy of condition monitoring in industry, through the measurement, control and monitoring of some adequate parameters, such as temperature, pressure, oil analysis, a visual examination, measurement and analysis of vibration in terms of displacement, velocity or acceleration depending on the case is presented. Some fundamental ideas of nondestructive testing techniques that are important for an effective maintenance program, and some ideas of the most modern nonconventional processes are presented. The importance of a close contact and discussions with different departments and sections of a generic plant, with the objective of getting all materials and parts using the adequate monitoring parameters in order to keep the whole installation free from nonprogrammed interruption is shown.

S.L.

N84-14696# Cape Town Univ. (South Africa). Dept. of Civil Engineering.

INFORMATION SYSTEMS DESIGN IN CONSTRUCTION MANAGEMENT
M. C. VORSTER In South African Inst. of Civil Engineers Symp. on Computers in Construction 11 p 1982 Refs (Avail: NTIS HC A08/MF A01)

Some ideas and impressions about the human aspects of information systems design are presented. It is shown that many of the lessons learned from the relationship between owner architect and contractor must be applied in the design of information systems. It is stressed that success relies heavily on the individual manager's ability to produce a design brief, recognizing the objectives of his/her organization. The key role of accurate data is emphasized.

M.G.

N84-14698# Computer Applications Bureau (Pty) Ltd. (South Africa).

COMPUTERISED PLANT CONTROL SYSTEM
R. A. BORDER In South African Inst. of Civil Engineers Symp. on Computers in Construction 12 p 1982 (Avail: NTIS HC A08/MF A01)

The effectiveness of a comprehensive system for controlling plant, machinery or vehicle revenue and expenditure is discussed. The advantages of the system are: flexibility in allowing the user to determine the level of detail he needs for analyzing costs; the accumulation of historic information including quantities and values for actual and budget figures; comparative analyses of similar plant items measured in return or cost per hour; the integration of the system with other systems such as invoicing, creditors, debtors, payroll, cost ledger, financial ledgers and asset registers; and a comprehensive system for simplifying the preparation of budgets.

M.G.
KEEPING YOUR FINGERS CROSSED WON'T HELP
S. GERS
In South African Inst. of Civil Engineers
Symp. on Computers in Construction
7 p 1982
Avail: NTIS HC A08/MF A01
With todays fluctuating economy, skill shortages and the rising
costs of labor, plant and material, construction management needs
to be able to utilize the power of a computer himself without
obtaining the necessary computer skills in order to obtain the
necessary information to maintain control of his business and
enable him to make the best decisions as and when the need
arises in his day to day activities relating to: plant management;
estimating and tendering; measurement and certificates; cost and
valuation control; project planning and scheduling; etc.

SUGGESTIONS TO HELP THE SMALL TO MEDIUM CONTRACTORS
A. STOCKING
In South African Inst. of Civil Engineers
Symp. on Computers in Construction
12 p 1982
Avail: NTIS HC A08/MF A01

Suggestions are presented to assist the small to medium civil
engineering contractor in assessing the possibility of introducing
computerized systems into the organization. A general study is
made of the need and advantages of such a course of action.
Some of the systems that can effectively be computerized with a
distinct benefit to the user are identified. The numerous alternative
methods of computerization are also discussed with a view enabling
the user investigate which of these options will best suit his
individual needs. Finally, a working example of computerization in
a medium sized company is described together with some of the
difficulties encountered in the implementation of the system.

PRACTICAL APPROACH TO COMPUTER SIMULATION OF CONSTRUCTION
PARTICIPATION IN A SYMPOSIUM ON CONSTRUCTION
P. J. J. DUPREEZ
In South African Inst. for Production Engineering
and Industrial Engineering.

The ways in which the machinery, manpower, material, and
money may be applied in more productive and profitable ways
within the forging industry of South Africa are discussed from a
practical viewpoint. The basic aspects of forging plant selection
are discussed in an attempt to help management within the industry
make the best choice of forging machine and correctly choose its
capacity for the market sector for which it is aimed. Some
information is given on furnaces and ancillary forging equipment
as well as on estimates of the cost of heating in the forge.

PRODUCTIVITY IMPROVEMENT IN A JOB SHOP
P. J. J. DUPREEZ
In South African Inst. for Production Engineering
Fourth Seminar on Efficient Metal Forming and Machining
7 p 1982
Avail: NTIS HC A11/MF A01

Workshop planning, manufacturing drawings, work
measurement, shop costing, and quality control and assurance
influence productivity in a production but are much more important
in a jobbing shop. Where and how these parameters influence jobbing shop more severely than a production shop are examined.

A.R.H.

N84-19605# Committee on Commerce, Science, and Transportation (U. S. Senate).

ROLE OF TECHNOLOGY IN PROMOTING INDUSTRIAL COMPETITIVENESS

The role of advanced manufacturing technology in competing in markets at home and abroad is examined.

N.W.


MANUAL FOR IMPLEMENTING A SHARED TIME ENGINEERING PROGRAM (STEP) SEPTEMBER 1980 THROUGH SEPTEMBER 1983

This manual describes a Shared Time Engineering Program (STEP) conducted by the New England Apparel Manufacturers Association (NEAMA) headquartered in Fall River Massachusetts, and funded by the Office of Trade Adjustment Assistance of the U.S. Department of Commerce. It is addressed to industry association executives, industrial engineers and others interested in examining an innovative model of industrial engineering assistance to small plants which might be adapted to their particular needs.

N84-23300# Cockerham (John M.) and Associates, Inc., Hopewell, Va.

COST RISK TRADE-OFFS IN TIMING THE PRODUCTION DECISION Final Report

The question before every development and acquisition program is when should production resources be committed? The actual decision to enter production is normally assumed to be the same point in time where the expenditure of production monies is authorized or initiated. This assumption is challenged through the analysis of the total cost risk of of the combined RDT&E and production programs versus time. Consideration is given to technology risk, program termination liabilities, RDT&E spending rates, production spend rates, cost of program stretchout, production lead times and return on investment. The purpose is to present and explore the primary financial factors and interrelationships to determine the optimum time to expand production monies independent of the final production decision. The methods and principals are demonstrated by an example derived from an actual application on a major weapon system.

Author (GRA)

N84-23318# Office of the Under Secretary of Defense for Research and Engineering, Washington, D.C.

THE INDUSTRIAL MODERNIZATION INCENTIVES PROGRAM: AN EXPERIMENTAL EFFORT TO IMPROVE DEFENSE CONTRACTOR PRODUCTIVITY Final Report

This paper concentrates on the philosophy and concepts behind the current test of Industrial Modernization Incentives Program (IMIP). The paper discusses how the test has been structured and applications to date. The test program is still in the early stages and the paper stresses that there are currently many more questions than answers. The aspects requiring further analysis are explored in detail. The paper also ties together other areas that relate to the IMIP and encompass the total environment motivating contractor productivity improvement efforts. These include Weighted Guidelines, Cost Accounting Standards, employee productivity incentive and bonus systems, multiyear procurement, economic production rates, the source selection process, and manufacturing technology.

Author (GRA)

N84-23319# Iowa State Univ. of Science and Technology, Ames. Center for Industrial Research and Service.

THE GOVERNMENT RELATIONSHIP TO INDUSTRY IN TECHNOLOGY TRANSFER AND DEVELOPMENT Final Report

Iowa State University's Center for Industrial Research and Service conducted a survey of manufacturers in January 1982. This mail survey to the 3,764 manufacturers in Iowa was designed to reveal the problem areas and information needs manufacturers and processors. The survey also addressed information sources, technology development, productivity improvement, and how managers expected to improve operations. The role of government, government laboratories, universities, equipment manufacturers, and trade associations in technology transfer and development was delineated in the analysis.

GRA

N84-23347# Pratt and Whitney Aircraft Group, East Hartford, Conn.

IMPACT OF CORPORATE RESOURCE ALLOCATION DECISIONS ON NATIONAL SECURITY OBJECTIVES: DISSYNERGISM IN AEROSPACE INDUSTRIAL RESOURCES PLANNING Final Report

The purpose of the proposed paper is to assess the impact of corporate resource allocation decisions in the US aerospace industry on long-term national security objectives. The data presented demonstrates the dissynergy that exists in one critical area of national interest as the result of inconsistencies between corporate and defense strategic resource planning objectives. The DoD Industrial Base and Preparedness Program will be evaluated as a basis for creating a credible defense industrial resource planning system to parallel existing force and technology planning systems; and, integrating corporate and defense long-range planning objectives. Based on the analysis, a recommended policy and organizational approach is presented in terms of the following parameters: acquisition efficiency and industrial preparedness.

GRA

N84-23348# Air Force Armament Lab., Eglin AFB, Fla.

TWO-STEP INDUSTRIAL PREPAREDNESS PLANNING: BALANCING FUNDS AND PRODUCTION CAPABILITY Final Report

The industrial Preparedness Planning program provides data relative to the capability of the production base to accelerate and expand production during a national emergency. Planning data also includes identification of Industrial Preparedness Measures (IPMs) which can be funded during peacetime to compress production build-up time. However, determining what IPMs to fund can be difficult since: Build-up times for components of end-item weapons vary by substantial margins; and Available funding is usually inadequate. This difficulty could be minimized by adjusting IPM data for pacing components to correspond to a common
build-up time based on an affordable funding level. Formalizing the adjustment of IPM data in this manner as a second step in the Industrial Preparedness Planning process would facilitate effective prioritizing of peacetime funding for IPMs. This would ensure funding of only those IPMs for potential production bottlenecks to support a balanced production response capability.

N84-23383# Aeronautical Systems Div., Wright-Patterson AFB, Ohio.
THE SCORE TECHNIQUE: AN ANALYTICAL APPROACH FOR ASSESSING THE RESULTS OF MANUFACTURING REVIEWS Final Report
Since the early 1970's, the techniques for conducting manufacturing assessments have improved as the lessons-learned from each new team were passed on the next. However, one area of the manufacturing assessment process, the scoring, has remained relatively unchanged over the years. This paper presents a fresh approach to the scoring process. The process outlined in this paper was first developed and used on the Next Generation Trainer Program. Since then, it has been applied successfully to other Aeronautical Systems Division manufacturing reviews both in Europe and the United States. The methods discussed here can be applied to other scoring scenarios such as source selection, Cost/Schedule Criteria System (C/SCS) reviews, and related review. The technique is generally applicable to any problem whose solution can be improved by adding objectivity and traceability to an otherwise subjective scoring process.

N84-25529# Committee on Science and Technology (U. S. House).
Topics relevant to the long term research and development goals for aeronautics are discussed. Subjects include general information on certain NASA and DOD projects, civil aviation, vertical takeoff aircraft, aircraft control systems, aircraft construction modules, and aerodynamic configurations through computer aided design. Current developments in civil aviation as well as future research plans are outlined by representatives of the aviation industry.

Production planning which is concerned with the determination of optimal operation projects of multiple materials on one or multiple machines is discussed. Lot sizes and production sequence are determined to keep expenses to a minimal. Random lot sizes are allowed. An optimal production order of a single article was investigated. This problem is considered to be a sequence problem.

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PARTS ON DEMAND: EVALUATION OF APPROACHES TO ACHIEVE FLEXIBLE MANUFACTURING SYSTEMS FOR NAVY PARTS ON DEMAND, VOLUME 1
Feb. 1984 94 p
(Contract N00014-82-C-0845) (AD-A143248) Avail: NTIS HC A05/MF A01 CSCL 05A

The scope of this study, sponsored by the Office of Naval Research and the Naval Supply Systems Command, focused on reducing spare part supply and procurement problems by using a Parts-on-Demand (POD) system that was defined by the study in these terms: a concept using advanced manufacturing technology to produce parts as needed and to reduce cost and production lead time in small batch production. The solution approach is based on using advanced manufacturing technologies capable of reducing cost and production lead time for low volume manufacturing. A major national program, using the concept of POD, is recommended to advance design, fabrication, test, and assembly technology for low volume production. The Navy POD program objectives were developed to foster a transition to very flexible manufacturing by encouraging both changes in vendor’s manufacturing technology to support low volume production and in military supply system policy and practices to more effectively employ its benefits. The emphasis of this study was on the technological issues involved and the role the Navy can play in stimulating research and development needed to advance manufacturing technology to support flexible manufacturing system to produce low volume replenishment parts. POD, however, is not to be imagined as a stand-alone system and will certainly not work in isolation. It must be gradually integrated into the current supply and procurement system, and modifications in policy and practice will be required for its effective implementation. GRA

ROBOTICS AND EXPERT SYSTEMS


NAVY AI PROGRAMS - WITH EMPHASIS ON APPLICATIONS

US Navy programs applying AI concepts in robotics, knowledge acquisition, automated reasoning, man-machine interfaces, expert systems, natural-language input, and crisis alerting are reviewed. The individual program titles are listed, and the organizational structure is indicated. The current status and goals of the research efforts in natural languages, electronic maintenance and troubleshooting, combat management, operational planning, and multisensor information integration are discussed. T.K.

04 ROBOTICS AND EXPERT SYSTEMS

REDUCING DESIGN PROTOTYPING AND PRODUCTION CYCLE TIMES AND COSTS

In 1979, a program was initiated by an American company with the objective to analyze factory operations and engineering and identify where significant gains in productivity could be achieved. A number of projects were jointly funded by this company and the Air Force as part of the Technology Modernization Program (Tech Mod). The projects discussed include MARK (Material Accountability and Robotic Kitting), SEAS (Standard Electronic Assembly System), and REACH (Robotically Enabled Assembly of Cables and Harnesses). MARK and SEAS are both concerned with the manufacture of printed wiring assemblies, while REACH provides for the cable and harness commodity a very comprehensive effort for reducing design to production test cycle times and costs. G.R.

AUTOMATED SPACECRAFT HEALTH AND STATUS

The application of artificial-intelligence techniques to the automation of ground-based health and status management of communications satellites is discussed, summarizing preliminary results from a study of the Defense Satellite Communications System, Phase III (DSCS-III). The aim of the study is to replace large numbers of human controllers with automated expert systems (analogous to the diagnostic systems used in medicine), thus increasing the survivability of mission data in the ground segment. The general automation capacity of DSCS-III is evaluated, demonstrating the need for ongoing ground support. The electric-power distribution system and the telemetry, tracking, and command system have been chosen for expert-system-prototype development; the current control techniques (involving human analysts) of these systems are characterized. The methods used by human experts; knowledge representation; data-driven, goal-driven, and mixed control strategies; and the representation of control knowledge are considered in general terms. T.K.

ADVANCES IN MANUFACTURING TECHNOLOGY

The importance of robotics, laser technology, and computer-aided-manufacturing in the production of large commercial aircraft engines is assessed. Attention is paid to the organization of the manufacture process around families of components, which permits the production of 35 different components on one manufacturing line without retooling. Computer-guided lasers reduced the number of operations in the hard-surfacing of interlocking turbine blade faces from five to three, and total time from seven-and-one-half minutes to 75 seconds per component. Robotic machining of directionally solidified and single crystal turbine blades reduced cutting time from six minutes to 45 seconds, and improved lead time, performance, and productivity by 50 percent. Computers monitor product quality, and warn when quality tolerance levels are approached, reducing production cost. Inertial reference systems of directional cutting paths was improved by 300 percent and lead times reduced by 50
percent. The use of CAD-CAM as a common data base for engineering and manufacture sectors is recommended. I.H.

A84-30608* # Boeing Computer Services, Inc., Seattle, Wash.

**COMPUTER-ASSISTED ENGINEERING DATA BASE**


General capabilities of data base management technology are described. Information requirements posed by the space station life cycle are discussed, and it is asserted that data base management technology supporting engineering/manufacturing in a heterogeneous hardware/data base management system environment should be applied to meet these requirements. Today's commercial systems do not satisfy all of these requirements. The features of an R&D data base management system being developed to investigate data base management in the engineering/manufacturing environment are discussed. Features of this system represent only a partial solution to space station requirements. Areas where this system should be extended to meet full space station information management requirements are discussed. Author

A84-31346

**JAPAN'S NEXT GENERATION OF ROBOTS**


In 1983, the Japanese Ministry of International Trade and Industry (MITI) initiated a project with the objective to develop robots capable of operating in environments which might be intolerable or unsafe for humans. Three special-purpose robots are to be designed for operations in nuclear plants and underwater research stations, taking into account tasks related to disaster relief, equipment and facility maintenance, and advanced assembly. The development of generic technologies is planned, giving attention to mobile mechanisms, manipulators, sensors, control systems, and system totalization. A preview of the considered project is presented along with an overview regarding the next generation of robots, and an outline of the various subsidiary research projects which are to be completed in the 1990s. G.R.

A84-42760

**PLANNING THE USE OF ROBOTS**


Careful planning is essential to the effective introduction of any new technology into an existing manufacturing environment. This includes the introduction of robotic technology. In this paper, certain management attitudes toward strategic planning are reviewed, and it is noted that the systematic development of strategic manufacturing plans traditionally has not been a priority with American industry. User views regarding robots are briefly reviewed to emphasize the need for involving users as well as management in the planning process. A ten-step procedure is then described for creating manufacturing strategic plans that are completely complementary with a company's strategic business plan. Finally, a few general rules are provided for the practical application of the proposed procedure. Author


**REPORT ON DEVELOPMENT, INSTALLATION OF INDUSTRIAL ROBOTS**


Different attitudes towards the utilization of industrial robots efficiency in the GDR economy, rationalization solutions to overcome bottle necks and defects, industrial robots for taking over certain working processes, characteristics figures and criteria for the useful economic effect of industrial robots, long term planning objectives, the current use of industrial robots and products of robot technology and their manufacturers. N.W.


Basic artificial intelligence (AI) research, AI applications, engineering, institutional management, and previously impractical missions enabled by AI are discussed. Author


**ARTIFICIAL INTELLIGENCE IMPLICATIONS FOR INFORMATION RETREIVAL**


The field of information retrieval is already more aware than many other fields of the relevance of artificial intelligence. Nonetheless there remain exciting applications of artificial intelligence that have been so far overlooked. In this paper we will point out some of the ways artificial intelligence might influence the field of information retrieval. We will then examine one application in more detail to discover the kind of technical problems involved in its fruitful exploitation. GRA

N84-13867# Naval Postgraduate School, Monterey, Calif.

**ARTIFICIAL INTELLIGENCE TECHNIQUES FOR INDUSTRIAL APPLICATIONS IN JOB SHOP SCHEDULING M.S. Thesis**

W. B. TOWNSEND Jun. 1983 48 p (AD-A132164; AD-E850405) Avail: NTIS HCA03/MFA01 CSCL 09B

The application of AI (artificial intelligence) techniques to the scheduling of industrial production operations offers a promising new approach to a scheduling problem of great magnitude and complexity. Foremost among these techniques is a powerful knowledge representation language that is capable of modeling the production environment at all levels of detail. The capturing of such complexity in the data base enables the computer to generate feasible schedules from a very large solution space which are highly rated by human experts. An introduction to artificial intelligence is presented that discusses knowledge representation techniques and describes an intelligent scheduling system. The relevance of AI techniques to military industrial production operations is explored by examining the closed job shop in the contest of jet engine repair. GRA
04 ROBOTICS AND EXPERT SYSTEMS

INTRODUCTION TO FLEXIBLE MANUFACTURING SYSTEMS: THEIR APPLICATIONS, CLASSIFICATION, AND OPPORTUNITIES


A Flexible Manufacturing System (FMS) is an automatic manufacturing system consisting of several types of automated fabrication equipment and a common material handling system, supervised by a common computer and designed to randomly manufacture or assemble products belonging to a common part family. The FMS is essentially limited in their applications to discrete assembly of components, or the manufacture and inspection of hard goods. The FMS grouping can be classified in various ways into modules, cells or work cells, and more complex systems. Two kinds of opportunities are discussed: the opportunity to design and acquire an FMS so it gives the maximum benefits to the user, and the opportunities for the FMS builders to take advantage of a growing market.

THE HUMAN SIDE OF ROBOTICS: RESULTS FROM A PROTOTYPE STUDY ON HOW WORKERS REACT TO A ROBOT

L. ARGOTE, P. S. GOODMAN, and D. SCHKADE May 1983 28 p

This study examines workers' reactions to the introduction of robots in a factory. The study focuses on understanding workers' psychological reactions to this new technology and to the manner in which it was introduced. Workers reported that both advantages (lower fatigue) and disadvantages (increased downtime) were associated with the introduction of the robot. Over time, workers' beliefs about robots became more complex and pessimistic. Production operators' jobs, as well as their interaction patterns with other production and support workers changed with the introduction of the robot. Consequences of these changes for increases in job stress are examined. A set of strategies for introducing robots in the factory is discussed.


This study examines workers' reactions to the introduction of robots in a factory. The study focuses on understanding workers' psychological reactions to this new technology and to the manner in which it was introduced. Workers reported that both advantages (lower fatigue) and disadvantages (increased downtime) were associated with the introduction of the robot. Over time, workers' beliefs about robots became more complex and pessimistic. Production operators' jobs, as well as their interaction patterns with other production and support workers changed with the introduction of the robot. Consequences of these changes for increases in job stress are examined. A set of strategies for introducing robots in the factory is discussed.
N84-22270# Naval Postgraduate School, Monterey, Calif.
METHODOLOGY FOR BENEFIT ANALYSIS OF CAD/CAM (COMPUTER-AIDED DESIGN/COMPUTER-AIDED MANUFACTURING) IN USN SHIPYARDS M.S. Thesis
R. B. GRAHLMAN Mar. 1984 87 p
(AD-A138398) Avail: NTIS HC A05/MF A01 CSCL 09B
This thesis expands the concept of Computer-Aided Design/Computer-Aided Manufacturing (CAD/CAM) in naval shipbuilding to include maintenance. This inclusion is coupled with the integration of the design and manufacturing processes in the acronym CIDMM, which stands for Computer-Integrated Design, Manufacture and Maintenance. A methodology is proposed to identify and measure the tangible and intangible benefits derived from CAD/CAM in naval shipbuilding. The methodology is flexible enough to be applied to future CIDMM systems. A decision-aid for assessing the intangible benefits and a structure for computing the time benefits are proposed in the methodology.
Author (GRA)

The Role of DBMS in Design Research
S. J. FENVES In NASA. Langley Research Center IPAD 2: p 237-254 Apr. 1984 refs
(Contract NSF MCS-78-22329) Avail: NTIS HC A12/MF A01 CSCL 09B
Research in integrated design systems which is almost invariable predicated on the existence of a database that acts as a common repository of data representing the emerging specification of the system or artifact designed is discussed. The role of data base management systems (DBMS) in design research is outlined as follows: (1) the representation and processing of detailed constraints is presented, including a dynamic mechanism for activating constraints as a design is firm ed up, (2) a concept of treating multiple sets of constraints as data residing in the database is presented; (3) exploratory work on the interaction of DBMS with knowledge based expert design systems is given.
E.A.K.

N84-22318* Military Academy, West Point, N. Y.
The Impact of IPAD on CAD/CAM Database University Research
Avail: NTIS HC A12/MF A01 CSCL 09B
IPAD-program has provided: direction, focus and software products which impacted on CAD/CAM data base research and follow-on research. The relationship of IPAD to the research projects which involve the storage of geometric data in common data base facilities such as data base machines, the exchange of data between heterogeneous data bases, the development of IGES processors, the migration of large CAD/CAM data base management systems to noncompatible hosts, and the value of RIM as a research tool is described.
E.A.K.

N84-23122# Office of Naval Research, London (England).
A Survey of European Robotics Research
S. HARMON 27 Jan. 1984 17 p
(AD-A138952; ONRL-R-4-84) Avail: NTIS HC A02/MF A01 CSCL 06D
This report describes the results of a 1981 survey to gather information about European robotics research that might be tailored to meet the US Navy's needs. The objectives of the study were: to identify key research organizations and scientists, and to determine the nature of the research and technology. The survey covered Belgium, France, the UK, Italy, Switzerland, and the Federal Republic of Germany.
Author (GRA)

N84-23375# University of Western Carolina, Cullowhee, N.C.
The Impact of Factory Automation and Robotics on the Contracting and Acquisition Processes Final Report
(AD-P002830) Avail: NTIS HC A24/MF A01 CSCL 13H
A report issued by the United States (U.S.) Comptroller General in 1976 noted that virtually every item produced by the U.S. industry is procured by the Federal Government. Products and services are procured by the Department of Defense (DoD) from over 25,000 industrial firms. The basic mechanism is through the contracting and acquisition processes. The key question raised by these circumstances is how will the increasing use of automation and robotics impact the contracting and acquisition processes in the 1980s and 1990s. A study was conducted to identify and classify the changes which will result from this trend to factory automation. The items considered include: reclassification and structure of contract costs; contracting and acquisition planning; contract types and their use; cost visibility; labor and other direct costs; cost and price analysis; cost control; bidding and solicitation procedures; and, clause structure and selection.
Author (GRA)

Computer Developments at Institute of Automation and Electrometry Described
Avail: NTIS HC A04
Developments in the use of computers in automation technology are examined. The research in computer aided design, manufacturing, and computerized test simulations is discussed. Methods of data storage and suggestions for the integration of computer systems to optimize labor management and increase production are included.
M.A.C.

SAAB Claims World's Most Modern Engine-Assembly Plant
Avail: NTIS HC A04/MF A01
The modernization of an engine assembly plant using computer aided manufacturing techniques and robotics is described. The development of associated tools and production procedures used to assemble the Light Component Project (LCP) modular automobile are discussed. Structural design criteria used to reduce the weight and increase the fuel efficiency of the vehicle are explained.
M.A.C.

USSR Report: Machine Tools and Metalworking Equipment
25 Apr. 1984 46 p refs Transl. into English from various Russian articles (JPRS-UMM-84-008) Avail: NTIS HC A04/MF A01
Progress in machine tools and metalworking equipment development is reported. Topics discussed include: industry planning and economics, automated assembly times and aggregated machining systems, and application of robotics to industry.
M.A.C.
TOOL, ROBOTICS is discussed. Use of industrial robots with programmed control is outlined. Management planning and factory automation are suggested. E.A.K.

INDUSTRY URGED TO INCREASE OUTPUT OF NC MACHINE COMPLEXES are developed at machine building enterprises. Specific robot manipulator complexes and versatile automated production complexes are developed at machine building enterprises. Specific goals and development deadlines are given and second generation robots and also for "intelligent robots" which are capable of performing complex production operations with pattern recognition. Changes are introduced in the structure of production management. E.A.K.

USE OF ROBOTS IN ESTONIAN AUTO, MACHINE TOOL INDUSTRIES VIEWED Robot building which is a new machine building subsector is examined. A program for the development and introduction of robot manipulator complexes and versatile automated production facilities is described. Automatic manipulators and robotics complexes are developed at machine building enterprises. Specific goals and development deadlines are given and second generation robots and also for "intelligent robots" which are capable of performing complex production operations with pattern recognition. Changes are introduced in the structure of production management. E.A.K.


IMPACT OF LATVIAN ROBOTICS INSTITUTE ON INDUSTRY Modernization - Computer-automated technological innovation in three manufacturing sectors A. MAJCHRZAK and V. F. NIEVA In AF Academy Proc. of the 9th Symp. on Psychol. in the DOD p 367-370 Apr. 1984 (AD-P003309) Avail: NTIS HC A99/MF A01 CSCL 05

ROBOTICS IMPACT ON LABOR PRODUCTIVITY EXAMINING A. MAJCHRZAK and V. F. NIEVA In AF Academy Proc. of the 9th Symp. on Psychol. in the DOD p 367-370 Apr. 1984 (AD-P003309) Avail: NTIS HC A99/MF A01 CSCL 05

AUTHOR (GRA)
04 ROBOTICS AND EXPERT SYSTEMS

N84-30774# Softech, Inc., Waltham, Mass.

The Integrated Computer Aided Manufacturing (ICAM) Architecture Part 3 was initiated to maintain and update the existing manufacturing architecture as well as develop training courses to assist in the transition of IDEF applications, concepts and procedures to other Air Force programs. This volume, Volume 4, presents the composite view depicting the design process as it exists today in the form of an 'AS IS' Information Model of Design. Author (GRA)

N84-31743# California Univ., Santa Barbara. Dept. of Geography.

The use of artificial intelligence to access and process geographically dispersed data sets with the use of geographically distributed software is examined. This requires capabilities in the areas of distributed data base management, long-haul networking, information presentation, distributed problem solving and artificial intelligence. In particular, the Pilot Land Data System, the Pilot Ocean Data System, and the Pilot Climate Data Base Management System (as well as a proposed Global Resource Information System) are structured as large computer networks. The techniques of artificial intelligence are discussed as they apply in distributed problem solving. M.A.C.

N84-31973# Softech, Inc., Waltham, Mass.

The Integrated Computer Aided Manufacturing (ICAM) Architecture Part III was initiated to maintain and update the existing manufacturing architecture as well as develop training courses to assist in the transition of IDEF (ICAM definition) applications, concepts and procedures to other Air Force programs. This volume, Volume 6, presents the composite view depicting manufacturing as it exists today in the form of an AS IS Information Model of Manufacturing. Author (GRA)

N84-31984# National Aerospace Lab., Amsterdam (Netherlands). Informatics Div.

The effects of CAD on cooperation aspects within the National Aerospace Laboratory (NLR) and between NLR and the aircraft industry are discussed. An infrastructure of hardware and software to support the aerodynamic design of aircraft is described. Organizational and technical aspects of this development are described. The CAD techniques make it possible to program NLR knowledge in such a way that it can directly be used for design in the industry by means of a dialogue between computer and designer. Author (ESA)

N84-32826# Committee on Small Business (U. S. House).

The economic and technological impact of robotics and artificial intelligence on the work force is examined through the testimony of government, industry, and university representatives. A current assessment of the skills of the labor force, educational opportunities, and projected unemployment figures are also discussed. M.A.C.


The CNRS (National Center for Scientific Research) has just created its first industrial link: Midi-Robot. The Midi-Robot company will operate in three areas: robot control software, particularly for assembly operations, robot vision systems, and engineering of automated production systems. The company also intends to operate in a consulting capacity on production problems for other companies. It will later become involved in artificial intelligence and control systems. In the long run, the objective is to build up an array of products able to compete on the world market. B.W.


The development of automated industrial techniques in Hungary is discussed. Social factors, international cooperation, industrial leadership, the role of the engineer, and conditions that should influence technical development are discussed. R.J.F.

N84-34991# Softech, Inc., Waltham, Mass.

The integrated computer aided manufacturing (ICAM) architecture Part 3 was initiated to maintain and update the existing manufacturing architecture as well as develop training courses to assist in the transition of IDEF applications, concepts and procedures to other Air Force programs. This volume presents all architecture, concepts and procedures to other Air Force programs. This volume presents all
05 COMPUTERS AND INFORMATION MANAGEMENT


A84-10011*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

BUILDING AN INFORMATION MODEL (WITH THE HELP OF PSL/PSA)


The evolution of a source library system to fit a given programming project structure is discussed. The source library is automated and contains data on the status and history of a product, imposes some structure on the data, and provides some central control on access to the data. Previous versions of the software modules are retained in categories designated by their temporal introduction. The library can contain the project proposal, contract, functional specifications, design documents, code, documentation, test cases, project memos, and error reports. The commands and control for the library encompass capabilities for item creation and deletion, access control, and modification sharing. It is noted that the modules are only permitted into the sharing mode when robustness is demonstrated. Examples are provided in terms of two compiler projects.

M.S.K.
A84-10065*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.

FORECASTING TRENDS IN NASA FLIGHT SOFTWARE DEVELOPMENT TOOLS

The experience gained in the design and development of Shuttle flight and ground support embedded software systems along with projections of increasing role and size of software in the proposed Space Station and other future NASA projects provides the basis for forecasting substantial changes in the tools and methodologies by which embedded software systems are developed and acquired. Similar changes in software architectures and operator interfaces will lead to substantial changes in the approach and techniques involved in software test and system integration. Increasing commonality among different flight systems and between flight and supporting ground systems is projected, along with a more distributed approach to software acquisition in highly complex projects such as Space Station.

A84-15309
CONFIGURATION AND DOCUMENTATION MANAGEMENT [GESTION DE LA CONFIGURATION ET DE LA DOCUMENTATION]

Configuration and documentation management assures that at every instant a complete technical description is available for a spacecraft under development, that the flow of materials and work can be controlled, that costs can be controlled, and that all interfaces are built properly. Configuration controlled products are thereby obtained, fully identified, verified, and documented, so that all technical references are complete and can be used during operation or installation of the satellite. Much of the documentation originates at the industry level and includes both system and subsystem descriptions. Interface requirements are documented and used as a guide for the manufacturers, who also document the chosen configurations and verification test results, which are performed at more integrated levels when the product is delivered. Modifications are subject to strict reviews by committees and the Project Manager, who has the responsibility for the coordinating and ensuring production and transfer of all relevant documentation. M.S.K.

A84-16649
AUTOMATED INTERFACE MANAGEMENT FOR MODULAR SOFTWARE DEPLOYMENT

Attention is called to the greater structure and modularity seen in today’s complex software systems, noting that most structure software design philosophies have modular software design as a basic requirement. The management system described was designed to reduce the amount of unproductive labor in managing software interfaces and in producing documentation that satisfies military documentation standards. Through automation of the interface management for complex software systems, the manpower requirements are reduced. In addition, continuous design feedback is ensured, and the documentation produced is more complete and correct. C.R.

A84-24449
SOFTWARE DEVELOPMENT MANAGEMENT PLANNING

The lack of comprehensive planning prior to the initiation of a software development project is a very pervasive failing. This paper walks through a sample software development plan discussing the various areas that a software development manager should address in preparing his project’s plan. Various considerations and suggestions are presented for each of the management subject areas. How the user/customer can use the developer’s plan to aid in monitoring of his software’s evolution is also presented. Detailed planning of a software development project is necessary to the successful completion of the project. Author

A84-26710
CRISIS AVOIDANCE IN A SOFTWARE MANAGEMENT SITUATION

The general characteristics of software management and development are examined. Crises situations are found to fall into three major areas, which are related to project planning problems that inhibit the manager’s effectiveness, resource availability problems, and test and integration problems. The origin of software management problems goes back to the start of the project. The software manager must, therefore, recognize the importance of early planning for the long-term health of the project. The essential first step is the software development plan. Poor productivity will result as a consequence of trading short term project requirements for long term planning requirements. Attention is given to secondary planning documentation, project drift caused by poor planning, approaches for implementing the plan, questions of resources availability, and an avoidance of potential catastrophes associated with testing by early planning. G.R.

A84-26713*# National Aeronautics and Space Administration. Flight Research Center, Edwards, Calif.

SOFTWARE CONTROL AND SYSTEM CONFIGURATION MANAGEMENT - A PROCESS THAT WORKS

A comprehensive software control and system configuration management process for flight-critical digital control systems of advanced aircraft has been developed and refined to insure efficient flight system development and safe flight operations. Because of
the highly complex interactions among the hardware, software, and system elements of state-of-the-art digital flight control system designs, a systems-wide approach to configuration control and management has been used. Specific procedures are implemented to govern discrepancy reporting and reconciliation, software and hardware change control, systems verification and validation testing, and formal documentation requirements. An active and knowledgeable configuration control board reviews and approves all flight system configuration modifications and revalidation tests. This flexible process has proved effective during the development and flight testing of several research aircraft and remotely piloted research vehicles with digital flight control systems that ranged from relatively simple to highly complex, integrated mechanisms.

Author

A84-26714
AVIONICS SOFTWARE MANAGEMENT AND CONTROL

The present investigation is concerned with a software management and control program (SMC) which is to conduct successful software projects. The approaches used in planning the management and control of systems are presented. The process is to account initial planning, pragmatic SMC aspects, requirements to provide positive benefits, the task to minimize the impact of control to software developers, the desirability of a supportive attitude, an exercise of the right degree of controls, the need for practical tailoring guidelines to fit the circumstances, the required flexibility of design management and the control system, and an evolutionary SMC implementation. A description of appropriate procedures for the implementation of the basic elements of SMC is also provided.

Author

A84-31347
COMPUTER RESEARCH IN JAPAN
H. S. STONE (Massachusetts, University, Amherst, MA) Computer (ISSN 0018-9162), vol. 17, March 1984, p. 26-32. refs

The report about computer research in Japan contains information obtained during a three-week tour of Japan in July and August 1982. A cross section of research activity is provided, taking into account four types of architectures with parallel characteristics, signal transmission involving the use of an optical bus with a collection of processors, and a comparison of research environments at Japanese and American universities. Academic research and corporate education in Japan and the U.S. are compared, and the influence of the Japanese language on computer technology is examined. It is found that the characteristics of the kanji characters (ideographs) have a profound effect on pattern recognition, keyboards, CRT displays, printers, and microcomputers in Japan. Two national computer projects are also discussed. One project, known as the Fifth-Generation Computer project, proposes to develop the technology for automatic language translation, speech recognition, and automatic software production. The second project, called the supercomputer project, has the objective to create a computer capable of 10G flops.

Author

A84-31351
GRIDNET - AN ALTERNATIVE LARGE DISTRIBUTED NETWORK

It is pointed out that network configurations which are centrally controlled to promote efficiency are discussed. Information are particularly vulnerable in times of disaster. The reason for this vulnerability is related to their dependence upon the continued operation of the controller. More fault tolerant are configurations which use either distributed control to permit gradual degradation of network performance when nodes fail or double loops to provide redundancy or limited rerouting of data when links fail. Most of the current fault-tolerant configurations, however, suffer from one of three drawbacks. They are vulnerable to becoming fragmented in a hostile environment, they are incapable of handling some of the problems which arise when link outages occur, or they are incapable of ensuring message delivery in a hostile environment. Gridnet has been developed in response to the considered unsolved network configuration and network survival problems. It is formed by interconnecting a number of dual loops in a "Crossfire configuration".

G.R.

Author

A84-33153
PREFERENCES ON TECHNICAL REPORT FORMAT - RESULTS OF A SURVEY
T. E. PINELLI, V. M. CORDLE (NASA, Langley Research Center, Hampton, VA), M. GLASSMAN (Old Dominion University, Norfolk, VA), and R. F. VONDRAK (Catholic University of America, Washington, DC) Society for Technical Communication, International Technical Communication Conference, 31st, Seattle, WA, Apr. 29-May 2, 1984, Paper. 5 p. refs

A survey of 513 engineers and scientists employed at the National Aeronautics and Space Administration Langley Research Center and 600 engineers and scientists from three professional/technical societies solicited the opinions of report users concerning the format of NASA technical reports. The results indicate that a summary as well as an abstract should be included, that the definitions of symbols and glossary of terms should be located in the front of the report, and that the illustrative material should be integrated with the text rather than grouped at the end of the report. Citation of references by number, one-column, ragged-right-margin layout, and third-person writing style are also preferred by a majority of the respondents.

Author

A84-41201
A TOTAL SYSTEM DESIGN FRAMEWORK

Contract F0062-80-C-0284

The development of successful computer systems requires an intense planning effort. For such an effort, suitable integrated design methodologies are needed. The present investigation is concerned with a total system design (TSD) framework which supports the development of integrated system design methodologies. In the TSD framework, system development is partitioned into stages and phases. After the problem definition stage, the system design stage is considered along with the software design stage, the machine design stage, and the firmware design stage. The 10 steps representing the design activities involved in each TSD phase are discussed. Attention is also given to hardware/software tradeoffs, aspects of context identification, framework pruning, the selection and validation of the specification language, the selection of design/analysis techniques, the sequencing of design/analysis activities, and the addition of project management components.

Author

A84-44395
JET PROPULSION LAB., CALIFORNIA INST. OF TECH., PASADENA.
ALGORITHM 607 - TEXT EXCHANGE SYSTEM: A TRANSPORTABLE SYSTEM FOR MANAGEMENT AND EXCHANGE OF PROGRAMS AND OTHER TEXT
W. V. SNYDER (California Institute of Technology, Jet Propulsion Laboratory, Pasadena, CA) and R. J. HANSON (Sandia National Laboratories, Albuquerque, NM) ACM Transactions on Mathematical Software (ISSN 0098-3500), vol. 9, Dec. 1983, p. 427-440. NASA-supported research. refs

Contract AT(29-1)-789
A survey questionnaire contained fourteen questions covering technical reports and the usage of technical report components. The survey questionnaire contained fourteen questions covering twelve survey topics. This article reports the findings of two survey topics: the components initially reviewed or read to determine whether to read a report in its entirety and the order in which report components are read.

A reader preference survey of engineers and scientists at the NASA Langley Research Center and in three professional/technical societies was conducted to determine the opinions of report users and producers concerning the format (organization) of NASA technical reports and the usage of technical report components. The survey questionnaire contained fourteen questions covering twelve survey topics. This article reports the findings of two survey topics: the components initially reviewed or read to determine whether to read a report in its entirety and the order in which report components are read.

A survey of engineers and scientists concerning the format of NASA technical reports indicates that a summary as well as an abstract should be included, that the definitions of symbols and glossary of terms should be located in the front of the report, and that the illustrative material should be integrated with the text rather than grouped at the end of the report. Citation of references by number, one-column, ragged-right-margin layout, and third-person writing style are also preferred by a majority of the respondents. The preferences of managers and nonmanagers are very similar for all aspects of technical report format covered by the survey.

NU - A NETWORK MONITORING, CONTROL, AND MANAGEMENT SYSTEM


Although ARPANET-like packet-switching networks function autonomously, for smooth operation sophisticated facilities for monitoring, control, and management are required. Such facilities can be provided by a Network Operations Center (NOC) using BBN's NU software. The NU (Network Utilities) system supplies services for failure detection, isolation, and correction, network configuration monitoring and control, traffic and performance data collection, and software maintenance and distribution in a highly integrated and flexible design. NU is a multiprocess, message-passing system, in which backbone processes (an External Message Handler, a Poller, and an Event Dispatcher) provide support services for application processes which monitor status, deduce network topology, collect performance statistics, send control instructions to network components, and display collected information. NU also includes a database of all network components, which is used extensively by NU processes for communicating with network entities and for interpreting messages about them.

N84-10807# Los Alamos Scientific Lab., N. Mex.

FUTURE DIRECTIONS IN LARGE-SCALE SCIENTIFIC COMPUTING

J. M. HYMAN Apr. 1983 32 p refs
(Contract W-7405-ENG-36) (DE83-013229; LA-9637-MS) Avail: NTIS HC A03/MF A01

Techniques now used to program physics production codes cannot cope with the increasing complexity of large-scale scientific and engineering problems. Future codes must be based on sound, scientific, computing-structured design principles and include the characteristics of flexibility, modularity, reliability, have standardized documentation, and use high-level support libraries. To meet these requirements, high-level mathematical software must be developed and existing ties among the national laboratories, industry, and universities must be strengthened.

N84-11066# Oak Ridge National Lab., Tenn.

PROCEEDINGS OF THE 1982 INTEGRATED DATA USERS WORKSHOP

R. J. OLSON and N. T. MILLEMANN 1982 193 p refs
Proc. held at Reston, Va., 13 Oct. 1982

Ways for improving the efficiency of data systems and to maintain and increase productivity are discussed. Creating long term strategies for coping with this problem is of real interest to both the producers and consumers of data and information. The pervasive and interrelated problems of society must be addressed using data that can be interrelated among physical, economic, and demographic dimensions. The status of integrated data systems in the present climate and approaches for coping with these challenges of how to do more with less are addressed. Two general areas are discussed: first, technologically based intimatives for improving efficiency and accessing information: and second, institutional alternatives involving options like the sharing of resources and public/private sector cooperation.

N84-11365# Polytechnic Inst. of New York, Brooklyn.

R. BOORSTYN, A. KERSHENBAUM, B. MAGLARIS, and P. SARACHIK 1 Sep. 1982 438 p refs
(Contract DAAA80-80-K-0579) (AD-A131357; CECOM-80-0579-F) Avail: NTIS HC A19/MF A01 CSCL 05A

This is the final technical report for work performed on network management techniques for tactical data networks. It includes all technical papers that have been published during the control period. Research areas include Packet Network modelling, adaptive

A84-10786# California Univ., Los Angeles. School of Management.

ISSUES IN SOFTWARE MAINTENANCE

B. P. LIENTZ Jul. 1983 24 p refs
(Contract N00014-83-K-0257; NR PROJ. 049-345) (AD-A130622) Avail: NTIS HC A02/MF A01 CSCL 05A

Up to a few years ago the area of software maintenance was largely ignored. Interest has increased in the last few years due to several factors. First, the increased volume of enhancement and maintenance with more systems from that of ten years ago has restricted resources available for new development. Second, there has been a growing awareness that tools and aids which assist development of information systems may have little effect on operational systems. Third, the management of information systems has come under increasing scrutiny. In this report we highlight some of the major issues that surfaced during several extensive operational software studies. These sources have pointed to significant questions that must be addressed concerning the roles of the users in operations and maintenance, the management of maintenance, and the types of tools and techniques that are needed in maintenance.

Author (GRA)
network routing, network design algorithms, network design techniques, and local area networks. Author (GRA)


The results of a recent study which reviewed Federal agency experience with microcomputers during the period of August 1982 to January 1983 are documented. Interviews conducted with the Federal agencies are presented in detail, summarized, and tabulated. Related management and technical issues are identified and discussed. GRA


An effective data collection method for evaluating software development methodologies and for studying the software development process is described. The method uses goal-directed data collection to evaluate methodologies with respect to the claims made for them. Such claims are used as a basis for defining the goals of the data collection, establishing a list of questions of interest to be answered by data analysis, defining a set of data categorization schemes, and designing a data collection form. Feasibility of the data collection methodology was demonstrated by applying it to five different projects in two different environments (other NRL Reports). The application showed that the methodology was both feasible and useful. GRA

N84-12477# Naval Postgraduate School, Monterey, Calif. COMPUTER SYSTEM DESIGN ENVIRONMENT SOFTWARE DEVELOPMENT PLAN A. A. ROSS and J. BOWERS 29 Jul. 1983 25 p (AD-A131651; NPS52-83-009) Avail: NTIS HCA02/MFA01 CSCL 09B

The Computer Systems Design Environment (CSDE) project is an attempt at automated design of computer systems. The project develops a system which will accept functional statements of requirements from the designer (utilizing a user friendly dialogue); translate those requirements into software and hardware primitives; evaluate those primitives and develop a proposed system using a Library of Realization Volumes. The CSDE will also verify that timing requirements have been met by the proposed hardware and software; and present the system design to the designer (in a user friendly format). The CSDE will be a prototype based on an existing feasibility demonstration version which has verified the concept. The prototype version will explore issues of adaptability, user friendliness and design system performance. This paper is a plan for the development of the CSDE. Author (GRA)


The Guide outlines planning, acquisition, implementation and post implementation evaluation considerations for information managers who are responsible for establishing office automation programs. This Guide was developed by Arthur Young & Company for the Information Resources Management Directorate, OASDC. The Guide is intended to assist the Department in realizing the opportunities to increase the productivity and effectiveness of professional, administrative, and clerical personnel that are presented by office automation technologies. Author (GRA)

N84-13022# Syracuse Univ., Utica, N. Y. INFORMATION RETRIEVAL RESEARCH SUPPORT Final Technical Report J. J. ARLOTTO May 1983 47 p (Contract F30602-79-C-0195; AF PROJ. 5581) (AD-A131690; RADC-TR-83-120) Avail: NTIS HCA03/MFA01 CSCL 09B

This report describes work performed by Utica College students of various academic disciplines to undertake study efforts and provide products in the Information Sciences. The report provides a synopsis of the individual investigation study efforts in such areas as information handling information processing, data extraction and data management. When appropriate, individual data gathering efforts were published as separate technical reports under this contract. Author (GRA)


This Plan documents the Federal Aviation Administration’s long-term plan for applying systems analysis and automated data processing technology to its information needs. As a long-range Plan, it provides a sound basis for both the Executive and Legislative Branches to properly appraise funding needs. It retains the flexibility needed to accommodate future technology as it becomes applicable to individual subsystems and it becomes evident that the new technology with improve our return on investment. The Plan begins institutionalizing a process of regular and comprehensive assessments of FAA’s information posture and needs. This Plan is the framework for the development, operation, and management of agency information resources and for the evaluation of performance as well as resources and priority decisions. The FAA will follow through on this planning effort with the detailed requirements documentation, system specifications, cost benefit analyses, and the other action sound system management requires. GRA


This study is an investigation into critical factors which would constitute reliable performance measures for bibliographic information retrieval systems. Thirty-two (32) judges, grouped by type of judge (researcher or student), level (senior or junior), speciality (biomedicine or social science), and evaluation context (relevance or utility), were asked to rate sixteen (16) documents on alcohol studies which included four (4) different search topics and four (4) document citations and abstracts for each search topic. Half of the judges were asked to rate the documents on how relevant the documents on the basis of the document's perceived utility for the individual judge. After rating the documents, judges were also asked to rate the importance of five (5) document attributes (author, title, abstract, source of publication, and date of publication) and six (6) information attributes (accuracy, completeness, subject, suggestiveness, timeliness, and treatment). The findings of the experiment indicate no significant difference in document rating, document attributes, or information attributes due to the evaluation context. Dissert. Abstr.
The inordinately high cost of software continues to be the major shortcoming in the development of computer systems. In the past, attempts to solve this software crisis have been from one of three independent approaches - using structuring techniques or using formal techniques (together these two are called software engineering) or using management techniques. It is now apparent that this management-technology decoupling is avoidable and that a viable software design methodology must include mutually supportive management, structuring, and formal components. This thesis attempts to develop just such a methodology for the design of large systems. The author proposes a set of criteria which will be used to evaluate design methodologies. Based on these criteria and research into existing methodologies, he then outlines his new methodology. It utilizes the advantages of high level abstraction, and Entity-Relationship set theoretical notation, hierarchical structuring, and numerous management techniques. A simple example is given to introduce the design style and notation. In order to assess the new methodology and its interaction of management and software engineering techniques, he does a case study development of a windowed, information sharing display and filling system. GRA

**A TECHNICAL OVERVIEW OF THE NATIONAL SOFTWARE WORKS**  
R. E. SCHANTZ and R. H. THOMAS  
Griffiths AFB, N.Y.  
RADC  
Mar. 1983  
118 p  
(Contract F30062-81-C-0213; AF PROJ. 2531)  
(AD-A132230; BBN-5238; RADC-TR-83-80)  
Avail: NTIS HCA06/MA01 CSCL 09B

This report presents a technical overview of the National Software Works System architecture and design. The NSW is a working example of a network operating system, which is intended to integrate and provide uniform access to software tools residing on a number of constituent host systems connected to the ARPA Network.  
Author (GRA).

**N84-14068#** Argonne National Lab., Ill.  
**TOOLS FOR THE CREATION OF IMS DATABASE DESIGNS FROM ENTITY-RELATIONSHIP DIAGRAMS**  
G. MARGRAVE, E. L. LUSK, and R. A. OVERBEEK  
1983 16 p  
refs  
Presented at the 3rd Inten. Conf. on Entity-Relationship Approach, Anaheim, Calif., 5 Oct. 1983  
Prepared in cooperation with Univ. of Northern Illinois, De Kalb  
(Contract W-31-109-ENG-38)  
(DES4-000592; CONF-831061-1)  
Avail: NTIS HC A02/MA01

An overview of a system of software tools that can be used in preparing database designs is presented. The design technique is based on the Entity-Relationship model, the tools allow a designer to conveniently develop an Entity-Relationship model, from which an Extended Entity-Relationship model is produced. The extended Entity-Relationship model is used as input to tools that generate the basic design appropriate to the target database management system.  
DOE

**N84-14730#** European Space Agency, Paris (France).  
**INTEGRATED SOFTWARE ENGINEERING FACILITIES (ISEF) SOFTWARE CONFIGURATION MANAGEMENT SYSTEM**  
L. DIAKITE  
in ESA Software Eng. p 9-23  
Aug. 1983  
refs  
Avail: NTIS HC A13/MA01

The ISEF, a prototype of a programming environment to be used by ESA for developing and maintaining software products is introduced. The ISEF implements and validates software development methodologies. It is implemented on VAX under UNIX (trademark) operating system. It uses RAPPORT (trademark) a relational database management system. It is a multiusers multiprojects software workshop. It applies throughout the whole life cycle of a software product from requirements definition to acceptance and maintenance phases. It helps in controlling the consistency of the product and managing its development.  
Author (ESA)
SOFTWARE CONFIGURATION MANAGEMENT

B. R. YOUNG In ESA Software Eng. p 105-114 Aug. 1983 refs
Avail: NTIS HC A13/MF A01

The manner in which traditional configuration management practices are adopted to reach the individual components of a software system is outlined. The tools and procedures developed to extend practical control down to individual code modules are described. The concept of software packages; the codes of practice to cover module identification and media issue; and the software tools to enable direct package content control and printout of module status are considered. Author (ESA)

TECSI-Software, Paris (France).

COHERENT MANAGEMENT SUPPORT IN THE ADA ENVIRONMENT

Avail: NTIS HC A13/MF A01

Methods and tools for supporting the development and maintenance of large scale software systems written in Ada were studied. The integration of the methods and tools for the whole range of software life cycle activities was emphasized. A coherent management support scheme was synthesized in an Ada programming support environment. The major coherency aspects of this scheme are described. Author (ESA)

Ada and the NASA software environment

Avail: NTIS HC A13/MF A01

The NASA software, in broad categories, is described, and the software life cycle is characterized. Programming language policy and practices are reviewed. Applicability, benefits, and transition, as well as present and potential problems with Ada are examined. Author (ESA)

THE PROJECT LIBRARY PLUS: A GENERAL OVERVIEW

F. PFEIFFROTH In ESA Software Eng. p 175-183 Aug. 1983 refs
Avail: NTIS HC A13/MF A01

A project library (PLUS) used with the PET/MAESTRO software development system is described. The structure of the project library is defined by three dimensions: product structure; document structure; and versions. The PLUS provides project library services for administration of development material and for support standards, methods and so on; and project management services for task distribution and for the control of execution costs and dates.

Author (ESA)

Ferranti Computer Systems Ltd., Cwmbran (England).

A HOST-TARGET PROGRAMMING SUPPORT ENVIRONMENT FOR THE PRODUCTION OF HIGH-QUALITY REAL-TIME SYSTEMS

Avail: NTIS HC A13/MF A01

Hardware and software components of an environment used for the production of large, real time systems are discussed, together with the reasons behind the choices made. Many software tools come directly from the host system (a DEC VAX with VMS) but tools for software (configuration) management and software verification were developed. Ada and Ada program support environments are contrasted with features of the environment currently used. Author (ESA)


COMPUTER PROGRAM DEVELOPMENT SPECIFICATION FOR ADA INTEGRATED ENVIRONMENT: KAPSE (KERNEL ADA PROGRAMMING SUPPORT ENVIRONMENT)/DATABASE, TYPE B5, B5-AIE(1),KAPSE(1)

12 Nov. 1982 182 p
(Contract F30602-80-C-0291)
(AD-A154092; IR-675-2) Avail: NTIS HCA09/MFA01 CSCL 09B

This specification establishes the requirements for performance, design, test, and qualification of a set of computer program modules identified as the Kernel Ada Programming Support Environment (KAPSE) of the Ada Integrated Environment. The KAPSE provides several facilities to the Ada Programming Support Environment, which can be grouped into the following five Computer Program Configuration Items: (1) SIMPCOMP - Database Operations on Simple and Composite Objects; (2) ACCECAT - Access Control and Categorization of Database Objects, and the Manipulation of User-Defined Attributes; (3) MULTIPROG - Invocation of and Communication Between Multiple Ada Programs, plus Multi-User and Multi-KAPSE Support and Synchronization; (4) HISTARCH - Configuration and System Management, with History, Archiving, Backup, and Recovery; and (5) RTS - Run-Time Support for the Execution of Ada Programs, including Language-Defined Input/Output Packages. This specification identifies the functional capabilities of the various KAPSE computer program components and describes the KAPSE/tool interfaces as well as the KAPSE/Host computer interfaces.

Oak Ridge Y-12 Plant, Tenn.

INTERACT EXECUTE FACILITY FOR JOB SCHEDULING AND MANIPULATION

(DE84-001553; Y/CSD/INF-83/3; CONF-8310190-1) Avail: NTIS HC A04/MF A01

The INTERACT's execute facility and command set which provide a very obvious and simple mechanism for computerizing the computer operations department are outlined. A production oriented shop has a large volume of batch jobs that are submitted on a regular schedule and these jobs are usually grouped into systems. Furthermore, within these systems, individual jobs that are related, if not dependent on each other, sometimes have to run in a particular sequence. It's usually the responsibility of a setup group within the computer operations department to see that these jobs are submitted on schedule, the results are checked, a predefined procedure is followed when things go wrong, and reports are distributed to appropriate people out in the field. An online system, the JESS NETWORK MANAGER, using INTERACT and its execute facility to handle these functions is presented.

Naval Postgraduate School, Monterey, Calif.

THE DETERMINATION OF USER INFORMATION REQUIREMENTS DURING THE DEVELOPMENT OF INFORMATION SYSTEMS M.S. Thesis

P. R. GARDELLA, JR. Jun. 1983 137 p
(AE-A132998) Avail: NTIS HCA07/MFA01 CSCL 05B

One of the major causes for the failure of Management Information Systems (MIS) is that these do not satisfy the user's information requirements. This, in turn, is most often caused by the fact that those requirements are difficult to obtain accurately and completely. Simply asking the user what he needs is inadequate. This thesis reviews the Information Requirements Analysis literature, briefly describing some of the techniques available for determining the users' information requirements. It then reports on a survey which attempted to investigate the degree to which the extensive MIS literature involving information requirements determination has had practical impact on the way in which MIS's are actually developed.
organizational/environmental determinants of productivity. B.G.

investigating including: (1) the efficacy of different organizational

personnel turnover, (3) impact of management approaches such

operations of a software development department as a continuous

is extended to investigate a broader set of issues pertaining to

Rather than continuing to focus on software development

the system dynamics modeling approach outlined

rather than trace the life cycle(s) of one or more software projects, the focus is on the

an integrated systems dynamic perspective.

Rather than continuing to focus on software development

packs Presented at the 2nd Intern. Statistical Database Management Workshop,

our approach was that of identifying the elements contributing to the accuracy of data transmisson using a cordless telephone as a part of a data communications link. The experimental design used was a fractional factorial design using two, one-quarter replications of all possible combinations of the eight variables studied. Independent variables manipulated included distance, height of receiver, antenna length, and antenna angle from the vertical. Other independent variables included the presence or absence of operating fluorescent lights, an intervening metal cabinet, an intervening wall and door, and an intervening human body. The dependent variable measured was the percentage of 13 character number strings received which matched identical records previously stored in a computer.

A new direction in the analysis of large data sets was established. The ALDS project is composed of a team of statisticians and computer scientists. The motivation and initial goals of the ALDS project, the impact of large data sets, the data management issues addressed by ALDS, current research tasks and their impact on statistical data base management, and perspectives is discussed.

A method for designing computer support documentation in which the writer's role in the systems design team of converting user desires into specifications and system descriptions into user understandable information; and an overall hierarchical and understandable information; and an overall hierarchical and structured approach to document design similar to that used in software engineering. Also provided is a modeling technique to help evaluate computer system design decisions.

This report identifies all Defense Data Network (DDN) testable components (hardware, software), assemblies, subsystems, integrated facilities, and subsystems; to describe the specific nature and objective of the tests required to assure proper network performance, including recommended schedules and locations; and to recommend which software and firmware developments should be monitored by Independent Verification, Validation, and Test. The objective of this report is to provide the Government, in an easily accessible form, information needed for the development of test and Evaluation Master Plan (TEMP) for the DDN.
This thesis provides the B-1B Program Office with assistance in development of their executive information system. To achieve this purpose, two research objectives were identified. The first objective was to identify the information needs of the B-1B executive management team not currently satisfied by the existing computer-based information system. The second objective was to determine and document the system specifications to support these needs. To achieve these research objectives, a structured systems approach, IDEF0, was used to develop a functional model of the management activities within the B-1B Program Office. The specific information needs were identified and documented. Also, system specification needs were identified and documented. System specifications identified by the executive managers as most important to them concern security, ease of system operation, trend analysis and forecasting, and interface with contractor information systems. Recommendations to the program office address data base management, centralization/decentralization of software development, system documentation, and operational control of system hardware and software. The results of this study should be applicable to efforts to automate information systems in major weapon system program offices.


DATA ORGANISATIONS AND THEIR MANAGEMENT
Avail: NTIS HC A06/MF A01
Organizations which are involved in generating, compiling, validating and disseminating data are not all alike. Different types of organizations have different objectives and motivations. These lead to differences in management. Ways of coordinating the activities of data organizations are considered and the scope for overall planning at national and international levels. The costs of data activities cannot be ignored. The economics of subsidies, pump priming and pricing need careful consideration.

HQ AFSC SELECTION OF A MICROPROCESSOR DEVELOPMENT SYSTEM
A microprocessor development system is essential to the system design laboratory where it is used to develop, test, and debug microprocessor-based circuitry and software. This report describes the functions and components of a typical development system, provides vendor selection criteria, and compares the characteristics of three proven or representative systems to determine the one most suitable for acquisition by HQ AFSC.

N84-17927# State Univ. of New York, Stony Brook. Dept. of Computer Science.

COMPUTER NETWORKS WITHOUT A SHARED MEMORY
AFOSR-81-0197 Interim Report
A. J. BERNSTEIN Jul. 1983 7 p (Contract AF-AFOSR-0197-81; AF PROJ. 2304) (AD-A135074; AFOSR-83-0930TR) Avail: NTIS HC A02/MF A01 CSCL 05B
The research performed under this grant centers on the concept of a network computer. By this the authors mean a network of computers (no shared memory) which can be programmed as if it were a single virtual machine using a high level distributed language. Work during this past year can be divided into three areas: Distributed Algorithms; Distributed Languages; and An Implementation of Multicasting on a Network Computer. This report summarizes progress achieved during the past year.


A PROGRAM FOR DEVELOPING AUTOMATED SCIENTIFIC-INFORMATION PROCESSING IN MARITIME ECONOMY
T. CIUNDZIEWICKI and T. PIOTROWSKI 17 Nov. 1983 11 p (PB84-125210; NSF/OIR-83-002) Avail: NTIS HC A03/MF A01 CSCL 14C

The need for efficient means to acquire scientific and technical information is addressed. The shortcomings of the present automated systems are surveyed. Finally, basic requirements for further development of an automated scientific information system are outlined.


WORKSHOP ON MAGNETIC INFORMATION TECHNOLOGY (MINT)

Questions addressed at the workshop are listed, including: (1) What are the Magnetic Information Technology (MINT) research needs in such areas as electronics, materials, surface science, magnetic phenomena and devices, aerodynamic aspects of magnetic systems, signal processing, and tribology as it bears on magnetics; (2) How should MINT research be addressed and conducted in the university environment, and (3) What are the vehicles in the university environment needed to facilitate addressing MINT issues. The MINT research is outlined. The need for research in the following areas is identified: magneto-optic recording, magnetic bubbles, particulate material recording, and thin film media.

GUIDE TO SOFTWARE CONVERSION MANAGEMENT Final Report
This guideline was developed to provide federal ADP managers a better understanding of the entire process of software conversion. Software conversions have life cycles with distinct phases and activities that occur in each phase. Understanding the order or sequence of a conversion and of the associated costs should help managers to plan and execute software conversions efficiently, effectively, and with minimum operations disruption to federal agencies. Although extensive references were consulted in preparing this guideline, the most important sources were interviews conducted at 14 federal agencies that had completed or were involved in software conversion projects. These interviews influenced the structure and organization of this guideline in an attempt to present, in logical order, activities that must be performed to achieve a successful conversion.

N84-18952# National Bureau of Standards, Washington, D.C.
GUIDANCE ON SOFTWARE MAINTENANCE Final Report
R. J. MARTIN and W. M. OSBORNE Dec. 1983 75 p refs (PB84-128651; NBS-SP-500-106; LC-83-600611) Avail: NTIS HC A04/MF A01 CSCL 09B

Issues and problems of software maintenance are addressed and actions and procedures which can help software maintenance organizations meet the growing demands of maintaining existing
systems are suggested. A working definition for software maintenance is established. Tools and techniques that may be used to improve the control of software maintenance activities and the productivity of a software maintenance organization are discussed. Emphasis is placed on the need for strong, effective technical management control of the software maintenance process.

N84-19170# University of Southern California, Los Angeles. Dept. of Computer Science.

DESIGN OF OFFICE INFORMATION SYSTEMS

E. HOROWITZ and B. NARASIMHAN 8 Nov. 1983 33 p
(Contract AF-AFOSR-0232-82; AF PROJ. 2304)
(AD-A136523; AFOSR-83-12537R) Avail: NTIS HC A03/MF A01 CSCL 05A

We outline the essential components of a truly integrated OIS. Then we critically examine four of the existing prototype systems and another suggested design. These systems have the common characteristic of providing a form based user interface. Then we present a set of requirements for such an OIS.

N84-19176# Stanford Univ., Calif. Dept. of Computer Science.

J. D. ULLMAN Aug. 1983 7 p
(Contract AF-AFOSR-0212-80; AF PROJ. 2304)
(AD-A135707; AFOSR-83-09627R) Avail: NTIS HC A02/MF A01 CSCL 05B

The query facility for their universal relation database system is now working. The fundamental paper unifying ideas on what a UR system can and should be has been published. A paper surveying developments in the field of universal relation systems was invited for the triennial IFIP Congress and was delivered in September. Some initial results on logical theories applied to the problem of updating views have been obtained. There have been a number of developments concerning inference of inclusion dependencies and on the complexity of deciding certain properties of data base schemes. Some interesting results on the difficulty of obtaining hash functions that work well for particular sets of data have been obtained and won an award. Author (GRA)

N84-19179# European Space Agency, Paris (France).

THE APOLLO CONCEPT: ELECTRONIC DOCUMENT DELIVERY BY SATELLITE

Apr. 1983 113 p refs
(ESA-SP-1048; EUR-8599-EN) Avail: NTIS HC A06/MF A01

Electronic document delivery via the European Communications Satellite, the Apollo project, is described. Document identification and ordering; Apollo operation; document digitization; characteristics of the products; transmission errors and image quality; the document terminal; the archive; and the satellite transmission system are outlined.

Author (ESA)

N84-20244# Naval Ship Research and Development Center, Bethesda, Md. Computation Mathematics/Logistics Dept.

COMPUTER GENERATION OF PLAN OF ACTION AND MILESTONE SCHEDULE Final Report
A. SHUFORD and S. BECKER Nov. 1983 83 p
(AD-A137057; DTNNSRC-CMCLD-83/27) Avail: NTIS HC A05/MF A01 CSCL 09B

The Computer Generated Plan of Action and Milestones (POAM) Program was developed to generate a Plan of Action and Milestones Chart using computer graphics. These charts are used in reports and system Decision Papers. The charts show the progress and methodology of a project. The original charts were generated by hand (ruler and pencil with a final typed copy) and by graphics procedures. The computer program will enable the user to generate these graphs faster, and more efficiently. The program uses Fortran, and Display Integrated Software System and Plotting Language (DISSPLA). DISSPLA is a software package that enables the user to produce graphics. The user is advised to become familiar with the introductory portions of the DISSPLA manual. This manual explains how POAMs are produced through interactive and batch computer methods.

N84-20425# Meridian Corp., Falls Church, Va.

REQUIREMENTS ANALYSIS FOR FORWARD FUNDING TRACKING SYSTEM, VOLUME 1 Final Report
1 Dec. 1983 49 p
(Contract MDA903-83-C-0342)
(AD-A138940) Avail: NTIS HC A03/MF A01 CSCL 05A

Volume I of this report focuses on the efforts undertaken with respect to the requirements for a Forward Funding Tracking System. The purpose of this effort was to analyze the feasibility and cost effectiveness of developing a forward funding tracking system which was capable of utilizing existing DARPA data bases. Used in this context, forward funding tracking refers to the process by which DARPA commits, obligates, and ultimately manages its fiscal resources. The motivation behind this analysis was the need to provide the DARPA Program Management Office (PMO) with sufficient information to enable an informed decision regarding the effectiveness of potential approaches to financial management. This need is a principal concern to the PMO, since it is the responsibility of this office to plan, manage, and control, at the aggregate level, DARPA program funds and project scheduling. In addition, within the context of the overall DARPA mission to pursue high-risk, high-payoff R&D, it is incumbent upon the technical program offices to manage individual projects from a technical, cost, and schedule point of view. Consequently, the coordination of the resource requirements for management of these individual projects is also a primary concern to the PMO.

N84-20426# Meridian Corp., Falls Church, Va.

REQUIREMENTS ANALYSIS FOR MILESTONE TRACKING SYSTEM, VOLUME 2 Final Report
1 Dec. 1983 17 p
(Contract MDA903-83-C-0342)
(AD-A138941) Avail: NTIS HC A02/MF A01 CSCL 05B

Volume II of this report concerns the efforts undertaken with respect to a Milestone Tracking System. The purpose of this task was to analyze the feasibility and cost effectiveness of developing milestone tracking system for internal use within DARPA which was capable of utilizing existing DARPA data bases. As defined in this document, milestones include a wide range of internal and external developments as well as decision points which may be of interest to DARPA managers. Specifically, these include: Technical achievements; Technical decision points; Financial decision points; Point of inter-project dependencies; and External events/considerations. The purposes initially identified for a milestone tracking system were threefold. First, the system was envisioned to be a mechanism to provide program managers with a concise representation of their program activities. Second, the system was conceived to provide an automatic prompting of milestone and/or critical events identified by the user. Third, the system was viewed as a mechanism to retain an historical data base on the conduct of DARPA programs. It soon became evident that the system also had utility in providing input to programming decisions through the analysis of imbedded dependency networks.

N84-20438# Naval Postgraduate School, Monterey, Calif.

BENCHMARKING THE SELECTION AND PROJECTION OPERATIONS AND ORDERING CAPABILITIES OF RELATIONAL DATABASE MACHINES M.S. Thesis
R. A. BOGDANOWICZ Sep. 1983 68 p
(AD-A136776) Avail: NTIS HC A04/MF A01 CSCL 09B

This thesis describes the performance-measurement experiments designed for a number of back-end, relational database machine configurations. An in-depth study of the tests and results of the two relational operations, namely, selection and projection, on a specific configuration is presented. In addition, tests are made on the ordering capabilities and performance of the machine configuration. The goal of the work is to lead to a development for a machine-independent methodology for
benchmarks the selection and projection operations and on ordering capabilities of database machines. Author (GRA)


SECURITY, A SET OF RULES OR AN APPROACH
R. P. DEMOEL 27 Sep. 1982 16 p refs In DUTCH;
ENGLISH summary Presented at Cryptography Course,
Amsterdam, 4-8 Oct. 1982
(NLR-MP-82047-U) Avail: NTIS HC A02/MF A01

Computer information security measures are examined. Encryption of data as a protection against unauthorized examination is discussed. Protective mechanics, general security directives derived from conventional security, and management security considerations are reviewed. Author (ESA)

N84-21204 Illinois Inst. of Tech., Chicago.

APPLICATIONS OF OPERATIONS RESEARCH AND
MANAGEMENT INFORMATION SYSTEM CONCEPTS TO
MANAGEMENT OF LARGE SOFTWARE PROJECTS Ph.D.
Thesis
J. H. LEE 1983 159 p
Aval: Univ. Microfilms Order No. DA8400839

As demands for large-scale software systems increase, improvement of software productivity has become an important goal. Achieving this goal requires efficient management of software development staff and computing resources through effective and timely planning and control decisions. Such decisions are possible when software systems are decomposed into components and life-cycle stages of developing these components are mathematically modeled. Incorporating staff consumption, resource usage and their relationships with time as tradeoffs into the model, the minimum cost, minimum duration and maximum profit project plans can be generated. For generating the plans, heuristic algorithms are formulated. The algorithms attempt to search for close-to-optimal project milestones, and from them, derive staff and resource needs. Reduction of the resulting computational cost, when compared with analytical methods, is significant. Three operations research oriented project management algorithms are presented. Dissert. Abstr.


MANAGEMENT OF AEROSPACE CONTRACT
DOCUMENTATION BY INDUSTRY AND GOVERNMENT
(DE84-900451; CONF-8309188-1) Aval: NTIS HC A02/MF A01

The initial approach used in establishing a user-defined information system to fulfill the needs of users at NASA Headquarters was unsuccessful in bringing this pilot endeavor to full project status. The persistance of several users and the full involvement of the Ames Research Center were the ingredients needed to make the AIMS project a success. The lesson learned from this effort is that NASA should always work from its organizational strengths as a Headquarters-Center partnership.

N84-21402# RAND Corp., Santa Monica, Calif.

INFORMATION SYSTEMS, SECURITY AND PRIVACY
(RAND/P-6890; AD-A145193) Aval: NTIS HC A02/MF A01

A brief overview concerning the security of information and computer systems was presented and the relationship between security and personal privacy was examined. Record keeping privacy concerns protecting personal information and controlling its use for authorized purposes. Computer security provides protective mechanisms that assure computer system safety and protect the stored information including access to that information. Defense environment security was contrasted with commercial security. Threats against Department of Defense security involve large technical and financial resources of major world powers while the industrial threat is comparatively minor and involves authorized individuals using the system for personal gain. Several suggestions for the improvement of security for computer software and the related systems are presented, including preparation of a standard government handbook listing preferred procedures for running a computer center, clarification of personal privacy laws, and vendor obligations regarding security safeguards.

N84-21405# National Aeronautics and Space Administration, Washington, D. C.

ACTION INFORMATION MANAGEMENT SYSTEM (AIMS): A
USER'S VIEW
Aval: NTIS HC A08/MF A01 CSCL 05B

The initial approach used in establishing a user-defined information system to fulfill the needs of users at NASA Headquarters was unsuccessful in bringing this pilot endeavor to full project status. The persistance of several users and the full involvement of the Ames Research Center were the ingredients needed to make the AIMS project a success. The lesson learned from this effort is that NASA should always work from its organizational strengths as a Headquarters-Center partnership.

N84-21406# National Aeronautics and Space Administration, Washington, D. C.

AUTOMATED RTOP MANAGEMENT SYSTEM
Aval: NTIS HC A08/MF A01 CSCL 05B

The structure of NASA's Office of Aeronautics and Space Technology electronic information system network from 1983 to 1985 is illustrated. The RTOP automated system takes advantage of existing hardware, software, and expertise, and provides: (1) computerized cover sheet and resources forms; (2) electronic signature and transmission; (3) a data-based information system; (4) graphics; (5) intercenter communications; (6) management information; and (7) text editing. The system is coordinated with Headquarters efforts in codes R,E, and T.

N84-21411# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

AUTOMATED ADMINISTRATIVE DATA BASES
Aval: NTIS HC A08/MF A01 CSCL 05B

Improved productivity and more effective response to information requirements for internal management, NASA Centers, and Headquarters resulted from using automated techniques. Modules developed to provide information on manpower, RTOPS, full time equivalency, and physical space reduced duplication, increased communication, and saved time. There is potential for greater savings by sharing and integrating with those who have the same requirements.

N84-21412# Maryland Univ., College Park. Dept. of Computer Science.

METHOD FOR ACCESSING DISTRIBUTED HETEROGENEOUS DATABASES
Aval: NTIS HC A08/MF A01 CSCL 05B

A scenario of relational, hierarchial, and network data bases is presented and a distributed access view integrated data base system (DAVID) is described for uniformly accessing data bases which are heterogeneous and physically distributed. The DAVID...
The strategies for managing computer based geometry are described. The computer model of geometry is the basis for communication, manipulation and analysis of shape information. The research on integrated programs for aerospace-vehicle design (IPAD) focuses on the use of data base management system (DBMS) technology to manage engineering/manufacturing data. The objectives of IPAD is to develop a computer based engineering complex which automates the storage, management, protection, and retrieval of engineering data. In particular, this facility must manage geometry information as well as associated data. The approach taken on the IPAD project to achieve this objective is discussed. Geometry management in current systems and the approach taken in the early IPAD prototypes are examined.

A.R.H.

N84-21443# Defence Research Information Centre, Orpington (England).
THE APPLICATION OF MANAGEMENT TECHNIQUES TO DEFENCE AND OTHER INFORMATION SERVICES: THE BRITISH APPROACH
G. W. HART In AGARD The Appl. of New Technol. to Improve the Delivery of Aerospace and Defence Inform. 16 p Dec. 1983 refs
Avail: NTIS HC A06/MF A01

The Aslib catalog was searched for books, reports, and periodical articles on applications of management techniques to information services and libraries which were published in Great Britain or written by British authors. Also the last eight years of Aslib Proceedings were searched and an on-line search of the LISA (Library and Information Science Abstracts) files was conducted. A logical approach was made, from planning a new system, through measurement and evaluation, to the application of different technique for improvement of a system, finishing with the more esoteric ones. The aim throughout was to give the flavor of different technique rather than a detailed description. Author

A.R.H.

MANAGEMENT OF AEROSPACE CONTRACT DOCUMENTATION BY INDUSTRY AND GOVERNMENT
Avail: NTIS HC A06/MF A01

Method of documenting and tracking contract requirements and deliverables from the inception of a project through its completion and reviewed. One specific system, the Technical Information Monitoring System, is discussed in detail. Emphasis is placed on the tracking of deliverables in the form of technical reporting requirements for research and development contracts for the U.S. Department of Energy. In addition, the application of new technologies to improve productivity and reduce overlap in energy research and development are examined and to enhance contract documentation and accelerate the dissemination of contractor research and development reports and technical information. Author

E. A. K.

N84-21445# Boeing Computer Services, Inc., Seattle, Wash.
MANAGING GEOMETRIC INFORMATION WITH A DATA BASE MANAGEMENT SYSTEM
Avail: NTIS HC A17/MF A01 CSCL 09B

The strategies for managing computer based geometry are described. The computer model of geometry is the basis for communication, manipulation, and analysis of shape information. The research on integrated programs for aerospace-vehicle design (IPAD) focuses on the use of data base management system (DBMS) technology to manage engineering/manufacturing data. The objectives of IPAD is to develop a computer based engineering complex which automates the storage, management, protection, and retrieval of engineering data. In particular, this facility must manage geometry information as well as associated data. The approach taken on the IPAD project to achieve this objective is discussed. Geometry management in current systems and the approach taken in the early IPAD prototypes are examined.

E. A. K.

N84-21446# California Univ., Berkeley. Lawrence Berkeley Lab.
COMPUTER-ASSISTED INFORMATION GRAPHICS FROM THE GRAPHIC DESIGN PERSPECTIVE

Computer-assisted information graphics can benefit by adopting some of the working processes, principles, and areas of concern typical of information-oriented graphic designers. A review of some basic design considerations is followed by a discussion of the creation and design of a prototype nonverbal narrative which combines symbols, charts, maps and diagrams. DOE

N84-21447# Amoco Production Co., Tulsa, Okla. Research Center.
RIM AS AN IMPLEMENTATION TOOL FOR A DISTRIBUTED HETEROGENEOUS DATABASE
Y. J. BREITBART and L. R. HARTWEG In NASA. Langley Research Center IPAD 2: p 155-164 Apr. 1984
Avail: NTIS HC A12/MF A01 CSCL 09B

The another distributed database system (ADDS) prototype supports interactive d hoc retrieval from several of the Amoco/Standard DHDBMS. The ADDS conceptual design, the usage of RIM in several components of ADDS, and some enhancements of RIM that were used by the developers of the ADDS prototype are outlined. Topics covered include: (1) ADDS Overview; (2) composite database dictionary/directory; (3) user interface and user profiles; (4) subrequest execution; (5) merger/formatter; and (6) a portable implementation. DOE

N84-21448# Martin Marietta Aerospace, Denver, Colo.
RIM AS THE DATA BASE MANAGEMENT SYSTEM FOR A MATERIAL PROPERTIES DATA BASE
P. H. KARR and D. J. WILSON In NASA. Langley Research Center IPAD 2: p 165-169 Apr. 1984
Avail: NTIS HC A12/MF A01 CSCL 09B

Relational Information Management (RIM) was selected as the data base management system for a prototype engineering materials data base. The data base provides a central repository for engineering materials property data, which facilitates their control. Numerous RIM capabilities are exploited to satisfy prototype data base requirements. Numerical, text, tabular, and graphical data and references are being stored for five material types. Data retrieval will be accomplished both interactively and through a FORTRAN interface. The experience gained in creating and exercising the prototype will be used in specifying requirements for a production system. DOE

R. O. PLUMMER In NASA. Langley Research Center IPAD 2: p 229-235 Apr. 1984
Avail: NTIS HC A12/MF A01 CSCL 09B

Data structures and data base management systems are common tools employed to deal with the administrative information of a university. An understanding of these topics is needed by a much wider audience, ranging from those interested in computer aided design and manufacturing to those using microcomputers. These tools are becoming increasingly valuable to academic programs as they develop comprehensive computer support
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systems. The wide use of these tools relies upon the relational data model as a foundation. Experience with the use of the IPAD RIMS.0 program is described.

E.A.K.

N84-23139*# Maryland Univ., College Park. Dept. of Computer Science.

MONITORING SOFTWARE DEVELOPMENT THROUGH DYNAMIC VARIABLES

(Contract NSG-5123)

Avail: NTIS HC A15/MF A01 CSCL 09B

Research conducted by the Software Engineering Laboratory (SEL) on the use of dynamic variables as a tool to monitor software development is described. Project independent measures which may be used in a management tool for monitoring software development are identified. Several FORTRAN projects with similar profiles are examined. The staff was experienced in developing these types of projects. The projects developed serve similar functions. Because these projects are similar some underlying relationships exist that are invariant between the projects. These relationships, once well defined, may be used to compare the development of different projects to determine whether they are evolving the same way previous projects in this environment evolved.

Author

N84-23150*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

MANAGERS HANDBOOK FOR SOFTWARE DEVELOPMENT
W. AGRESTI, F. MCGARRY, D. CARD, J. PAGE, V. CHURCH, and R. WERKING Apr. 1984 59 p refs

(NASA-TM-85604; SEL-84-001; NASA 1.15:85604) Avail: NTIS HC A04/MF A01 CSCL 093

Methods and aids for the management of software development projects are presented. The recommendations are based on analyses and experiences with flight dynamics software development. The management aspects of organizing the project, producing a development plan, estimation costs, scheduling, staffing, preparing deliverable documents, using management tools, monitoring the project, conducting reviews, auditing, testing, and certifying are described.

M.A.C.

N84-23294# Air Force Space Div., Los Angeles, Calif.

OFFICE AUTOMATION IN THE ACQUISITION ENVIRONMENT Final Report

(AD-P002747) Avail: NTIS HC A24/MF A01 CSCL 15E

The Defense Meteorological Satellite Program embarked on automating the office functions associated with word processing, data delivery, financial and management information in March, 1981. This paper describes some of the planning, experiences, and lessons learned involved with automating the acquisition environment within the program. This description includes specifying the hardware, software, communications and interfaces involved in tying together not only the program office, but also the contractors, and operating and supporting agencies. Finally, the paper evolves recommendations for future directions in automating the acquisition environment.

Author (GRA)

N84-23295# Air Force Space Div., Los Angeles, Calif.

THE MICROCOMPUTER IN THE ACQUISITION ENVIRONMENT Final Report
M. ECUNG In AF Business Research Management Center Proc. of the Fed. Acquisition Res. Symp. with Theme p 2-4 1983

(AD-P002748) Avail: NTIS HC A24/MF A01 CSCL 15E

Headquarters Space Division in Los Angeles took the initiative in adopting the microcomputer as a viable tool to improve overall operations. After a little better than 18 months there are over 200 terminals on station. Most are split between 4 and 8 user multiprocessor systems. Our primary goal in both microcomputer hardware and software acquisition is to stay away from proprietary products that can lock the user into a particular vendor for systems software and modification. The result of our November 1981 decision was hardware configured around the Z80 microprocessor using the S-100 (IEEE-696) Bus. Standardized user interface was included by specifying a keyboard configuration of NASA’s Jet propulsion Laboratory design with 40 programmable function keys. Eight inch single side, single density floppy disk drives IBM format 3740 were chosen because they represent the one industry wide standard in disk formatting. Though most of this work was done in a Contracting office the conclusions are relevant to all. We feel the experience of our period of experimentation with Office Automation can aid other offices considering taking this course of action. We have had both positive and negative result with our effort, but the overall conclusion is that: (1) micro-computer office automation can not be avoided; and (2) we have only scratched the surface of its applications in the acquisition environment.

Author (GRA)

N84-23296# Army Armament Munitions and Chemical Command, Rock Island, Ill.


(AD-P002749) Avail: NTIS HC A24/MF A01 CSCL 15E

This paper examines the contract simplification effort currently under prototyping development in the services under the Defense Acquisition Improvement Program. This effort has led the author to explore the state of the art of contracting and what changes will have to be made to methods of contracting to keep pace with the commercial marketplace in the next decade. Further, the computer is becoming as common as the telephone in every office. The use of the computer seems to be unlimited, ranging from games to sending electronic mail. This paper provides the author perceives as a step by step advancement needed by the Government in the use of computers to transition from formal paper contracts transported by mail to paperless contracting transmitted via telephone lines or satellite to contractors and between contractor and Government agencies. This paper explains the author's concept of the various elements of paperless contract evolution which must be achieved to allow the release of solicitations via computers, and the eventual award of contracts via computers.

Author (GRA)

N84-23297# Air Force Systems Command, Wright-Patterson AFB, Ohio.

MECHANIZED CONTRACT DOCUMENT PREPARATION AND ABSTRACT SYSTEM Final Report

(AD-P002750) Avail: NTIS HC A24/MF A01 CSCL 15E

We have developed a system that revolutionizes contract document preparation by taking advantage of state-of-the-art technology in combining the functions of word processing (WP) and data processing (DP). This system has been proven effective in reducing document preparation time, in producing a better quality document, and reducing document errors. The system simultaneously captures data to be abstracted and fed into a Management Information System (MIS) ensuring that the contract document and abstracted data in the MIS are identical. Since contract documents are mostly text, the WP capability was most important, yet the abstract of specific information could not be accurately and efficiently captured in WP mode. To streamline the data capture portion of the system for abstracting, WP was needed. Finally, to produce a finished product containing both the text and abstracted data, WP and DP had to be efficiently integrated. Through complex software development, we supplemented the vendor software development, we supplemented the vendor software to build a successful prototype system that is undergoing acceptance testing. The system is still in its infancy, but it has taken great strides in increasing the efficiency of contractual
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document preparation and abstracting. Yet to come is distributed processing of edit and validation routines currently being accomplished on the mainframe computer.  

Author (GRA)

N84-23298#  Air Force Systems Command, Wright-Patterson AFB, Ohio.  

THE ACQUISITION MANAGEMENT INFORMATION SYSTEM: FRIEND OR FOE? Final Report  

(A-D-P002751) Avail: NTIS HC A24/MF A01 CSCL 15E  

AFSC's Acquisition Management Information System (AMIS) is a complex, extensive computer system containing detailed information on over 61,000 contracts. This paper describes the history and development of AMIS, plus recent actions taken by the Directorate of Contract Data Systems to improve system user-friendliness. A survey of field activities revealed several unsatisfied user needs, especially in data input/output. The Distributed Processing for Contractual Input (DPCI) system was designed and programmed to fill some of these needs. The genesis and growth of DPCI is treated, including software design and hardware acquisition. The paper also covers a fundamental change in management philosophy—expanded participation of system users in establishing and prioritizing system development and change. A new AMIS Users Group was established to affect the effective use of AMIS through the interchange of information concerning system design, use, operation and maintenance. More emphasis is also being placed on improving data base accuracy and completeness. Management education has been stressed. The paper explains steps taken in these and other areas and comments on future system changes to further enhance user-friendliness.  

Author (GRA)


COMPUTER GENERATED ACQUISITION DOCUMENT SYSTEM (CGADS) Final Report  

(A-D-P002784) Avail: NTIS HC A24/MF A01 CSCL 15E  

The Computer Generated Acquisition Document System (CGADS) is a computer program written in F77 (version of FORTRAN 77) through which draft Statements of Work (SOW) and Contract Data Requests Lists (CDRL) for weapon systems acquisitions may be created. CGADS was developed by the Electronics Systems Division at Hanscom Air Force Base, Massachusetts, to provide automated assistance to project/procurement officers in the development of acquisition documentation for inclusion in solicitations and Request for Proposals (RFPs). This paper describes the current version of the operational CGADS.  

Author (GRA)

N84-23332#  American Inst. for Research, Bedford, Mass.  

COMPUTER AIDED SOURCE SELECTION (CASS) Final Report  

(A-D-P002785) Avail: NTIS HC A24/MF A01 CSCL 15E  

The source selection process in the Department of Defense is a labor intensive effort which ties-up the management, technical, and administrative resources of acquisition agencies on a continuing basis. The CASS series of prototype computer programs have been developed with the objective of providing automated aids to facilitate the conduct and management of the source selection process. It is anticipated that the following benefits can accrue with the use of CASS by the DoD: Shorten the time required for source-selection decisions; Reduce the manpower supporting proposal evaluations for both the Government and Industry; Improve traceability of evaluation findings to contractor selection; Serve as a training aid to new and inexperienced evaluators; Provide more flexible decision support tools; Reduce the administrative burden of documenting the source-selection; and Facilitate a lessons learned data base.  

Author (GRA)


PROGRAM MANAGER'S SUPPORT SYSTEM (PMSS): AN UPDATE Final Report  

(A-D-P002825) Avail: NTIS HC A24/MF A01 CSCL 05A  

The Defense Systems Acquisition Process is a complicated process requiring the integration of many disciplines and functional areas. The Defense Program Manager (PM), in executing an assigned program within this environment, is faced with many non-routine and unstructured decisions. Although Management Information Systems (MIS) typically are available to the PM and provide information to aid in making these decisions, they predominately support only past and current project status, usually with an abundance, and many times perhaps, an over-abundance of data. A need exists, therefore, to support the PM's decision-making process by looking at future courses of action and displaying the available data into meaningful alternatives. This need is being addressed at the Defense Systems Management College (DSMC) through a research project aimed at applying Decision Support System (DSS) technology to the Defense weapons systems program management environment. This paper describes the resultant Program Manager's Support System (PMSS) effort. It is an update to the PMSS presentation given at the 1982 Federal Acquisition Research Symposium. As such, this paper presents a brief background review, the functional requirements for such a system, the project's current status and future plans, and issues which must be addressed.  

Author (GRA)

N84-23386#  Rolls-Royce Ltd., Derby (England).  

CORPORATE DP PLANNING: NEW APPROACHES AND NEW CONCERNS  
J. H. RUSSEL  12 Jul. 1983 11 p

(PNR-90180; REPRINT-893) Avail: NTIS HC A02/MF A01  

Management of data processing systems development in the aircraft industry is discussed. Software development strategies and user requirements are considered.  

Author (ESA)


PREREQUISITES FOR SCIENTIFIC-TECHNICAL PROGRESS ENUMERATED  

Avail: NTIS HC A05  

The most important trends in scientific and technical development are used as the basis for an examination of problems in the assessment of the scientific and technical potential of national economic sectors and methods of accelerating its growth rate.  

Author


PROBLEMS OF PROMPT ADOPTION OF NEW TECHNOLOGY DISCUSSED  

Avail: NTIS HC A05  

The way of solving many economic problems facing the country lies in activation of scientific research, strengthening the tie between science and production and speeding up introduction of the achievements of science and technology into the national economy. Scientists, ministers and personnel of planning organs know this. But time passes and sometimes a tremendous distance exists to the time of introduction of new developments. Why does that happen? Usually, the ministries in question have a ready answer: either the plan was not reinforced with resources, or the
construction people let it down, or subcontractors failed to deliver materials or equipment on time. At the same time, the State Plan for Economic and Social Development of the USSR whose constituent parts consist of scientific-technical programs is the same for all and its fulfillment is the law of our economy. Deputies of the USSR Supreme Soviet--members of the preparatory commission--discussed this quite specifically. Such organs form permanent commissions of the chambers for analysis of materials presented by ministries and departments.

Author

N84-23406 Maryland Univ., College Park.
STRATEGIES AND MECHANISMS FOR THE DIFFUSION OF SCIENTIFIC AND TECHNICAL INFORMATION: A COMPARATIVE STUDY Ph.D. Thesis
Z. M. P. D. S. FRANCA 1983 174 p
Avail: Univ. Microfilms Order No. DA8402558

Existing strategies and mechanisms for the diffusion of scientific and technical information through an analysis of selected doctoral dissertations are analyzed. The major results of the study were as follows: (1) On the basis of Lewin’s three-phase paradigm for planned change, seven types of information strategy were identified: Delivery, Information Network, Adoption-Diffusion, Decision-making, Direct Foreign Investment, Research, Development and Diffusion, and Social Behavior; (2) A wide variety of mechanisms were noted; (3) Chi-square testing showed that personal mechanisms were significantly more effective than other types of mechanism; (4) A model was constructed which reflected the variation in communication sources and channels as well as the role of social cultural pressures and decision-making functions at all three levels of information dissemination. This model is applied to the communication process between developed nations to end-users in less developed countries.

Dissert. Abstr.

N84-24496# RAND Corp., Santa Monica, Calif.
DESIGNING READABLE AND REUSABLE TABLES
I. S. LOWRY Dec. 1983 84 p refs
(RAND/P-6945; AD-A140127) Avail: NTIS HC A05/MF A01

A practical guide to designing tables for research reports, books, and professional articles is presented. Expositional purposes and devices for achieving them are stressed. The specific applications of tables or figures are outlined. Exemplary tables are provided in the main text along with 50 sample tabular formats in the appendix. A glossary of tabular terms is included.

R.S.F.

N84-25329# Naval Postgraduate School, Monterey, Calif.
A GUIDE TO MACRO AND MICRO COMPUTER PERFORMANCE EVALUATION M.S. Thesis
G. K. GRAY Dec. 1983 125 p
(AD-A140127) Avail: NTIS HC A06/MF A01 CSCL 09B

Guidelines and discussions are presented for computer performance evaluation at two levels. The first level, Computer Performance Management (CPM) or Macro Performance Evaluation, involves an overall computer performance management strategy concerning the use of computer resources. The role of CPM throughout the computer system life-cycle is also discussed. The second level of computer performance involves Computer Performance Evaluation (COPE) or Micro Performance Evaluation. A brief discussion of CPE tools is given, as well as how to select a performance monitor. Some computer performance fallacies are revealed and a discussion of the determination of ‘critical sections’ of software systems and program tuning practices for improving system performance is presented. Limited discussion is devoted to performance issues in relatively new areas in the computer field such as networks, data base management systems and microcomputers.

Author (GRA)

N84-25331# National Bureau of Standards, Washington, D.C.
INST. FOR COMPUTER SCIENCES AND TECHNOLOGY.
COMPUTER SCIENCE AND TECHNOLOGY: SELECTION OF MICROCOMPUTER SYSTEMS Final Report
J. BARKLEY, D. GILBERT, and A. HANKINSON Mar. 1984 34 p refs
(PB84-167725; NBS-SP-500-112; LC-84-801010) Avail: NTIS HC A03/MF A01 CSCL 09B

This document is chiefly aimed at providing assistance to non-technical users in evaluating the applicability of microcomputer-based systems in addressing their needs and choosing appropriate systems. However, technical users providing related support to their organizations should also find the material useful. Similarity, while focused for Federal users of administrative/management applications, there is general applicability to other environments.

GRA

SOFTWARE COST ESTIMATION WORKSHOP REPORT Final Report
(Contract F19628-84-C-0001; AF PROJ. 6810) (AD-A139840; MTR-9165; ESD-TR-84-150) Avail: NTIS HC A03/MF A01 CSCL 09B

The Software Cost Estimation (SCE) Workshop was held September 13-15, 1983 at The MITRE Corporation in Bedford, Mass., sponsored by the Electronic Systems Division of the U.S. Air Force and the Rome Air Development Center, Rome, N.Y. Government and industry experts addressed the topics: Cost Effective Software Data Collection on Defense Programs; Integrating SCE with Program Management; Organization and Performance of SCE; and New Directions in SCE. This report contains a summary of each group’s discussions and findings, together with a list of recommendations. The views expressed at the workshop and reported in this document are those of the participants and should not be interpreted as official positions of the government agencies, corporate entities, academic institutions or other organizations with which the individual participants are affiliated.

GRA

N84-25367# California Univ., Livermore. Lawrence Livermore Lab.
SPECIAL OR GENERAL PURPOSE END-TO-END TRANSPORT MECHANISMS IN DISTRIBUTED SYSTEMS: ONE VIEW
(Contract W-7405-ENG-48) (DE84-008297; UCRL-89755; CONF-8405126-1) Avail: NTIS HC A02/MF A01

There is increasing interest in the design of special purpose end to end transport mechanisms for use in distributed systems. The special purpose designs try to minimize the mechanisms needed to match the error and other service properties of specific networks with the services required by application and communication interface semantics. General-purpose transport protocol designs and implementations can be effective in a wide range of distributed applications because: (1) many of the mechanisms and implementation techniques used in the special purpose work apply to general purpose transport protocol designs and implementations; (2) special purpose designs have hidden costs; and (3) quite a number of the overall system loads, application response times, and other service properties are required before the cost of the special purpose protocols are the main performance bottlenecks.

M.A.C.
COMPUTERS AND INFORMATION MANAGEMENT

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N84-25512# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil)
SIRIUS: BIBLIOGRAPHIC SEARCH AND RETRIEVAL SYSTEM [SIRIUS: SISTEMA DE PESQUISA E RECUPERAÇAO BIBLIOGRÁFICA]
An on-line system developed and implemented at INPE may be accessed to obtain bibliographic data through the arguments such as author, title, descriptor and series; as well as to obtain up-dated circulation information about a certain material and/or user. The query language is constructed of the following commands: MOSTRE: lists the arguments with the same radical; DEFINA: creates and combines sets of references; VERIFIQUE: lists and/or removes references of a set;IMPRIMA: prints a set; NOMES: furnishes the relation of the defined sets; USUARIO: states the present situation of a user in relation to loads and reservations; MATERIAL: informs the availability of some material for load; SOS: helps the user to handle the query language. This bibliographic retrieval system that was developed for the B 6800 Burroughs can be adapted to other computers. Author (GRA)

N84-25522# California Univ., Berkeley. Lawrence Berkeley Lab.
PROCEEDINGS OF THE 2ND INTERNATIONAL WORKSHOP ON STATISTICAL DATABASE MANAGEMENT
The purpose of this workshop is to bring together statisticians and computer scientists, statistical database system users and system builders, to exchange ideas on statistical data base management, statistical analysis, and the present recognized problems that current data management and statistical software do not fully address. The proceedings are published prior to the Workshop so that they can: (1) report research results and work in progress; (2) provide an intellectual introduction to most of the workshop participants; (3) provide a point of departure for working group discussions. DOE

UNIVERSAL DOCUMENTATION SYSTEM HANDBOOK - AN INTRODUCTION TO THE UNIVERSAL DOCUMENTATION SYSTEM
1984 15 p (AD-A140140; RCC/DOG-501-84) Avail: NTIS HC A02/MF A01 CSCL 05A
The Range Commanders Council (RCC) Documentation Group has developed a Universal Documentation System (UDS) for the purpose of creating better communications between interacting agencies. The UDS endeavors to standardize the efforts of all agencies who seek support in conducting operations on the various ranges. The following graphic illustrations have been prepared for the purpose of familiarizing potential range users with the UDS, which has been published as RCC Document 401. An overview of the system, including descriptions of the various levels of documentation, system flexibility/options and general user guidelines has been included. The UDS is a comprehensive tool which can be used by all. Author (GRA)

N84-26317# Mitre Corp., McLean, Va.
GUIDELINES FOR DEVELOPING NASA (NATIONAL AERONAUTICS AND SPACE ADMINISTRATION) ADP SECURITY RISK MANAGEMENT PLANS Final Report
This report presents guidance to NASA Computer security officials for developing ADP security risk management plans. The six components of the risk management process are identified and discussed. Guidance is presented on how to manage security risks that have been identified during a risk analysis performed at a data processing facility or during the security evaluation of an application system. GRA

N84-26318# Mitre Corp., McLean, Va.
GUIDELINES FOR DEVELOPMENT OF NASA (NATIONAL AERONAUTICS AND SPACE ADMINISTRATION) COMPUTER SECURITY TRAINING PROGRAMS Final Report
The report presents guidance for the NASA Computer Security Program Manager and the NASA Center Computer Security Officials as they develop training requirements and implement computer security training programs. NASA audiences are categorized based on the computer security knowledge required to accomplish identified job functions. Training requirements, in terms of training subject areas, are presented for both computer security program management personnel and computer resource providers and users. Sources of computer security training are identified. Author (GRA)

N84-26471# Clemson Univ., S.C.
UNIFIED DATABASE DEVELOPMENT PROGRAM Final Report
The objective of the unified database (UDB) program was to develop an automated system that would be useful to those responsible for the design, development, testing, and support of Air Force aircraft weapon systems. Primary emphasis was on development of an historical logistics data repository system to provide convenient and timely access to relevant information about existing aircraft weapon systems, development of a fully automated logistics support analysis record system that would satisfy current Air Force and Department of Defense requirements, and develop the overall UDB system to function as a closed-loop system for use throughout the life of a weapon system. This report summarizes the accomplishments of the UDB program to data and describes the major features and capabilities of the UDB system. GRA

N84-28473# Rochester Univ., N. Y. Dept. of Computer Science.
THE ROE FILE SYSTEM
ROE is a network-wide file system being developed for a heterogeneous local network. The system has been designed for two purposes: to serve as a testbed for experimenting with various policies for file migration and distribution strategies and to provide users with a logically coherent file system that takes advantage of distributed and diverse resources. The system is a synthesis of solutions to the problems of ensuring consistency of replicated data, allowing transparent reconfiguration, and providing adequate file accessibility. This report describes what has been accomplished
Database management techniques cope with data transfer. Interactive interrogating of a centralized database, and interactive graphics are applied in the analysis and presentation functions. The system is called the Engineering Data Interactive Presentation and Analysis System. 

N84-27491# National Bureau of Standards, Washington, D.C. 
COMPARING SOFTWARE DEVELOPMENT METHODOLOGIES FOR ADA (TRADE NAME): A STUDY PLAN Final Report 
P. FREEMAN, A. I. WASSERMAN (California Univ., Irvine), and R. C. HOUGHTON, JR., ed. Mar. 1984 38 p 
(PB84-178029; NBSIR-84-2827) Avail: NTIS HC A03/MF A01 CSCL 09B 
A study plan is presented that concentrates on the impact of alternative development methodologies on the maintainability of Ada code. The basic elements of the study include: (1) experts in each of several methods create Ada implementation for a specific problem, (2) each implementation is modified by each of several maintenance terms, and (3) the impact of the methodology on the maintainability of the resulting Ada coded systems is evaluated and reported. 

Author (ESA)

N84-27476# SoHaR, Inc., Los Angeles, Calif. 
MICROCOMPUTERS: INTRODUCTION TO FEATURES AND USES Final Report 
(Contract NBB255-E-4-P-0004) 
(PB84-178821; NBS-SP-500-110; LC-84-601005) Avail: NTIS HC A07/MF A01 CSCL 09B 
Microcomputers and their uses in the Federal government are examined. Basic concepts in microcomputers are discussed, and their uses by clerical, administrative, professional, and technical Federal personnel are described. The motivations costs, and risks of microcomputer use are identified, and recommendations for successful implementations are provided. Appendices contain a glossary and annotated bibliography. 

Author (GRA)
N84-28672# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. Dept. of Computer Science.

APPLICATIONS PROGRAMS TO FACILITATE USE OF A DBMS TO STORE AND RETRIEVE GRAPHICS DISPLAYS (INGRED 2)

M.S. Thesis
J. D. GATEWOOD Dec. 1983 240 p refs
(AD-A139059; AFIT/GCS/EE/83D-10) Avail: NTIS HC A11/MF A01 CSCL 09B

This paper briefly presents the design of a distributed relational database system that is intended for use with the Defense Directives and Instructions. Its purpose is to aid in-house, contractor, or grantee reports according to the Defense Directives and Instructions. The authors discuss experimental details and comparisons are made using constant, inflated and discounted dollars for three cases: (1) present (no automation), (2) lease and (3) purchase.

Author (GRA)


This report documents the results of an analysis of costs and benefits which are expected to accrue to the Rome Air Development Center (RADC) through the acquisition and implementation of the local office automation system. The report has two major parts: (1) Volume 1 - the LONEX Cost/Benefits Study which describes the major findings and (2) Volume 2 - Appendix C. Cost Benefits Analysis - A comparative cost analysis is presented in accordance with AFSC regulations and guidelines. The ground rules and assumptions underlying the analysis are detailed and comparisons are made using constant, inflated and discounted dollars for three cases: (1) present (no automation), (2) lease and (3) purchase.

Author (GRA)

N84-29459# California Univ., Berkeley. Dept. of Electrical Engineering and Computer.

R. S. FABRY and C. SEQUIN 30 Sep. 1983 172 p
(Contract N00039-82-C-0235; ARPA ORDER 4031)
(AD-A142177) Avail: NTIS HC A08/MF A01 CSCL 09B

This paper briefly presents the design of a distributed relational data base system. Then, the authors discuss experimental observations of the performance of that system executing both short and long commands. Conclusions are also drawn concerning metrics that distribute query processing heuristics should attempt to minimize. Lastly, they comment on architectures which appear viable for distributed data base applications.

Author (GRA)
the costs of preparing, storing, retrieving, reproducing, and distribution of reports; and to aid the interchange of scientific and technical information with the research and development community.

Author (GRA)
APPROPRIATE TECHNOLOGY MANAGEMENT INFORMATION SYSTEM

Feb. 1984 763 p
(Contract DE-AC01-82CE-15095)
(DEA-010956, DOE/CE-15095/14) Avail: NTIS HC A99/MF A01

Grants were given in the full range of technology areas which included conservation, solar, biomass, wind, geothermal, and hydro power. The final report from each DOE grantee was reviewed to extract information about new ideas and proven concepts that could be of value to the public. The appropriate technology management information system (ATMIS), a computer data base, was developed to manage the growing wealth of information from the grant reports, and to monitor the report review process. The ATMIS classifies data into numerous categories (technology area, geographic location, project status, etc.). This manual which was generated directly from the data base is presented.

THE OPTICAL COINCIDENCE INFORMATION RETRIEVAL SYSTEM (OCIR)

(MP6-E-66-84-10) Avail: NTIS HC A02/MF A01

The Optical Coincidence Information Retrieval System (OCIR), based on an inverted thesaurus (going from specific to general terms in an unhierarchical manner) is described. The hardware in its first stage is based upon a (mechanical) Optical Coincidence Card System which can be implemented in any nonindustrialized country. In its second stage it is implemented on a personal computer. In a third stage it can be supplemented by large computers having free text search capabilities. The OCIR concept allows the generation of many fairly small decentralized and autonomous information systems which might be linked through or into an information center.

SOFTWARE CONTROL AND SYSTEM CONFIGURATION MANAGEMENT: A SYSTEMS-WIDE APPROACH

(NASA-TM-85908; H-1256; NAS 1.15:85908) Avail: NTIS HC A02/MF A01 CSCL 01C

A comprehensive software control and system configuration management process for flight-critical digital control systems of advanced aircraft has been developed and refined to insure efficient flight system development and safe flight operations. Because of the highly complex interactions among the hardware, software, and system elements of state-of-the-art digital flight control system designs, a systems-wide approach to configuration control and management has been used. Specific procedures are implemented to govern discrepancy reporting and reconciliation, software and hardware change control, systems verification and validation testing, and formal documentation requirements. An active and knowledgeable configuration control board reviews and approves all flight system configuration modifications and requalification tests. This flexible process has proved effective during the development and flight testing of several research aircraft and remotely piloted research vehicles with digital flight control systems that ranged from relatively simple to highly complex, integrated mechanizations.

THE EVOLUTION OF THE JOVIAL/J73 LANGUAGE FROM DEFINITION TO USE

J. T. PEPE In ASD Proc. Papers of the 2nd AFSC Avionics Standardization Conf., Vol. 1 p 3-8 Nov. 1982
(AD-P003518) Avail: NTIS HC A25/MF A01 CSCL 09B

The development of a standard programming language is a multi-year effort involving many phases of activity starting with language requirements analysis, leading to language definition, production compilers and programming utilities, and then configuration management of the support software and documentation. After a study of the requirements for a standard Air Force high order language, the JOVIAL/J73 language was defined by MIL-STD-1589A (later superseded by MIL-STD-1589B). Several years of compiler development has resulted in JOVIAL/J73 compilers hosted on three mainframe computers and targeted to several embedded architectures. Because of an embedded computer's limited resources considerable effort has been devoted to compiled object code optimization. The Air Force has sponsored the development of the JOVIAL Compiler Validation System for validating JOVIAL compilers and JOVIAL programming utilities to assist programmers in writing and debugging JOVIAL code. The Language Control Facility has been established to control the definition of JOVIAL/J73, validate compilers and provide support for JOVIAL programmers.

AN INTEGRATED APPROACH TO A SUCCESSFUL EMBEDDED COMPUTER RESOURCE PROJECT

(AD-P003574) Avail: NTIS HC A25/MF A01 CSCL 09B

This paper describes a number of key milestones and techniques that should be accomplished in order to produce cost effective, embedded computing systems. It stresses the necessity of improved project management to effect an integrated hardware/software system. Improved project management requires a thorough understanding and implementation of the DOD/MIL standards and specifications. If Program Project Managers from both the government and contractor are knowledgeable in, and motivated to follow, the approved standards/ specifications, embedded computer resources, i.e., equipment, computer programs, personnel, facilities, and logical, will be provided at lower costs and per the requirements allocated to each resource. The paper will emphasize the need for systems engineering, work breakdown structures, the systems development process, documentation milestones, DT&E for hardware/software, and integration leading to system stones, DT&E for hardware/software, and integration leading to system certification. This can only be effective via standards compliance.

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the same framework, (4) Provision of a coherent set of tools to connect all elements of the data base for development, control, and management purposes.

Author (GRA)

N84-32255#  AAI Corp., Cockeyeville, Md.

SOFTWARE PROGRESS TRACKING SYSTEM


(A-D-P003488) Avail: NTIS HC A17/MF A01 CSCL 09B

An automated software progress tracking system which uses an earned point scheme has been successfully used to monitor software development on several large simulator programs. Points are assigned for each step in the software development cycle on a per element basis. The steps are hard milestones in which a generated product is accepted by program management. As the products are accepted the associated points are earned. The ratio of earned points to total possible points is compiled on an element, functional area, or total software system basis to determine progress achieved. A report generator program usually resident on the simulator computational system, tabulates the data in a variety of management reports. The system as implemented is flexible, highly automated, and is closely coupled to configuration management systems and software quality assurance procedures in order to ensure validity of data. The accumulated point values are quickly ascertained, objective, and based on the point values provide an accurate measure of progress, deviation from schedule, and prediction of future progress.

Author (GRA)


DEPARTMENT OF ENERGY'S ACTIVITIES TO LIMIT DISTRIBUTION OF CERTAIN UNCLASSIFIED SCIENTIFIC AND TECHNICAL INFORMATION

30 Mar. 1984  28 p

(P-84-189158; B8212184; GAO/RCED-84-129) Avail: NTIS HC A03/MF A01 CSCL 05B

The Department of Energy is a major publisher of unclassified scientific and technical information. The Technical Information Center, the Department's repository, sends most of its unclassified information to the National Technical Information Service, which sells it to the public. However, some of the information is limited to distribution within the federal government because it involves nuclear safety matters; securing foreign research results; or protecting patentable, proprietary, and other information. This report describes the Department's procedures and controls for determining, distributing, and accessing unclassified information that is not made available to the public.

Author (GRA)

N84-33057#  National Bureau of Standards, Washington, D.C.

I/O CHANNEL INTERFACE

29 Jul. 1983  117 p refs

(NBS-FIPS-PUB-60-2) Avail: NTIS HC A06/MF A01

The functional, electrical, and mechanical interface specifications for connecting computer peripheral equipment as a part of automatic data processing (ADP) systems are defined. This standard, and a companion standard for power control, defines the hardware characteristics for the I/O channel level interface. Device class specific operational specifications standards are also required for each class of peripheral device to achieve full plug-to-plug interchangeability of peripheral components. These operational specifications standard will be proposed as Federal Information Processing Standards to accompany this standard as they are developed. The employment of this I/O Channel Interface standard is to reduce the cost of data processing requirements through increasing its available alternative sources of supply for computer system components at the time of initial system acquisition in system replacement and augmentation and in system component replacement. This standard is expected to lead to improved reutilization of system components.

E.A.K.
A STUDY OF THE EXTENT OF AUTOMATION IN SMALL COLLEGE LIBRARIES AND RELATIONSHIPS OF ATTITUDES OF LIBRARY DIRECTORS TOWARD IT Ph.D. Thesis
L. W. YOTHER 1984 147 p
Avail: Univ. Microfilms Order No. DA8410827

Library automation in small college libraries is a relatively new application for computers. Little has been known about the extent of library automation already in place, the attitudes of library directors toward it, or the relationships of these attitudes to the extent of automation in libraries. This has been especially true for small academic libraries with fewer than 100,000 volumes. This study surveyed a random national sample of 175 such libraries to determine the extent of automation in place, the attitudes of library directors toward automation in general, and the relationships of these attitudes and selected variables to the extent of automation in small libraries. The data on extent of automation were subjected to analysis of variance and stepwise multiple regression, to determine the relationship between the degree of library automation and size of collection, institutional control, background of directors and staff members, and attitudes toward library automation held by library directors. A .05 level of significance was applied to all resulting values.
Dissert. Abstr.

N84-33260*#$ National Aeronautics and Space Administration, Washington, D. C.
NASA ADMINISTRATIVE DATA BASE MANAGEMENT SYSTEMS, 1984

Strategies for converting to a data base management system (DBMS) and the implementation of the software packages necessary are discussed. Experiences with DBMS at various NASA centers are related including Langley's ADABAS/NATURAL and the NEMS subsystem of the NASA metrology information system. The value of the integrated workstation with a personal computer is explored.

N84-33268*#$ National Aeronautics and Space Administration, Washington, D. C.
EFFECTIVE ORGANIZATIONAL SOLUTIONS FOR IMPLEMENTATION OF DBMS SOFTWARE PACKAGES
Avail: NTIS HC A07/7 MF A01 CSCL 05B

The space telescope management information system development effort is a guideline for discussing effective organizational solutions used in implementing DBMS software. Focus is on the importance of strategic planning. The value of constructing an information system architecture to conform to the organization's managerial needs, the need for a senior decision maker, dealing with shifting user requirements, and the establishment of a reliable working relationship with the DBMS vendor are examined. Requirements for a schedule to demonstrate progress against a defined timeline and the importance of continued monitoring for production software control, production data control, and software enhancements are also discussed.
A.R.H.

N84-33269*#$ National Aeronautics and Space Administration, Goddard Space Flight Center, Greenbelt, Md.
ADMINISTRATIVE AUTOMATION IN A SCIENTIFIC ENVIRONMENT
Avail: NTIS HC A07/7 MF A01 CSCL 05B

Although the scientific personnel at GSFC were advanced in the development and use of hardware and software for scientific applications, resistance to the use of automation or purchase of terminals, software and services, specifically for administrative functions was widespread. The approach used to address problems and constraints and plans for administrative automation within the Space and Earth Sciences Directorate are delineated. Accomplishments thus far include reduction of paperwork and manual efforts; improved communications through telemail and committees; additional support staff; increased awareness at all levels on ergonomic concerns and the need for training; better equipment; improved ADP skills through experience; management commitment; and an overall strategy for automating.
A.R.H.

N84-33270*#$ National Aeronautics and Space Administration. John F. Kennedy Space Center, Cocoa Beach, Fla.
THE ADMINISTRATIVE WINDOW INTO THE INTEGRATED DBMS
Avail: NTIS HC A07/7 MF A01 CSCL 05B

A good office automation system manned by a team of facilitators seeking opportunities to serve end users could go a long way toward defining a DBMS that serves management. The problems of DBMS organization, alternative approaches to solving some of the major problems, problems that may have no solution, and how office automation fits into the development of the manager's management information system are discussed.
A.R.H.

N84-33271*#$ National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
A USER VIEW OF OFFICE AUTOMATION OR THE INTEGRATED WORKSTATION
Avail: NTIS HC A07/7 MF A01 CSCL 05B

Central data bases are useful only if they are kept up to date and easily accessible in an interactive (query) mode rather than in monthly reports that may be out of date and must be searched by hand. The concepts of automatic data capture, data base management and query languages require good communications and readily available work stations to be useful. The minimal necessary work station is a personal computer which can be an important office tool if connected to other office machines and properly integrated into an office system. It has a great deal of flexibility and can often be tailored to suit the tastes, work habits and requirements of the user. Unlike dumb terminals, there is less tendency to saturate a central computer, since its free standing capabilities are available after down loading a selection of data. The PC also permits the sharing of many other facilities, like larger computing power, sophisticated graphic programs, laser printers and communications. It can provide rapid access to common data bases able to provide more up to date information than printed reports. Portable computers can access the same familiar office facilities from anywhere in the world where a telephone connection can be made.
A.R.H.

N84-33284#$ RAND Corp., Santa Monica, Calif.
INTERACTIVE INFORMATION ENVIRONMENTS: A PLAN FOR ENABLING INTERDISCIPLINARY RESEARCH
L. R. TALBERT, T. K. BIKSON, and N. Z. SHAPO In its RAND/N-2115 Apr. 1984 76 p refs
Avail: RAND/N-2115

The implementation of information technology in organizational settings is examined. Research plans and problems are discussed along with the preliminary procedures and hypotheses. An organizational structure is also provided.
M.A.C.

N84-33356#$ Massachusetts Inst. of Tech., Cambridge.
COMMUNICATION NETWORKS
Avail: NTIS HC A12/7 MF A01

A research program to determine and demonstrate the principles to be followed in the design of local communication networks as typified by local area networks, private branch exchanges and integrated collections of such structures is planned. Two fundamental assumptions distinguish the research from much of
the ongoing work: (1) a single integrated system is to provide a set of highly diverse communication services such as interactive terminal service, data base access, file transfers, graphics, and voice and video; and (2) a single mode optical fiber links with very wide bandwidth economical. These assumptions are not satisfied by the networks now being designed, but based upon the perceived trend toward such integrated diverse services and the declining cost of single mode fiber technology. It is planned for the research to involve theoretical, experimental, and design activities. 

Author


The administrative data processing systems at Sandia Laboratories are divided into common systems, people systems, property systems, procurement systems, and financial systems. The common systems consist of a data dictionary/directory system, which captures data field descriptions, common data input and retrieval systems, and the accounting title master system, the central authority for the accounting title master system. The people systems support personnel activities at Sandia. The property systems support property, material, inventory, documents, and records. Descriptions of property control, property accounting, property inventory control system, classified material accountability, classified document accountability, and others, are included. Procurement systems support procurement activity, including production of hard copy, summarized data, and procurement reports. Financial systems include payroll, employee accounts, financial modeling, budget, and others. S.B.

N84-34316# Air Command and Staff Coll., Maxwell AFB, Ala. MANAGING MICROCOMPUTERS: A SURVIVAL KIT FOR FUNCTIONAL MANAGERS E. C. IVERSTINE Apr. 1984 20 p (AD-A144006; AD-E751074; ACSC-84-1345) Avail: NTIS HC A02/MF A01 CSCL 05A 

Military and civilian use of microcomputers has expanded at a phenomenal rate. Their popularity stems from the fact that they now must manage their computational tools (microcomputers) as well as their work units. This article defines the microcomputer management environment facing functional managers and outlines some principles for meeting this challenge. Author (GRA)

N84-34321*# National Aeronautics and Space Administration, Washington, D. C. MASTER LIST AND INDEX TO NASA DIRECTIVES 1 Aug. 1984 81 p (NASA-TM-87362; NGB-1410.4J; NAS 1.15:87362) Avail: NTIS HC A05/MF A01 CSCL 05B 

All NASA management directives in force as of August 1, 1984 are listed by major subject headings showing number, effective date, title, responsible office, and distribution code. Delegations of authority in print and by that date are listed numerically as well as by the installation or office to which special authority is assigned. Other consolidated lists show all management handbooks, directives applicable to the Jet Propulsion Laboratory. The people systems, directories published in the Code of Federal Regulations, complementary manuals, and NASA safety standards. Distribution policies and instructions for ordering directives are included. A.R.H.

N84-34323# Naval Postgraduate School, Monterey, Calif. THE SIMULATION OF A MAJOR AUTOMATED INFORMATION SYSTEM (AIS) ON A MICROCOMPUTER M.S. Thesis K. V. LOCKETT and M. E. ONEIL Mar. 1984 188 p (AD-A143598) Avail: NTIS HC A05/MF A01 CSCL 09B 

The objective of this thesis is to determine if a mainframe Computer Automated Information System can be simulated on a conventional microcomputer. To this end, the topical areas of software, hardware, the simulation development lifecycle, and systems testing and evaluation are explored in-depth. The purpose of this in-depth subject area examination is to demonstrate the tradeoffs and decision points encountered in the systems management lifecycle. Recommendations based upon these tradeoffs and decisions are then presented. Lastly, the conclusions address the attainment of the thesis objective. Author (GRA)


This thesis discusses the design and development of a central database on a network of microcomputers. It provides an overview of the methodology utilized in creating the system, along with the problems associated with a central database. The thesis includes the source listings for the creation of the system and a discussion of the difficulties of controlling contention within the networked database environment. Author (GRA)


This thesis has identified the primary regulatory and administrative requirements related to the acquisition of major automated information systems (AIS). In addition, case analysis was performed on current ADP projects to evaluate the application of acquisition directives to obtain pertinent cost data for model development. A baseline model was created from available data using the Interactive Financial Planning System (IFPS). This model delineates the cost elements germane to the approval and acquisition phases of the life cycle management process. This concluded the initial phase of an effort towards a comparison of government and private sector acquisition processes. Further analysis of these acquisition processes is recommended for continued model refinement, including decision support system applications. Author (GRA)

06 RESEARCH AND DEVELOPMENT


The organizations required for a large space project are discussed, along with several of the tasks involved. A large space project is affected by its international effects, the necessary technical interfaces, the environments in the various countries manufacturing subsystems, and political and industrial limitations.
The Telecom I project is cited as an example of a goal with international implications. The participants were the client, the project manager, the industries involved, the work managers, the subcontractors, and the equipment suppliers. It was found that the organization was not amenable to technical hierarchies, and a matrix organization functioned instead. A project head was appointed and mandated to maintain a management structure to administer the work. The project leader coordinated the individual subprograms and reported directly to the governing agency. Simultaneously, a ground station network was established for tracking and controlling the satellite, as well as transmitting signals and receiving data. The human interactions on an organization level were affected by the location of authority, the dynamism of the organization, the relations between the people involved, the management actions, and the experience of the participants.

A84-15304
THE CONTRACT [LE CONTRAT]

Features of contracts, negotiations, and other considerations which are germane to the realization of large space projects are described. The justifications, specifications, consultations, selection of suppliers, and negotiating considerations for contracts are outlined. Three types of contracts are used: fixed price, controlled expenses, and incentive contracts with penalty clauses for delays. The contracts must take account of interest, carry a bill of particulars, detail the costs, cite administrative fees and assign duties, and identify suppliers. Price sampling techniques are detailed in terms of units of account, and attention is given to methods of modifying contracts in order to meet new or reformulated requirements, particularly those due to unanticipated cost increases for supplies.

A84-15305
THE PROGRESSION OF PROJECTS [LE DEROULEMENT DES PROJETS]

Milestones and managerial actions which are necessary during various specified phases of a large space project are explored. The space projects are organized by phases to coordinate dispersed work, reduce risk, and for economic purposes such as selecting areas needing the greatest attention. The phases include mission analysis, feasibility analysis, design, manufacture, production, and use. NASA avoids following the phases rigorously in order to maintain flexibility during development. Industrial feedback is required during the different phases, as is constant monitoring of developments carried out in other countries. Reviews are performed at each phase to maintain coherence in the work and assure that the goals are being met or suitably modified. The reviews cover all aspects of the projects.

A84-15306
MANAGEMENT OF A SPACE PROJECT [LA CONDUITE D’UN PROJET SPATIAL]

Management techniques and organization proven in the development of the Ariane launcher, the SPOT satellite, and the DBS satellite for France are outlined. It is necessary for management to be interfaced with the technical difficulties encountered in the progress of the project and to be able to modify the work schedule and budget accordingly. The end goal of most space projects is a product which will be launched into space and will no longer be available for physical modification once in use. Each project takes from 4-7 years to complete, and must be accomplished from as diverse means as possible to assure success, while simultaneously being broken down into various subprograms in order to progress on the entire system. The framework devised for the project therefore is crucial to realization of the finished product. Attention is also necessary for political, commercial, budgetary, and temporal factors. Techniques used to cut up the development of the Ariane launch vehicle into subprograms are detailed.

A84-15324
THE MANAGEMENT OF LARGE PROJECTS - CASE STUDY: ARIANE [LA GESTION DES GRANDS PROJETS - ETUDE DE CAS: ARIANE]

The history and management structure of the Ariane development program are reviewed. The initiation of the project in 1973, the original objectives, and the overall organizational structure are considered, and the development plan is shown to be based on a compromise between the need to delay tests of an assembly until its components are matured and the need to incorporate integration-testing results into the final subassembly design. The plans for stage development, equipment-bay design and testing, system tests, and flight tests are summarized, and the configuration choices are defined. The management specifications included in all contracts to maximize communication, visibility, and coordination among the ten nations and more than 40 firms participating in the Ariane project are characterized, including those on industrial organization, the work-breakdown structure, configuration management, quality and reliability, continual project control, documentation, and contractual framework. The further development from Ariane 1 to Ariane 2-3 and the plans for Ariane 4 are surveyed. Block diagrams of the management structure are provided.

A84-15325

The management techniques applied by ESA in the Spacelab (SL) development program are reviewed critically. The history, objectives, and contractual responsibilities of ESA and NASA are summarized, and the SL modules to be supplied by ESA are characterized. The management structure is presented, with discussion of the roles of ESA and industry, the phases of the program, the principal reviews, documentation, verification, ongoing control of specifications, quality control and security, cost control and the evolution of the budget, the geographical distribution of the contracts, delay control, and configuration management. Block diagrams, sample worksheets, graphs, and maps are provided. The problems of the SL program are seen as primarily technical, associated with an insufficient initial technical base, overly diffuse management control, substantial modifications during development, and contractual and economic difficulties arising from the technical problems. It is shown that the management techniques adopted during the second half of the program limited the cost overrun to 40 percent of the original budget and ensured the successful fulfillment of the technical objectives.
The overall management of R&D activity within a company is examined in terms of contrasts between more and less successful firms. An R&D department is characterized as operating with a higher degree of uncertainty, at least as perceived by the management. A problem exists in integrating the R&D activities within the rest of the firm, a situation that may be achieved by setting long-range goals for the department. The inputs to the R&D department have been proven to be most successful if originating from marketing. It is assumed, though, that the success of R&D will ultimately depend on the quality of the management throughout the firm. A questionnaire circulated among 68 companies with significant R&D expenditures demonstrated that R&D must become a centralized unit as a company grows. A scientific discipline orientation was more successful than a project orientation. It is necessary for R&D management to play a role in shaping the company goals. The percentage of total revenue devoted to R&D grew with the size of the more successful companies, which also had manufacturing management participate during on-going R&D.

M.S.K.

**A84-22854**

**PROJECT MANAGEMENT IN THE '80S**


The importance of project management for industry and government, the development of modern project management techniques, and predicted trends for the decade are considered. A list of recommended subjects for a training program in project management is presented.

C.D.

**A84-23988**

**THE OCCUPATIONAL INTERESTS OF R&D MANAGERS AND TECHNICAL SPECIALISTS - SOME PRELIMINARY FINDINGS**

R. E. HILL, P. F. ROSELLE (Michigan, University, Ann Arbor, MI), and M. T. TINKHAM (Evansville, University, Evansville, IN). IEEE Transactions on Engineering Management (ISSN 0018-9391), vol. EM-31, Feb. 1984, p. 12-17.

This study compared the occupational interest patterns of technical specialists and R&D Managers. The hypothesis was that R&D managers would be similar to technical specialists in the scientific/engineering domain, but exhibit comparatively higher levels in the management/organizational interest domain. The findings supported the hypothesis and indicated R&D managers reflect a psychological functioning which simultaneously incorporates the conflict between managerial and scientific motives. This was discussed in terms of increasing the effective utilization of technical personnel, and also in terms of specialized career development applications.

**A84-31214**

**NEEDS ASSESSMENT FOR SUPPORT UNITS IN AN R & D ORGANIZATION**


The relationship between support units and projects groups in R&D organizations has been neglected. This article reports a study of the role and mission of an electronic fabrication support unit among project users and other relevant management personnel of a major national laboratory. The inability to be cost efficient for both prototype development and low-cost volume-fabrication projects resulted in criticism, dissatisfaction, and poor image of the supporting unit in this organization. Given the difficulty in controlling allocated costs, the supporting unit may improve its image by differentiating the demands through separate organizations, cost policies, and integration mechanisms.

**A84-35922**

**METHODS AND OPERATIONAL MEANS FOR PROJECT MANAGEMENT [METHODEN UND ARBEITSMITTEL FUR DAS PROJEKTMANAGEMENT]**


The economical-political situation of today leads to problems which can only be solved with the aid of technical systems of growing complexity. Risks related to the implementation and the utilization of such systems are increasing, and it becomes often very difficult to recognize aspects and relations concerning the technical system and its operation. For these reasons, the concepts and operational procedures of systems engineering become increasingly vital for the execution of the tasks of project management in connection with the implementation of such systems. The present investigation provides a description of the various methods and operational approaches which are now available to project management. Attention is given to the importance of the correct definition of the objectives of a project, the structuralization of the project, approaches for dealing with risks, aspects of configurational control, quality assurance, the employment of technical standards, legal relations, scheduling, and cost control.

G.R.

**A84-42620**

**'REVERSE' TRANSFERS OF TECHNOLOGY FROM OVERSEAS SUBSIDIARIES TO AMERICAN FIRMS**


Although U.S. firms perform about 10 percent of their R and D overseas, very little is known about the transfer of technology and overseas subsidiaries to their U.S. parents. This paper presents the results of what seems to be the first systematic study of the extent, growth, nature, and effect of such 'reverse' technology transfer. The results, based on detailed data regarding 29 overseas laboratories (which account for about 10 percent of all overseas R and D spending by U.S.-based firms), have implications for public policy and for the analysis of firms' productivity and profits. It is believed that they will be of interest to management scientists, engineers, and economists.

**A84-42621**

**AN EVALUATION OF THE EFFECTIVENESS OF PROJECT CONTROL SYSTEMS**


Researchers and practitioners have been unable to identify a general set of guidelines or develop a prescriptive model for the project manager to use when selecting a project control system. The research presented here extends and integrates areas of past research on project control systems; it addresses the interactions between project control systems and the situations in which they are implemented. The results provide insights into the effectiveness of control systems which were not evident when the control system and situational conditions were treated separately. The research is based on an empirical study of 103 development projects. The results clearly show that the interactions between control systems and the situations in which they are used have very significant relationships with project success.

Author
06 RESEARCH AND DEVELOPMENT

SCIENTIST DISCUSSES PROBLEMS IN INTRODUCING NEW TECHNOLOGY
Avail: NTIS HC A06

The problems of introducing new technologies to science are discussed. It is found that everything depends on production, which is a poor introduction to innovations. Production, however, is the main thing. Listening to the plants and sectorial organs is recommended while the problem of new technology introduction could be changed. The introductory stage appears to be weakest link since it is the introduction or a proving ground where the imperfections of the entire mechanism with control scientific and technical progress is graphically demonstrated. E.A.K.

THE SOCIALIST AND DEVELOPING COUNTRIES: TECHNOLOGY TRANSFER

The transfer of technology as a basic means accelerating industrialization in the developing countries has extended beyond the framework of the specific problems; it now reflects the essence and character of relations between the industrialized countries and the newly independent nations. Elaboration of an agreed new organizational basis for the technology transfer to the developing countries and for improving its economic mechanism with due regard for the interests of all its participants is one of the urgent tasks for restructuring international economic relations and establishing a new international economic order. Author

ORGANIZATIONAL IMPROVEMENTS IN CEMA SCIENTIFIC, TECHNICAL COOPERATION SOUGHT
Avail: NTIS HC A05 (USSR), no. 4, Apr. 1983 p 20-22

Scientific-technical cooperation among the CEMA member-countries has the following goals: Unification of the efforts of engineers and scientists and concentration of the resources of the fraternal countries for achieving the maximum results with regard to the problems of mutual interest, in particular, with regard to working out the introducing into production competitive models of machinery and equipment, along with technology new in principle; creation of a mutually coordinated scientific-technical potential; and working out the introducing into production competitive models of the fraternal countries for achieving the maximum results with regard to the problems of mutual interest, in particular, with regard to working out the introducing into production competitive models of machinery and equipment, along with technology new in principle; creation of a mutually coordinated scientific-technical potential; and working out the introducing into production competitive models of the fraternal countries for achieving the maximum results with regard to the problems of mutual interest, in particular, with regard to

LACK OF SUPPORT FOR INTRODUCTION OF SOVIET INVENTIONS SCORED
Avail: NTIS HC A05

The need for equipment and inventions to be transfer to industrial uses is stressed. The failure of industry and scientific research to merge is a problem to the economic development within the country. Stress was placed on the solution to industrial problems by scientific endeavor. B.G.

SIXTH ALL-UNION CONGRESS OF INVENTORS HELD
Avail: NTIS HC A05

Vast opportunities for scientific and technical creativity are afforded to the working people of our country. The army of millions of innovators is making its own weighty contribution to the fulfillment of the decisions of the 26th CPSU Congress. The broad expansion of scientific and technical progress and the mass mobilization of direct participants in production for creative exploration are actively promoted by the All-Union Society of Inventors and Rationalizers VOIR. Currently it has a membership of nearly 23 million production pace-setters, experts and scientists. Author

APPLICATIONS OF ACADEMIC RESEARCH NEGLECTED BY INDUSTRY
Avail: NTIS HC A05

The transfer of scientific research to industrial problems often does not happen. Methods to use the research meet with resistance, and so the benefit is lost. Methods of overcoming this difficulty must be found by cooperation of science and industry. Author

N84-11052# National Science Foundation, Washington, D.C.
Div. of Policy Research and Analysis.
PAPERS FOR AND A SUMMARY OF A WORKSHOP ON THE ROLE OF BASIC RESEARCH IN SCIENCE AND TECHNOLOGY: CASE STUDIES IN ENERGY R AND D (RESEARCH AND DEVELOPMENT)
1983 266 p Workshop held in Washington, D.C., 12-13 Mar. 1983
(PB83-213637; NSF-83-28; NSF/PRA-83013) Avail: NTIS HC A12/MF A01 CSCL 05A

Six papers are presented that assess both the direct impact of basic research on the advancement of energy science and technology and the indirect benefits of that research to society. The various research areas of the Department of Energy's Basic Energy Science Program are described and a set of criteria is presented for use in allocating the limited resources available for basic energy research funding. Distinctions are drawn between basic and applied research in industry. It is pointed out that basic energy research tends to be carried out in large, centralized laboratories within organizations that are themselves large, diversified, and multinational. The effects of the economy on near-and medium-term research and development (R&D) programs are examined. Author (GRA)

N84-11977# Argonne National Lab., Ill. Engineering Div. paa
PROJECT MANAGER'S GUIDE
(Contract W-31-109-ENG-38
(DE83-014454; ANL/ENG-PMSO-02) Avail: NTIS HC A08/MF A01

Guidance to ANL project managers is provided. Project management policy and procedures are provided by the ANL Policy Manual System. ANL management, at an appropriate level commensurate with the size, complexity and sensitivity of a project, assigns responsibilities and establishes project management requirements for individual projects. With management approval, the project manager selects the specific management tools and procedures that he will utilize in the execution of the project. This guide describes an approach to project management that is intended to assist him in the selection process. DOE
PROJECT MANAGEMENT TECHNIQUES FOR HIGHLY INTEGRATED PROGRAMS
(NASA-TM-86029; H-1211; NAS 1.15:66023) Avail: NTIS HC
A02/MF A01 CSCL 05A
The management and control of a representative, highly integrated high-technology project, in the X-29A aircraft flight test project is addressed. The X-29A research aircraft required the development and integration of eight distinct technologies in one aircraft. The project management system developed for the X-29A flight test program focuses on the dynamic interactions and the subordination of departments to more functional units of the government and industry. The insights gained from the new conceptual framework permitted subordination of departments to more functional units of decisionmaking, information processing, and communication networks. These processes were used to develop a project management system for the X-29A around the information flows that minimized the effects inherent in sampled-data systems and exploited the closed-loop multivariable nature of highly integrated projects.

FACTORS EXPLAINING DECISIONS TO TERMINATE OR CONTINUE AN R AND D PROJECT, EXECUTIVE SUMMARY
Final Report
(Contract NSF ISI-81-05585)
(PB83-256602; NSF/ISTI/PRI/81-05585-1) Avail: NTIS HC
A02/MF A01 CSCL 05J
The study was designed to identify and evaluate critical factors underlying decisions to continue or terminate R&D or development projects in private firms after appreciative amounts of investment funds have been expended in those projects. The first part of the study entails a search to identify, reduce, and operationalize both environmental factors (such as government regulations and procurement activities; actions by major consumer groups; and the degree of product competition) and organizational factors (such as degree of support from top management and R&D management or the presence of a project champion) and to account for the influence of these factors separately from the influence of project specific factors (such as the probabilities for technical and commercial success, expected profits after commercialization occurs, and expected capital requirements).

GOVERNMENT - CONTRACTOR INTERACTION
Final Report
D. M. THOMAS in AF Business Research Management Center
Proc. of the Fed. Acquisition Res. Symp. with Theme p 118-121
1983
(AD-P002768) Avail: NTIS HC A24/MF A01 CSCL 15E
The development of the Administrative Contracting Officer represents an advance in the Government system of contract management because it provides an individual with knowledge, time, and a specialized function to ensure performance of Government contracts. However, the development has created a dichotomy between the award and the post-award function which increases the adversary relationship with Government contractors. This paper advocates that this adversary relationship can be decreased if PCOs and ACOs are provided with opportunities to serve in the assignments of the other.

AWARD FEE CONTRACT PROVISIONS AS A PROGRAM MANAGEMENT TOOL
Final Report
R. F. DEMONG in AF Business Research Management Center
Proc. of the Federal Acquisition Res. Symp. with Theme p 168-174
1983
(AD-P002776) Avail: NTIS HC A24/MF A01 CSCL 15E
Award fee contract provisions can be used as a program management tool. Award fee contracts have been found to be a cost effective means of encouraging contractors to surpass the specifications of the contract. Award fee contracting can be successfully used in the dynamic environment of R and D programs as well as full scale development programs. Award fee contracting
relied on other forms of motivation than just the profit motive. The frequent evaluations used in award fee contracting give the contractor (including its managers and employees) timely feedback on its performance. These evaluations implicitly tell the contractor what the government's priorities are. This evaluation process also enables the government to better define its requirements. It serves as a motivation tool in that the managers will strive to make the evaluation look as good as possible. Timely and high level government involvement have been found to be important in the success of award fee contracting. 

Author (GRA)


This study, an offshoot of a DoD cost growth study, was conducted to identify elements common to successful programs. Programs that met most of their cost, schedule, and performance goals, and worked well when fielded. Key government and industry officials of twelve successful programs were interviewed to find out how success is measured and what impact various forces had on the success of these systems. The primary measure of success is that the system worked well when fielded. Main elements of a successful program are stability, realistic requirements, good people, good leadership and, particularly, confidence and teamwork between the program office and the contractor. The PM's tenure, pushing the state-of-the-art in technology, and meeting the requirements of regulations and directives have little impact on the success of a program. Outside influences are, on balance, helpful. The people we interviewed enjoyed their jobs and the challenges of program management. One program manager said it was the finest job he ever had—high risk, high rolling. A Navy PM said it was the closest thing ashore to the command of a ship.

Author (GRA)


This paper will briefly examine the evolution of the theory and practice of project (program) management as an integral part of the management discipline. This examination will hint at the origins of project (program) management and how it has influenced the management of contemporary organizations. The authors will review some of the influences that project management has had on contemporary organizations.

Author (GRA)


This paper discusses steps taken by the Defense Technical Information Center (DTIC) to strengthen small business participation in DoD extramural R&D, indicates a need for explicit attention to information transfer requirements by R&D contract administrators and concludes with a suggestion to the DoD contract administration community. Many factors impede small business efforts to do R&D business with the federal government. These run the gamut from federal procurement policies, regulations, and procedures; beliefs, biases, and practices of federal R&D people and their management systems; and the formidable advantages of bigness in the federal marketplace. Information transfer issues exacerbate the impacts of all the above and further reduce small business capabilities to compete for and to perform federal agency-particularly DoD–R&D projects. The studies and testimony leading to the Small Business Innovation Development Act of 1982 indicated a need for change in federal agency approaches to R&D contracting. DTIC's approach has been to mitigate the impacts of information transfer barriers on small R&D firm efforts to do business with DoD.

Author (GRA)


The purpose of the Planning Guide is to direct the attention of the scientific community to the technology interests of the Air Force, to provide a prospectus of research objectives to which the scientific community can respond, and to document the relevancy of fundamental to the Air Force mission. The research objectives described here represent the combined counsel of technical directors and program managers at the Air Force research and development laboratories. These objectives have scientific opportunities which, when exploited, will provide fundamental knowledge required to develop future Air Force systems, prevent technological surprises, and provide alternatives in solving technological problems which mitigate the qualitative superiority of Air Force systems. The objectives are grouped into eight technical areas: life sciences, materials, geophysics, aerospace vehicles, propulsion and power, weaponry, electronics, and computational sciences. These areas relate directly to Air Force mission areas and involve such scientific disciplines as physics, chemistry, biology, psychology, mathematics, and engineering.

Author (GRA)
The problem of unequal technology transfer between the United States and the U.S.S.R. is discussed with particular emphasis on the National Security of the United States and the economic impact of the military and commercial sectors. Researchers and thinkers must consider the military Critical Technology List (MCTL) and the military effectiveness of transfer processes. Research may be successful in solving a national problem but have no industrial application. The majority of the technology transferred is through many people, takes many routes, and usually requires 5 to 10 years to become incorporated; that transfer is invisible. Technology transfer is alive and effective, and should continue to be encouraged. However, transfer has to be done at the individual researcher level. Funds spent on tech transfer offices and studies could be more effectively spent on the research itself.

RESEARCH INTEGRATION: AN ESSENTIAL FOR SCIENTIFIC AND TECHNICAL INFORMATION TRANSFER: ISSUES AND OPTIONS

T. K. BIKSON, B. E. QUINT, and L. L. JOHNSON

Mar. 1984

124 p

refs

This Note describes a study funded under Contract PRA-84-00667 with the Division of Policy Research and Analysis (PRA) of the National Science Foundation (NSF). The purpose of the project is to identify and assess ways to improve the transfer to potential users of knowledge generated by federally funded research in science and technology. To accomplish this purpose, the study examines problems of information quality control and processes by which scientific and technical knowledge is or could be tailored and packaged for users. It draws heavily from the literature listed in the bibliography and from informal telephone conversations with federal officials, industrial users, information producers, and others. The study includes an overview and evaluation of current federal policies and practices, and an assessment of alternative policy options, especially as they may relate to the NSF. Appendixes suggest future directions for research in dissemination policy and present a history of the evolution of relevant federal policies and milestones.

B.W.

SCIENTIFIC AND TECHNICAL INFORMATION TRANSFER: ISSUES AND OPTIONS

T. K. BIKSON, B. E. QUINT, and L. L. JOHNSON

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B.W.
technology utilization, or secondary application, and the mechanisms NASA employs to stimulate technology utilization are provided. Contact sources for further information are presented.

S.B.


The Philips corporation's research and development strategy, policies and major efforts are described. Fluorescent lights, the electric razor, the magnetic cassette and the compact disc were all invented by Philips. This research has been extended by a very strong development policy.

B.W.


The ESA telecommunication, rendezvous and docking, meteorological, remote sensing, climatology and geodesy laser applications programs are outlined. Author (ESA)

N84-34717# European Space Agency, European Space Research and Technology Center, ESTEC, Noordwijk (Netherlands). THE ESA TECHNOLOGICAL RESEARCH PROGRAMS M. TRELLA In ESA Space Laser Appl. and Technol. (SPLAT) 4 p May 1984 Avail: NTIS HC A14/MF A01

Funding, decision making, and research management aspects of ESA's technology program are introduced. Author (ESA)

07 ECONOMICS, COSTS AND MARKETS

Includes Costs and Cost Analysis, Cost Control and Cost Effectiveness, Productivity and Efficiency, Economics and Trade, Financial Management and Finance, Investments, Value and Risk (Monetary), Budgets and Budgeting, Marketing and Market Research, Consumerism, Purchasing, Sales, Commercialization, Competition, Accounting.


An ongoing program to increase the productivity of software programmers is characterized, and some preliminary results are given. The dominance of salaries in the cost of producing software is pointed out, and the difficulty of measuring productivity is discussed. In the case presented, productivity is defined as the ratio of total software output to total input in labor and capital costs and measured at the project level. The improvement program comprises management policies, techniques, standards and metrics, tools, and training. The training courses, which necessarily involved diverting key personnel from projects and encountered passive resistance (even from engineers who participated in planning the program), presented some obstacles which have not yet been fully overcome. After two years, the projects in which the program has been implemented show about 25-percent lower labor costs, and it is projected that deliverable source instructions can ultimately be increased from about 5.66 to 18-24 per staff day.

T.K.


A description is presented of a user requirement study which was conducted during the fall of 1982 to determine possible commercial communications missions for a low-earth orbit space station under consideration for the 1990s. The study included a review of the literature on large space structures for communications. The survey returns were grouped into four categories, taking into account missions relating to testing, space communications technology, scientific research priorities and suggestions for cost savings in space, and communications traffic growth. In discussions regarding the space station, of considerable interest to many of the participants was the concept of the space station as a 'service station-in-the-sky'. Some interest was expressed in a low-earth orbit communications satellite.

G.R.

A84-15215 RELIABILITY COST ESTIMATION - MANAGERIAL PERSPECTIVES T. L. REGULINSKI (Goodyear Aerospace Corp., Goodyear, AZ) and Y. P. GUPTA (Manitoba, University, Winnipeg, Canada) IEEE Transactions on Reliability (ISSN 0018-9529), vol. R-32, Aug. 1983, p. 276-281. refs

This paper deals with selected sources of uncertainties associated with the reliability related life cycle costs (LCC). Some of the factors responsible for uncertainty in reliability cost estimation are identified and discussed. A practical approach to the use of Beta distribution in estimating the reliability-related costs within the LCC framework is detailed, and is illustrated using a hypothetical example. Improved estimation of reliability related LCC requires better understanding of sources of associated uncertainties and the methods of dealing explicitly with them. Numerous distributions can be used for modeling of cost variables besides the Beta demonstrated in this paper. The 3-parameter Weibull and Gamma distributions are two examples. Whichever distribution is chosen, given a sufficiently large cost data base, it is essential to test the cost variate for goodness of fit and to validate the model by appropriate test of hypothesis. However, in estimation of costs involving large capital expenditure over a period of years, the data base is not likely to be large. Lacking, then, a statistically significant sample which would allow testing for the underlying probability distribution governing the cost variate, modeling via the Beta or other appropriate distribution presents a practical alternative.

Author


An examination of techniques for establishing the price and costs of work which has to be contracted is presented, together with methods the client can use to assess, control, and discuss the costs and prices. Price is a monetary expression of the value of the transaction, while cost is the accumulation of charges and can be determined at any stage of the work. The costs can be set prior, during, or after the work is completed. The costs are a concern of management, which depends on information provided by the separate services performing the tasks either in concert or alone. Interim budget reports and projections are needed, as are comparisons with cost goals. An analytical accounting plan has been devised for cost management and is adaptable for any enterprise of any size, geographic dispersal, organic structure,
professional branch, and degree of integration. Details of the plan are provided, including terminology, analysis steps, and techniques for assigning value. M.S.K.

**A84-15316**

**COST ESTIMATION AND ESTIMATE ANALYSIS [ESTIMATION DES PRIX ET ETUDE DES DEVIS]**


Industrial estimation of total costs for contractual participation in a space project is examined, noting the dependence of the cost estimates on analytical models. Early estimates are performed quickly and without excessive detail, and must include a sensitivity analysis. The estimations are analyzed after contract bids are placed, and cost control measures are taken, together with modifications, in the course of the work. The project management issuing the contracts forms an estimate of the total cost from the individual estimates of different industrial concerns manufacturing the subsystems. The costs include the equipment, the management, tests, individual subsystem costs, and the system integration costs. Global, semi-global, parametric, analogical, and mixed price estimation methods are described, with examples taken from actual projects. Estimates are synthesized and distributed to financiers, who take into account the ranges over which the costs will vary, the distribution of the management tasks for the project, and the costs of the components involved in the product. M.S.K.

**A84-15317**

**THE RECORDING OF OUTLAYS AND THE PROJECTION OF COMPLETION [L'ENREGISTREMENT DES DENPENSES ET LA PROJECTION ACHÉVEMENT]**


Cost accounting during the progress of a project is detailed, together with techniques for projecting, at any point in the work, the expected final total cost of the enterprise. Attention is given to the particular case of a technical project, where accounting of a work in progress can be done by sampling techniques, which also support projections of the final overall cost. Problems due to delays are discussed, along with means for detecting when costs are deviating from projections. The projections of the final costs are noted to serve mainly for guiding decisions, i.e., for administrative purposes. Differences between the prices and the final cost, plus interest on funds in the interim, are a matter of negotiation between the interested parties, and depend on the form of the contract, the addition of modifications, the power of the negotiating parties, and the competence and capabilities of the negotiators. M.S.K.

**A84-15320**

**THE 'VALUE ANALYSIS' TOOL [L’OUTIL ‘ANALYSE DE LA VALEUR’]**


Value analysis techniques are presented for controlling costs, estimating costs over the length of a project, accounting for different types of products, and assigning responsibilities for estimating costs. Costs are initially larger than the worth of the total product produced until volume production is achieved. Value analysis covers the definition of the system to be produced, the environment in which the product will be produced and used, the functional characteristics of the product to the user, the total number of the things that are needed, the effect the product will have on the milieu in which it is deployed, and the constraints on the designer of the product. Value analysis proceeds from study orientation to research, to analysis of costs and functions, research on solutions, and study and evaluation of the solutions. A tentative balance sheet is generated, recommendation(s) of the choice(s) are made, and the project is followed through to realization. M.S.K.

**A84-15321**

**FINANCING LARGE SPACE PROJECTS [LE FINANCEMENT DES GRANDS PROJETS SPATIAUX]**


The arrangement possible for financing large space projects is explored, together with various projects which can be undertaken. The scale of financing is noted to be on the order already experienced with petroleum, nuclear, natural gas production and utilization facilities, the Airbus program, and international gas pipelines. The projects depend on volume, time to operational status, the novelty, international aspect, and the risks. Participants in the venture comprise the promoter, the financiers, the public authorities, and the clients. Financing plans include normal credit channels, taking into account the associated risks and necessary advances for capitalization, loans, credit-leasing arrangements, and through commercial banks. Proposed and operational projects for which financial assistance is necessary include the Ariane, the SPOT satellite, Spacelab, DBS satellites, and astronomical satellites. M.S.K.

**A84-17063#**

**SHOULD THERE BE A MORTGAGE CONVENTION FOR SPACE ACTIVITY INVESTORS?**


(AIF PAPER 82-IISL-52)

Private sector activity and interest in outer space are increasing. Launch vehicles and launch operations are already attracting private capital investment. Space transportation systems are being eyed by private entrepreneurs. Use of outer space and celestial bodies for private profit oriented ventures are being imagined. The communications industry is already in space. Others are likely to follow. Private space activity will require private financing. Private financing will raise questions relating to creditors' rights and security interests. Some aspects of this emerging area of concern in the context of the aviation environment are discussed. Particular attention is given to the existence of some municipal law regimes and not as they relate to aviation and attention is drawn to the so-called 'Mortgage Convention' relating to rights in aircraft. While not suggesting any particular path to follow in addressing security interests in space launch vehicles, it is suggested that the time
has come to at least start focusing on problems and solutions - perhaps drawing upon past experience in aviation. Author

A84-20599
THE 'AFFORDABLE' FIGHTER MARKET

The 'affordability' of the range of fighter aircraft types from cannon-armed advanced trainers to missile-armed, specialized interceptors depends on a country's size, wealth, the international significance of its resources, and the perceived threat. Attention is presently given to the fighter aircraft that are currently available for export in the $5-15 million price range. The low price end of the market encompasses such Soviet-built aircraft as the Mig-21 variants and the Western Hawk 60, Alpha Jet and AMX. The high price aircraft available include the F-16 and Mirage 2000. The JAS39 Gripen and IAI Lavi, currently under development, are also intended for export. The F-20, a Mach 2-capable development of the highly successful F-5 export series aircraft, is expected to be an attractive choice for air forces contemplating a medium price ($10 million) multirole fighter. O.C.

A84-21482
FINANCING A SOLAR POWER SATELLITE PROJECT

It is pointed out that the solar power satellite project constitutes a unique financial challenge because is represents the first attempt to exploit extraterrestrial sources commercially. This project is to make electricity available to all nations from sources which are outside the claim of any nation. This transnational character of the project and, in addition, the magnitude of the project costs, point to the desirability and the need for international funding. A technique known as 'project financing' has been developed in the world's financial community specifically for the purpose of funding such very large ventures. Attention is given to details of project financing, the completion risk, the completion agreement, the economic risk (technological risk), aspects of equity, questions regarding the debt, and the United Nations revolving fund for natural resources exploration. G.R.

A84-24448
SOFTWARE ENGINEERING ECONOMICS

This paper summarizes the current state of the art and recent trends in software engineering economics. It provides an overview of economic analysis techniques and their applicability to software engineering and management. It surveys the field of software cost estimation, including the major estimation techniques available, the state of the art in algorithmic cost models, and the outstanding research issues in software cost estimation. Author

A84-25192/
ANALYSIS OF THE INFLUENCE OF THE LOAD FACTOR IN PLANNING AIRCRAFT TRANSPORT CAPACITY [ANALISI DELL'INFLUENZA DEL COEFFICIENTE DI RIEMPIMENTO IN FASE DI IMPOSTAZIONE DELLA CAPACITÀ DI TRASPORTO DEI VELIVOLI]

A mathematical model of the factors affecting the profitability of passenger/transport aircraft in commercial-airline operation is developed and applied to sample aircraft of the 20-50-passenger class. The break-even load factor is defined as the ratio of payload (passengers, cargo, and mail) to capacity at which income covers direct operating costs for a given flight. Since the direct operating costs in these aircraft are practically independent of load factor, load factor becomes the key parameter determining the margin (to be applied to indirect operating costs) and profit obtainable with a given aircraft on a particular route. Hence in choosing an aircraft capacity, airline management must balance the greater efficiency of larger aircraft with the potential risk of low load factors. Numerous graphs of the principal parameter relationships and a table of aircraft characteristics are provided. T.K.

A84-29881
CONTEMPORARY BUSINESS OUTLOOK FOR LARGE SPACE VENTURES FINANCING, MANAGEMENT, CONSTRUCTION

This paper discusses the outlook for privately financed, managed and constructed large space ventures within the confines of today's free-market business infrastructure. The characteristics of earth-based macroprojects are outlined and shown to parallel the requirements of a proposed large space venture scenario. By focusing on two existing corporations and their relevant macroproject experiences, the paper formulates an existence proof which suggests that a large space venture could be handled with success by contemporary private businesses. Author

A84-29882
THE ECONOMICS OF SPACE MANUFACTURING - SOME FUNDAMENTAL PROPOSITIONS

The paper examines the rationale of market failure to provide an optimal development of space manufacturing, and the consequent need for public intervention. The optimum development of space manufacturing is formally modeled as a problem of allocating terrestrial resources to an activity with an uncertain payoff. Two sources of market failure are examined: the lack of markets for certain types of risks and the public-goods nature of technical knowledge. Author

A84-29883
INTERNATIONAL COMPETITION IN COMMERCIAL AEROSPACE MARKETS

The U.S. has not approached the subject of space commerce in a way which takes the best advantage of its competitive free enterprise system. Many lessons can be learned by closely examining the relationship between government and entrepreneurs in the early days of air commerce. A review of recent international trends in commercial space technology suggests that the U.S. is not maintaining the technological leadership to which it is committed in the early days of air commerce. A review of recent international trends in commercial space technology suggests that the U.S. is not maintaining the technological leadership to which it is committed due to a suboptimal government/industry relationship vis a vis other industrialized nations. Author

A84-29885
ENCOURAGING BUSINESS VENTURES IN SPACE TECHNOLOGIES

The principal findings and recommendations of a report by a Panel of the National Academy of Public Administration that was released on May 3, 1983 are summarized. Policies and initiatives for adoption by NASA to encourage business ventures in space
technologies include: (1) Declare and institutionalize a major commitment to the commercialization of space technology; (2) assist industry in pursuing opportunities for profitable investment in space; (3) offer NASA facilities and services for use by private companies under conditions that encourage commercial development; (4) continue R&D including study of long-range opportunities; and (5) reduce the risks and restrictions that impede commercial exploitation of space technologies.

A84-30646/#
COST ESTIMATION OF RESEARCH AND DEVELOPMENT PROJECTS

The development of good cost estimates for R&D projects depends on the ability to define the tasks that must be performed and the results expected from R&D. The first step then is to define the project and the options and alternatives which are available. The next step would be to define the schedules for the accomplishment and ordering the tasks necessary to complete within schedule. The third step is to quantify the facilities, tooling, subcontract support, personnel, etc., necessary to accomplish the project, then the costs must be quantified. The final step is to identify and quantify risk and consolidate the estimate. This paper defines the steps which the authors feel necessary to put together a creditable cost estimate for an R&D project.

A84-31794
THE USE OF MICROCOMPUTERS FOR PLANNED MARKETING
[KLEINRECHNEREINSATZ ZUR GESCHÄFTSPLANUNG]

The results of applying a microcomputer to rationalize the production process from the contracting state through production, marketing, and long-term planning are summarized. Planning costs have been rationalized to the extent that they were amortized within one year, Error-free and reproducible planning is attainable in the briefest times using a microcomputer.

A84-34770
RISK MANAGEMENT - A NECESSARY TOOLS FOR SATELLITE OWNERS AND USERS

The process of risk management comprises four basic steps: identification, evaluation, control, and financing. Each of these techniques, or steps, is described, and it is shown how they apply to risks faced by satellite owners and users. It is stressed that insurance is not a panacea for the hazards faced in owning and operating a satellite. When properly employed, the methods of risk management will enable an organization to protect itself against the financial impact from them at the lowest cost. It is therefore important for the risk manager to identify and evaluate all such loss exposures in order to control and/or finance them at the lowest cost. What is more, any insurance policy that is purchased must be carefully made sure that it covers exactly what the organization is intending to cover.

A84-37900
THE TECHNICAL AND ECONOMIC CONSIDERATIONS OF BRINGING SATELLITE COMMUNICATIONS TO SMALL MOBILE USERS

The potential market presented by small users is considered and the characteristics of the present systems of communication satellites are reviewed. The satellite parameters of antenna gain and directivity and of bandwidth are then discussed and the operational considerations of the existing satellites are examined with reference to the requirements of the proposed small mobile users. The implications of economic tariffs are briefly touched upon.

A84-38947
THE PRACTICAL DIMENSIONS OF SPACE

Attention is given to the gradual development of commercial priorities in U.S. space research, as well as to current possibilities for manned spacecraft industrial development, whose testbed will be the NASA Space Shuttle. Also noted is the range of economically advantageous uses to which unmanned spacecraft have been put (TV relay, telephony, navigation, weather prediction, and earth resources surveying), and the form that such commercially profitable technologies may take in the near future. The relative importance of 'free enterprise' initiatives in prospective space projects is also discussed, with a view to establishing the balance between government and private industry roles in space.

A84-66348/
AN INNOVATIVE APPROACH TO SUPPLIER COST CONTROL

Important management concerns of today can be described by the concepts of productivity and affordability. The present investigation is concerned with an innovative approach which is being used by an American aircraft manufacturer to improve affordability of its products by stimulating productivity improvements via cost reductions in product materials obtained from suppliers. The analysis of 54 supplier visits, and over 1000 proposed cost savings ideas, provides a reasonable base of data for the formulation of conclusions regarding a 'Productivity/Should Cost' program. It is found that supplier's personnel do have a wealth of cost savings ideas which can be tapped by an affirmative program.

A84-69145/#
NEW OPPORTUNITIES FOR THE PRIVATE SECTOR IN SPACE TECHNOLOGY

The proposed transfer of the Landsat operational system to the private sector is certain to create many new opportunities, and a few problems, for those entrepreneurs willing to invest in the future of this program. While there is vigorous conflict of opinions over the worth of the program, we believe the assets of the program are unique in several respects. First, no other resource of the federal government can acquire the same objective information about the natural resources of the earth. Second, the revenue potential of the sale of the data is orders of magnitude smaller than the revenue potential of resource investment decisions enabled by early access to the raw data. Third, we find it ironic that because the system was designed and administered jointly by and for the resource agencies of the government, it has become an albatross around the neck of the single 'responsible' agency. If logic were used as a criterion, the program was a model of how to conduct cost-effective research in the government. This paper discusses alternative strategies and opportunities for private sector involvement.
A84-49413
PROGRAMS DESIGNED TO HELP SMALL BUSINESSES COMMERCIALIZE DEVICES INVENTED BY NASA, DOD, AND OTHER FEDERAL AGENCIES - A CASE HISTORY

The U.S. Government's Small Business Innovation Development Act of 1982 established the Small Businesses Innovation Research (SBIR) program, which has as its objective the promotion of innovation in high-tech areas through direct Government funding of research conducted by businesses with less than 500 employees. SBIR will thereby complement the alternative mechanisms of private capitalization, providing incentives at the feasibility study, testing, and concept-development stages of a prospective product. Other programs of similar intent have been conducted by NASA, the U.S. Department of Defense, the Atomic Energy Commission, and the National Science Foundation. Attention is given to a case study concerning the early development phase of a novel family of analytical instruments based on patented mass spectrometer technology.

N84-10108# Committee on Science and Technology (U. S. House).
SPACE COMMERCIALIZATION
The development of opportunities for the American free enterprise system to use space for a variety of applications and technologies is discussed in an effort to assure that the private sector is free to organize and operate for profit in the space environment. The requirements of a policy framework conducive to business ventures based on space technologies are discussed as well as the relationships between the public and private sectors in the commercial utilization of space.

TRADE AGREEMENTS ON KNOW-HOW DISCUSSED
Under the conditions of the present scientific and technical revolution the thirst for possessing advanced production experience and knowledge has led to a significant increase in the number of agreements on the transmission of know-how as compared with license agreements, whose objects are patented scientific and technical achievements. As a rule, the All-Union Litsenzintorg Association concludes agreements on the transmission of know-how in the USSR. A number of other foreign trade associations also conclude such agreements. In accordance with their charters operations are performed for the transmission of know-how, when the latter form an integral part of agreements on the export or import of goods based on the products list of these associations. An analysis of the terms of agreements on the transmission of know-how shows that the rights and duties of the parties to the agreement coincide in large measure with the rights and duties of the licensor and licensee according to the license agreement.

N84-12773# Stanford Univ., Calif. Center for Research on Organizational Efficiency.
SEARCH AMONG QUEUES
Customers must often wait to obtain some service or goods, the wait usually being longer the greater the total number of persons who have yet to be served. This phenomenon is especially common in transportation markets, such as the trucking, household moving, and bus industries. Nor is it unknown for customers to have to wait for the services of accountants, lawyers, dentists, physicians, and, most importantly, plumbers. When for some reason shortages occur, rationing is often accomplished by queuing; new models of automobiles and computers have lately been subject to such shortages. Recent research has shown that explanations of market behavior should incorporate customer’s aversion to such waiting. The fundamental idea is that a customer who arrives at some facility and finds a long queue may find it worthwhile to balk, incur some search cost, and find a shorter queue at some other facility. This in turn means that excess capacity may result not from oligopoly of inefficiencies, but from a socially beneficial effort to reduce consumers’ waiting costs.

N84-14697# Umgeni Water Board, Pietermaritzburg (South Africa).
INTEGRATED BUDGET CONTROL USING A DESKTOP COMPUTER
R. F. PHELINES and A. E. CARLISLE In South African Inst. of Civil Engineers Symp. on Computers in Construction 15 p 1982 Avail: NTIS HC A08/MF A01
A computerized accounting system enabling management to monitor income and expenditure on cost heads against monthly budget is described. The handling of planning expenses, the combination of overheads, the inclusion of unpaid financial commitments and the distribution of interest accrued on monies loaned but not allocated, allow realistic costs to be determined for each selected cost head and for variances against budget to be identified. The system is flexible and can be adapted to accommodate any details of monthly income and expenditure which management wishes to identify.

N84-14699# California Univ., Berkeley.
INTEGRATED BID ESTIMATE SYSTEMS FOR CONTRACTORS
R. A. APPUHN In South African Inst. of Civil Engineers Symp. on Computers in Construction 9 p 1982 Avail: NTIS HC A08/MF A01
An integrated bid estimating system which is designed for use either on medium or large interactive or data based systems is described. The basic parameters on which the bid estimate is based and the method by which resources are defined and utilized for the preparation of the bid estimate are discussed. The information thus obtained may then be merged into a larger and more general integrated information system for effective project management.

N84-14967# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio.
LIFE CYCLE COSTING IN A DYNAMIC ENVIRONMENT Ph.D. Thesis
J. A. LONG 1983 202 p (AD-A133023; AFIT/CI/NR-83-26D) Avail: NTIS HCA10/MFA01 CSCL 05A
The consideration of life cycle cost is a major part of the Department of Defense management strategy to control the increasing cost of defense systems. It includes the cost of research and development, production, operating and support, and disposal. Unfortunately, due to a lack of credibility, life cycle costing has not reached its full potential. In an attempt to rectify the situation, this research centers on life cycle costing in a dynamic environment. This examination is from the three perspectives: methodology, modeling, and application. The chapter on methodology is a critical examination of Air Force life cycle costing in the acquisition of new aeronautical systems. It contains recommendations for reorganization and revision of current business practices. The chapter on modeling reviews various models and methods for risk analysis including Monte Carlo simulations, additive and multiplicative moments, sums and products of random variables, and transform techniques. The chapter on application demonstrates the feasibility of using the various models and methods under a realistic scenario for systems acquisition.

GRA
COMMERCIALIZATION OF OPPORTUNITIES FOR MATERIALS PROCESSING IN LOW GRAVITY Final Report


Management Consulting & Research, Inc. (MCR) collected data on the Total Obligational Authority (TOA) requested by the Army, Navy and Air Force to procure attack, bomber and fighter, fixed and rotary wing aircraft. The TOA was normalized to base fiscal year 1981 dollars. Lots average, cumulative average and unit costs were calculated for Airframe, Airframe and Engine on total flyaway cost where available. Data is presented for 128 Mission/Design/Series (MDS) aircraft. Author (GRA)

5. One of the major shortfalls in software cost estimation is the lack of a well-defined, well-structured database. This report is the culmination of a multi-year effort to develop contractual documents to effect quality software data collection on defense programs. It includes as attachments a proposed draft military standard for software work breakdown structures and a data item description for reporting project attributes that impact software cost and schedule. The evolution of the documents is discussed and procedures for implementing data collection on defense programs are provided. Readers are asked to comment on the SARE methodology using a questionnaire provided as the third attachment. Author (GRA)

6. Five years of quarterly overhead costs at two major defense aircraft manufacturers were categorized according to the types of costs incurred. These categories of overhead costs were then modeled via regression analysis using production and operating data from the two contractors as independent variables. Adjustment for quarterly autocorrelation revealed excellent structural and predictive models of total overhead and labor-related overhead costs. Author (GRA)

7. This report discusses the accuracy of self-reported programmer activity data and valid ways to analyze the data. We conducted a one-week experiment during which we sampled the activities of five software engineers working in the Software Cost Reduction (SCR) project at the Naval Research Laboratory. We compared the sampled data with activity data submitted ‘as usual’ by the five engineers on weekly activity reports. The results indicate that the engineers report relatively accurate with the activity report if...
they make notes of their activity, or if they promptly submit their reports. If engineers do not keep notes of their activities, prompt reporting is critical to ensure the accuracy of reported data. The results also indicate that ratios between activity categories are valid metrics of project activity. Author (GRA)

N84-21437# Terra-Mar, Mountain View, Calif.
ALTERNATIVE STRATEGIES FOR SPACE STATION FINANCING

The attributes of the proposed space station program are oriented toward research activities and technologies which generate long term benefits for mankind. Unless such technologies are deemed of national interest and thus are government funded, they must stand on their own in the market place. Therefore, the observed project of a Life stage, Synchronous space station should be based on commercial criteria; otherwise, such a project attracts no long term funding. There is encouraging evidence that some potential space station activities should generate revenues from shuttle related projects within the decade. Materials processing concepts as well as remote sensing indicate substantial potential. Furthermore, the economics and thus the commercial feasibility of such projects will be improved by the operating efficiencies available with an ongoing space station program. B.G.

N84-22287# National Aerospace Lab., Amsterdam (Netherlands). Informatics Div.
FUNCTIONAL REQUIREMENTS FOR THE DEVELOPMENT AND USE OF A SOFTWARE-COST DATABASE

The characteristics of a data base used to develop an accurate cost estimation method and to support cost management in software development are discussed. A cost estimation method based on project size, project type, reliability, percentage of utilization, percentage of new design and code, development environment, application, and human resources, with 47 well-defined cost factors is proposed. Author (ESA)

N84-22510# Yale Univ., New Haven, Conn.
FISCAL AND MONETARY POLICY IN A GENERAL EQUILIBRIUM MODEL
T. BEWLEY 27 Jan. 1984 92 p (Contract N00014-77-C-0518; NSF SES-83-42754) (AD-A136502; FOUNDATION-DISCUSSION-690) Avail: NTIS HC A05/MF A01 CSCL 12A

This is a theoretical study on monetary and fiscal policy in a general equilibrium model with rational expectations, with perfect markets for current goods, but with restrictions on borrowing and insurance and with a Crouser constraint on payments. Fiscal actions are understood to be manipulations of taxes and subsidies. Monetary policy is understood to be the purchase and sale of government debt or control of the banking system's ability to lend. The main result of this paper, Theorem 4.1, may be interpreted as saying macroeconomics is easy. Here is a model in which phenomena resembling trade cycles may occur, and it is proved that policy may prevent them. Furthermore, the result is not at all surprising once one realizes that it is an analogue of the second welfare theorem. However, one should be aware that there are strong hypotheses underlying the model. These are that expectations are rational and that random changes of aggregate importance are revealed to everyone simultaneously. The latter assumption, of course, precludes the asymmetric information which underlies the so-called island models of macroeconomic theory. Author (GRA)

N84-22511# General Accounting Office, Washington, D. C.
PROGRESS IN IMPROVING PROGRAM AND BUDGET INFORMATION FOR CONGRESSIONAL USE Annual Report
8 Nov. 1983 13 p (AD-A137491; GAO/OACG-84-2) Avail: NTIS HC A02/MF A01 CSCL 05A

The annual report, submitted to the Congress in accordance with 31 U.S.C. 1113(b), summarizes progress in improving program and budget information for congressional use. The report discusses progress in such areas as cooperative work with DOD to improve their budget process; required information services provided by GAO; and continuing improvements by the executive branch. The report also discusses GAO's work on an improved financial management system for the Federal Government. Author (GRA)

N84-23301# Air Force Systems Command, Wright-Patterson AFB, Ohio.
MANAGING PROGRAM RISK: ONE WAY TO REDUCE COST GROWTH Final Report

Former Deputy Secretary of Defense, Frank C. Carlucci, in his 30 April 1981 memorandum on Improving the Acquisition Process recognized that the key to reducing program costs is to establish and maintain a stable program. One of his initiatives requires the Services to budget to most likely or expected costs, including predictable cost increases due to risk; and to provide incentives for acquisition officers and industry to make and use realistic cost estimates. This paper focuses on how the program manager can reduce cost growth through a Risk Management Program that provides a more complete assessment of program risks. The essential elements of a risk management program, a proposed approach to implementing the program, and the advantages associated with successful implementation on major weapon systems acquisitions are outlined. In summary, OSD has demonstrated a commitment to reducing cost growth. Success, however, will require the program managers to establish a risk management program that forces consideration of all program risks before they occur. Author (GRA)

N84-23304# University of Southern California, Los Angeles.
ASSUMPTION OF RISK IN THE R AND D ENVIRONMENT Final Report

There has been a traditional philosophy regarding the use of different types of contracts to share risk during the development of a major weapon system. This philosophy would have the Government assume the burden of risk early in the life of the system through the use of Cost Type contracts. As the requirement becomes more defined, the burden of risk is gradually transferred to the contractor with a commensurate increase in potential profit. If we accept the premise that the Acquisition system requires improvement, what are the alternatives that may be considered to alter the process? A method that has been utilized by the Ballistic Missile Office has been to dramatically alter the traditional concept of assumption of risk by offering Contractors the opportunity to take their fate into their own hands and assume a major share of the cost risk while simultaneously reducing the risk associated with technical failure. GRA

N84-23314# Air Force Business Research Management Center, Wright-Patterson AFB, Ohio.
COST ACCOUNTING STANDARDS: A TIME FOR GOVERNMENT AND INDUSTRY ACTION Final Report

From its inception in 1970, the Cost Accounting Standards Board (CAS Board) was the subject of considerable controversy. In September 1980, Congress declined to continue funding of the
Board and it ceased operations. But the nineteen Standards promulgated by the Board continue today as a part of the law. Consequently government and industry alike have found themselves without an authoritative body to interpret the Standards and issue corrections, exemptions and waivers. This paper will examine the history of the Board, some of the current problems, and discuss several of the alternatives that are available at this time for dealing with the situation created by the demise of the Cost Accounting Standards Board.


There is evidence that Government contractors perform production contracts using high-cost methods leading to higher than necessary prices to the Government. Capital investments which lower total cost of performance are discouraged or at least not encouraged by current policies and market environment. This paper describes a model of contractor investment behavior within existing DoD contracting principles. A preference for investments which confer long life advantage to the Government is shown to arise under current contracting policies. A discounted cash flow investment analysis model is used to explore a number of correctives to current policies including increased weight on facilities capital employed in Department of Defense (DoD) profit policy, sharing of cost savings, and investment incentives such as accelerated depreciation. Finally, the payoff to the Government and DoD if each corrective were adopted is explored. Author (GRA)


Competition is looked upon by many as one technique to maximize the return from the procurement dollars available. Many members of Congress recommend the competitive method of purchasing for most Government procurement actions. However, the history of Federal procurement attests to the fact that competitive bidding is inadequate in some situations. Since competitive procurement does not always result in lower prices, program managers, contracting officers, and buyers should understand the conditions which may affect prices and aggressively seek competition for items that may likely result in net savings to the Government. This paper includes a summary of competition theory and recent research conducted in the area of competition by graduate students at the Air Force Institute of Technology (AFIT). Two graduate research projects that addressed competition for weapon system replenishment spare parts are summarized in the paper followed by some concluding observations. Author (GRA)


The concept of competition for defense acquisition is one that requires careful examination in today's cost conscious environment. The Office of Management and Budget Circular A-109 directs each government agency to... depend on, whenever economically beneficial, competition between similar or differing system concepts throughout the acquisition process. This direction leads to the current high level attention that competition is receiving today. Competition is being examined as a major factor in cost control for weapon system procurement for the entire acquisition process. The need for complete preplanning and market research to promote effective competition is apparent when past procurement efforts are examined. Preplanning and market research in the early stages of the acquisition process are areas that need active management support. Author (GRA)


This article presents a model which describes the relationships among the cost risk inherent in a particular procurement situation, the degree to which that cost risk is shared between the government and the contractor, and the risk premium awarded to the contractor for assuming his share of the cost risk. The model is normative in that it provides a framework for analyzing the possible combinations of risk assumption on the part of the government and risk premiums which are logically consistent. The model requires that the price analyst estimate the cost of contract performance, the general shape of the distribution of probable costs, and the standard deviation of that distribution. In addition, a policy decision is required concerning what constitutes a reasonable probability that the contractor would incur a loss.


With ever increasing emphasis being placed on Department of Defense acquisition improvements and reduction of acquisition lead time, the Air Force Systems Command, Armament Division, has developed and is testing a contracting initiative referred to as Best Proposal for Price. This concept is intended to significantly reduce efforts by government and contractor personnel and thereby reduce acquisition lead time while maintaining the integrity of competitions that are limited by funds. Best Proposal for Price contemplates award without negotiation, if possible. The main thrust of this acquisition concept is to identify the government's maximum contract dollar amount in the solicitation thus minimizing the negotiation processing time and yet insuring technical performance. Offering potential for improving present negotiation contracting procedures, the very nature and structure of Best Proposal for Price lends itself to some controversy. Nevertheless, Best Proposal for Price has the intrinsic momentum to be highly contributory in government contracting strategy.


A micro-processor based computer model utilizing expert system concepts has been developed to provide cost based acquisition planning information to the DoD acquisition community. The model, called ACROM, is a menu driven inquiry-response system wherein qualitative acquisition profile descriptions are converted, via embedded algorithms, to quantitative system acquisition cost estimates in a MIL-STD-861A Work Breakdown Structure format. The choice of one of two input modes provides for a top-down

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(Mode A) estimate using only six high level input parameters or a bottom-up (Mode B) estimate by characterizing each of 45 WBS elements for the system acquisition. Estimates may be accumulated by subsystem for large scale programs or by phase for total program and/or life cycle cost estimates. The model has been exercised for over 70 DoD system acquisitions and has provided relatively accurate estimates for electronic computer-based systems. It is anticipated that continued use and enhancements of the model will improve the embedded expertise in specialized acquisition areas and will provide a readily accessible and easy to use program management support tool in the critical area of system cost. Author (GRA)

N84-2334# Clemson Univ., S.C.
AN AUTOMATED AIRFRAME PRODUCTION COST MODEL Final Report
N. K. WOMER In AF Business Research Management Center Proc. of the Fed. Acquisition Res. Symp. with Theme p 222-228 1983
(AD-P002787) Avail: NTIS HC A24/MF A01 CSCL 15E
This paper is dedicated to developing a better understanding of the factors and forces that determine weapons system cost during production. Here we report on a tool that provides timely estimates of the cost impacts of program policy decisions. This tool was developed from theoretical principles. The economists production function was incorporated into a model which addressed the realities of program management. The model uses the calculus of variations to include the production cost drivers of learning by doing, learning over time, the speed of the production line and production line length. It is estimated from data on the C-141 program and tested on other Air Force programs. This work is fully documented in Cost Functions for Airframe Production Programs a report prepared for the Air Force Business Research Management Center and the Office of Naval Research by Womer and Gulledge. This paper concentrates on the results and applications of that study. Author (GRA)

RISK ANALYSIS: COMPARING DIFFERENT CONTRACT TYPES Final Report
(AD-P002788) Avail: NTIS HC A24/MF A01 CSCL 15E
This paper presents a brief description of how the results from a cost risk analysis can be used to distribute the risk in a contract between the government and the contractor. The main contract types discussed are Firm Fixed Price (FFP) and Fixed Price Incentive (FPI). Other contract types may be structured around a risk analysis but are not discussed here. GRA

N84-2339# Management Consulting and Research, Inc., Falls Church, Va.
THE PROBLEM OF COST GROWTH Final Report
(AD-P002752) Avail: NTIS HC A24/MF A01 CSCL 15E
There is a substantial amount of rhetoric on the subject of cost growth. Usually, we blame such growth on inflation. There are, in fact, several views on the reasons for cost growth or the measures used to calculate and present cost increases by weapon system. MCR has conducted studies of cost growth for many years. This particular paper will discuss the problem from an historical perspective, and present actual results from an analysis of the 31 December 1982 Selected Acquisition Reports (SARs). GRA

ECONOMIC PRODUCTION RATE STUDY Final Report
(AD-P002793) Avail: NTIS HC A24/MF A01 CSCL 15E
The objective of this study is to give the Program Manager tools for use in discussing, planning and evaluating economic production rates. In order to deal with large scale, multi-tiered acquisition programs, a distinction must be made between procurement and production rate. The economic procurement rate refers to the rate of acquisition of the complete system, while the economic production rate addresses each component or contractor contributing to the system. The EPR is defined as that rate of procurement (or production) that permits efficient use of available industrial resources to achieve the lowest unit cost. Using a model suggested by John Bemis, this study examines the procurement profile of five major DoD acquisition programs—the Army's M-1 tank, Fighting Vehicle System and TOW missile, the Air Force's A-10 aircraft, and the navy's A-6E aircraft. The model can be expressed either graphically or as an exponential equation. The graphical form is especially useful when iso-unit cost lines are plotted on axes of production rate versus cumulative quantity. In this form it is possible to evaluate various procurement profiles of a system and draw some conclusions concerning their relative efficiencies. This analysis was done for each of the five systems, and savings from more economical rates are estimated. GRA

N84-23341# Ohio State Univ., Columbus.
EXPERT SYSTEMS FOR PRICE ANALYSIS: A FEASIBILITY STUDY Final Report
(Contract F33615-82-C-5114) Avail: NTIS HC A24/MF A01 CSCL 15E
The feasibility of alternative designs for an expert system computer system is evaluated by analyzing the price analysis task, and the related support requirements, as performed by Air Force procurement activities. Generally, the Air Force should embark on a coordinated, long-range program of providing adequate expert system support to all procurement functions. Initially, this support can best be provided by a highly structured, interactive expert system which confronts the system user with requisite decision sequences. Each sequence points to a tutorial network which provides explanation and instruction if desired. The most immediate benefit will be experienced at the base level where little expert assistance is currently available. This type of expert system provides the nucleus for developing more sophisticated expert systems for other procurement activities in the intermediate and long term. Author (GRA)

N84-23342# Naval Postgraduate School, Monterey, Calif.
CONTRACTOR 'HUNGRINESS' AND THE RELATIVE PROFITABILITY OF DOD BUSINESS Final Report
(AD-P002796) Avail: NTIS HC A24/MF A01 CSCL 15E
Lately, DoD-contractor profitability has been very much an issue. Some feel low profits may convert defense business into a market of last resort. Others allege defense contractors earn excessive profits. We address the contention between these viewpoints. Specifically, we examine data covering 20 years, and study how the profitability of DoD contracts is influenced. We ask how profitable contractors are in their DoD versus commercial business segments, and whether the risk levels faced are equivalent. Our conclusions are that Program Managers (PM's) take advantage of returns on commercial business during periods of low capacity or life cycle cost estimates. The model has been exercised for each of the five systems, and savings from more economical rates are estimated. GRA
utilization. Also, the volatility of returns is higher for DoD business which means the risks are viewed by management as being somewhat higher.

Author (GRA)

N84-2344# Ohio State Univ., Columbus.
(Contract F33615-82-C-5114) Avail: NTIS HC AC/4/MF A01 CSCL 15E

We investigated price analysis as performed in the United States Air Force (USAF) and the environment in which buyers at bases make decisions about procurement actions. Based on this study, we evaluated the intelligent manual approach for guiding a buyer through the decisions and actions necessary to conclude a buy. An intelligent manual is a computer-based consultant that provides advice and pointers on the use of existing information in response to user queries. Our prototype intelligent manual is constructed as part of the ZOG system. ZOG is an active, large-network, menu-selection system. We present the design of the interactive intelligent manual (based on our analysis of pricing) and discuss its short-term and long-term implications for procurement in the USAF. We identify how this system would be the basis for a larger intelligent, problem-solving expert systems that automate significant components of the pricing task.

Author (GRA)

N84-2345# Delaware Univ., Newark.
(AD-P002799) Avail: NTIS HC AC/4/MF A01 CSCL 15E

Comparisons of a priori cost estimates with a posteriori payments is about as pervasive as it is instinctive. A new result of mathematical optimization and probability theories leads to the unexpected conclusion that such comparisons, even for many idealized engineering designs, appear to be invalid. The paper demonstrates that before and after costs are independent samples from populations with different probability distributions.

Author (GRA)

(AD-P002800) Avail: NTIS HC AC/4/MF A01 CSCL 15E

Unrealism in Defense contractors' cost proposals, especially for RDT&E programs, often contributes to cost growth as well as to other problems. The Defense Department is therefore concerned with achieving greater cost realism. A methodology has been developed for achieving greater realism of contractor cost proposals. This methodology defines cost realism as an evaluation criterion stated in the solicitation which compares the offeror's proposed cost with a detailed Government estimate for each contractor and then scores the degree of realism. The methodology constitutes a source selection cost evaluation process involving determination of cost evaluation factors; preparation of instructions to be included in the solicitation concerning the cost evaluation factors; preparation of Government estimates for each offeror; and scoring each offeror for cost realism and Government estimated cost. The methodology is a synthesis and improvement of the best techniques and procedures currently being used in source selection cost evaluation (especially those of NAVELEX).

Author (GRA)

N84-2335# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio.
(AD-P002810) Avail: NTIS HC AC/4/MF A01 CSCL 15E

This paper attempts to quantify the relative impacts of large firm efficiency and market power on profit margins in defense industries. The methodology employs a direct measure of firm efficiency together with a conventional measure of market power. Large firm efficiency and the effective use of market power appear to be generally present in industries characterized by decreasing costs. However, the basic defense industries - aircraft, missiles, ordnance, and shipbuilding are notable for the absence of large firm efficiency and the absence of effective use of market power by leading firms.

Author (GRA)

(AD-P002812) Avail: NTIS HC AC/4/MF A01 CSCL 15E

Procurement of crude oil on the spot market at minimum prices requires economic analysis which focuses on the discovery of market price levels and the determination of short-run market direction. This paper presents the results of statistical research concerning the formation of spot prices in the crude oil market. Variables suggested by the economic theory of raw materials and commodity markets are investigated. The demand for incremental (spot) volumes of crude oil is found to be derived from the demand for incremental volumes of petroleum products. Insights gained from this analysis are used to establish tactical decision rules to be followed when making purchases under the provisions of the Defense Fuel Supply Center's open and continuous solicitations on behalf of the Department of Energy's Strategic Petroleum Reserve. The results of this research are also shown to be important for strategic decisions concerning the mix and timing of spot and long-term contract procurements.

Author (GRA)

(AD-P002827) Avail: NTIS HC AC/4/MF A01 CSCL 15E

This article reports on a method to improve the effectiveness of Cost Plus Award Fee contracts used for program management support services. The approach involves allowing employee participation in the receipt of award fee dollars thru a concept called Cost Plus Award Fee, Employee Participation, CPAF (EP). An example of an unsuccessful attempt to use CPAF (EP) is presented and a possible solution to problems associated with the use of EP on support service contracts is introduced. The recommended solution is centered around the use of a criteria oriented EP system, similar to criteria developed for Cost/Schedule Criteria System. A major element in the EP system presented is simplicity, in that any EP system must be easy, for a contractor to administer. The article concludes with a structured recommendation that CPAF (EP) criteria be developed and tested.

Author (GRA)
on production costs, labor management, and resource allocation. The reorganization necessary to implement the proposed evaluation policy is included.

M.A.C.

N84-24495# Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany). Unternehmensbereich Raumlufthofter. PROFITABILITY IMPROVEMENT OF PROJECTS BY EARLY CONSIDERATION OF LIFE CYCLE COST REDUCTION [VERBESSERUNG DER WIRTSCHAFTLICHKEIT VON PROJEKTEN DURCH FRUHEZEITIGE LEBENSKLUSKOSTEN (LZKBETRACHTUNG)] B. J. MADAUSS 16 Feb. 1983 32 p refs. Partly in GERMANY and ENGLISH Conf. on Ges. fuer Projektmanagement, Munich, 16 Feb. 1983 (M8B-UR-620-83-O) Avail: NTIS HC A03/MF A01 Life cycle costs, average unit fly away cost, and design to cost are defined. Program costs and program phases in the life cycle costs of a system are presented. The political decision making in the production of public goods is explained. The main milestones in and main activities during life cycle of a system are presented. The parameters influencing life cycle costs are given. 

Author (ESA)

N84-25504# Societe Nationale Industrielle Aerospatiale, Paris (France). Direction Industrielle. VALUE AND COMPETITION [VALEUR ET COMPETITION] J. BULTEL and R. TASSINARI 20 Jun. 1983 11 p in FRENCH (SNIA-S-832-501-101) Avail: NTIS HC A02/MF A01 A Frenchman associates the word value with a costly object of the finest quality. The concept does not bring up the notion of the exchange value which is implied in the American usage of the term. Value to a buyer is based on quality as well as life cycle and operating costs. To the seller, quality and production costs are factors to be considered when determining the marketing price (or value of exchange).

Transl. by A.R.H.


This paper presents an approach that in the foreseeable future could provide a significant percentage of major Army systems' life cycle actual (historical) costs. Also presented are procedures that could be implemented now to collect/derive a significant portion of those costs. This approach was tested on three Selected Acquisition Report (SAR) systems. The test procedures and results are included.

Author (GRA)


The future international competitiveness of the U.S. civil aircraft industry is examined in terms of its principal businesses: large transport, commuter, business and helicopter aircraft. There is no single view of how the U.S. large transport aircraft business may fare in the 1990s in competition with the European Airbus and a potential independent entry from Japan. U.S. international competitiveness depends on the performance of an interaction among an array of economic, market and technological variables. The United States does not have an independent entry in the larger commuter aircraft market, a market whose size continues to grow. Future U.S. international competitiveness in this business is expected to rely on the U.S. business aircraft and helicopter businesses are challenged by strong foreign competition, and imports now account for a significant share of the U.S. market.

GRA


This paper is extracted from an interim APRO report describing the results of a survey of contractor productivity measurement practices. Respondents ranking organizational performance evaluation factors listed productivity fifth in importance behind profitability, effectiveness, quality, and efficiency. Problems encountered in measuring productivity were usually due to the complexities of quantifying and relating various input and output factors involved. Although no evidence was found from the survey that an integrated total factor productivity measurement system has been implemented, production cost and productivity information is available and currently being tracked with varying success by defense contractors. The most popular indices used are value added/employer and comparison of standard hours to actual hours.

Author (GRA)
07 ECONOMICS, COSTS AND MARKETS

N84-27473#  PEL, Inc., Baton Rouge, La.
G. H. WORM Jan. 1984 34 p
(Contract F33615-83-K-5075) (AD-A140758; BRMC-83-5075) Avail: NTIS HC A03/MF A01 CSCL 105B
Part I presents a brief description of a computer program which is available to perform calculations needed in a risk analysis. The program allows a user to estimate the risk associated with any number of variables and to display the distribution of any arithmetic (+, -, and/or *) combination of the variables. The mode of operation is designed to be similar to a calculator. Rather than entering in a single number, the user must supply a low, most likely, and high for each variable. Variables can be added, subtracted, or multiplied; intermediate calculations can be stored; and the distribution of the total can be displayed at any time. Part II discussed the development of a microcomputerized statistical price risk analysis model which allows a user to estimate a distribution of total cost using complete 14 objective input. The objective characteristics of a contract which introduces cost risk are identified, and the standardized factors associated with these characteristics are defined and applied to a cost breakdown. The use of standardized factors has several advantages over subjective estimates of risk: the cost risk analysis is objective rather than subjective; estimates of risk are independent of biases and experience; risk analysis results are comparable between contracts; standardized factors provide documentation for the cost risk analysis; oversights are eliminated; and standardized factors allow for the incorporation of many different points of view. GRA

REPORT ON U.S. DOMESTIC AND INTERNATIONAL TELECOMMUNICATIONS AND INFORMATION MARKETS Final Report
Feb. 1984 204 p refs Sponsored by NTIA
(PB84-166362) Avail: NTIS HC A10/MF A01 CSCL 05C
Contents: the U.S. telecommunications equipment market, 1970-82; the data processing equipment market, 1970-82; U.S. licensing and regulation of exports and imports of telecommunications and information equipment; U.S. Government procurement policies for telecommunications and information equipment; market for U.S. firms in telecommunications services; U.S. information services industry, 1970-82; new telecommunications and information services currently available or under development; identification of the market for remote sensing by satellites; selected users of and benefits from telecommunications and information services. GRA

SPACE STATION COMMERCIAL USER DEVELOPMENT
20 Jan. 1984 51 p
(Contract NASW-3775) (NASA-CR-173688; NAS 1.26:173688) Avail: NTIS HC A04/MF A01 CSCL 22A
The commercial utilization of the space station is investigated. The interest of nonaerospace firms in the use of the space station is determined. The user requirements are compared to the space station's capabilities and a feasibility analysis of a commercial firm acting as an intermediary between NASA and the private sector to reduce costs is presented. M.A.C.

N84-28678#  European Space Agency. ESRIN, Frascati (Italy).
Information Retrieval Service.
THE ECONOMICS OF COMPUTERIZED INFORMATION DISSEMINATION
Avail: NTIS HC A02/MF A01
The European information dissemination market is reviewed. The fusion of political and economic factors is discussed. Future trends are indicated. Author (GRA)

N84-30662#  Naval Sea Systems Command, Washington, D.C.
IMPROVING SYSTEM AFFORDABILITY
(AD-A142387) Avail: NTIS HC A02/MF A01 CSCL 05C
This paper is an announcement of the expansion of the Navy's Standard Electronic Module Program (SEMP) into a larger more comprehensive program to be known as SHARP for Standard Hardware Acquisition & Reliability Program. The paper is intended to discuss the factors which impact cost in all phases of the program's life; a common sense look at what major cost drivers are, and what can be done to control them. The paper will analyze standardization, quality, reliability, testability, and reparability with a look at their impacts on Navy life cycle costs. Special emphasis will be placed on the ability of standardization programs to adopt new technologies. In this day of increased costs and restriction of funds, it is imperative that weapons systems developers recognize the full impact of their efforts on overall life cycle costs and not concentrate solely on the development phase. GRA

N84-32263#  Boeing Military Airplane Development, Wichita, Kans.
PROFIT RESPONSIBILITIES IN THE SIMULATION AND TRAINING EQUIPMENT INDUSTRY
(AD-P605497) Avail: NTIS HC A17/MF A01 CSCL 05C
The objective of increased readiness through training can be enhanced through mutual military/industry efforts to support a viable earnings position. Strong financial health of companies competing in the mutual market provides the resources, knowledge and systems that supply advanced technology and products that meet military training objectives. Government agencies can contribute by providing clear definitions of the product needed, by imposing
only specifications necessary to meet acceptable quality, and by contracting provisions commensurate with program risk. With firm product goals and applicable specifications, industry can minimize risk through sound planning and stable performance. Industry can contribute by developing resources and systems that are efficient and effective in providing training products. Capability growth fosters innovativeness in advanced planning and productiveness, which are significant to providing quality products on schedule at the lowest cost possible. Industrial growth to bring this about is possible only if industry is in a strong financial position.

Author (GRA)


COST AND SCHEDULE CONTROL SYSTEMS CRITERIA FOR CONTRACT PERFORMANCE MEASUREMENT, INFORMATION PAMPHLET

May 1984 54 p (DE84-012576; DOE/MA-0155) Avail: NTIS HC A04/MF A01

Interested DCE and industry personnel are informed about the basic concepts and general requirements of the Cost and Schedule Control Systems Criteria (CSCSC) of DOE Order 2250.1A. The CSCSC do not represent a management system nor are specific methods of organization or operation prescribed. The criteria are intended to serve as standards of measuring adequacy of management control systems. Objectives in using the criteria are: (1) to provide an accurate status of contract progress; (2) to provide early visibility to problems - prevent surprises; (3) to improve estimated final cost projections; (4) to improve on shortcomings of prior requirements; and (5) to minimize proliferation of systems and data problems. The CSCSC contain thirty-five criteria which are grouped into five categories: organization; planning and budgeting; accounting; analysis; and revisions and access to data.

Author (GRA)

N84-32269# Civil Aeronautics Board, Washington, D.C.

VOLUNTARY ACCOUNTING SYSTEMS FOR A SMALL AIR CARRIER: REVENUES, FINANCIAL AND TRAFFIC STATISTICS

1984 122 p refs (PB84-210986) Avail: NTIS HC A06/MF A01 CSCL 05A

The Civil Aeronautics Board published a booklet to assist small airlines in setting up internal accounting procedures. The booklet shows small airlines not subject to CAB financial filing requirements how to set up their own internal systems. No mandatory requirements are included in the booklet. The CAB is providing it to small airline companies as a service. The booklet describes methods of setting up balance sheets, profit and loss accounts, key statistical ratios for management analysis and evaluation, and methods to calculate various traffic statistics.

Author (GRA)

N84-34205# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).

WORST CASE PERFORMANCE OF SOME HEURISTICS FOR LOT SIZE PROBLEMS (DESEMPENHO, NO PIOR CASO, DE ALGUMAS HEURISTICAS PARA PROBLEMAS DE TAMANHO DE LOTE)


The uncapacitated dynamic lot size problem was considered. The worst case performance of some heuristics which use the idea of minimizing the average cost per unit is presented. These heuristics have arbitrarily large errors.

Author (GRA)
obtaining airspace for flight tests of new aircraft configurations are explored.

**A84-15213**

MANAGEMENT OF LOGISTIC SUPPORT COSTS IN THE EQUIPMENT ACQUISITION PHASE


DOD-supported research. Approximation approach. Management control objectives in the logistic support cost (LSC) commitment goal communicated to contractors by the DOD during equipment procurement are explored. A cost model framework (CMF) is communicated to the contractor in order to establish controllable equipment logistic parameters prior to bidding for contracts. A cost target is determined, including an estimate of how well the equipment will perform in the operational environment of the LSC. Particular attention is given to factors which will influence the life cycle cost of the equipment, and thus affect the cost estimates at the onset. Statistical sampling is performed with a Poisson failure assumption. Consideration is also devoted to questions of legal responsibility and risk.

**A84-20645**

SOME TECHNICAL AND CONTRACTUAL ASPECTS OF TRANSPONDER LEASING BY EUTELSAT


After reviewing the services offered by the EUTELSAT system in general, the paper concentrates on the transponder lease service. The general technical characteristics of the resources available for leasing are reviewed. The development of the offering of the leasing service is described both in the light of the Constitutive Agreement of the EUTELSAT Organization and its increasing significance vis-a-vis other services. In particular, the process followed to enable the Organization to meet the consumers' demand for such service from a legal viewpoint is described. Finally, the paper deals with the approach followed in developing difference types of lease agreements and outlines their salient features.

**A84-44732**

THE O'HARE RUNWAY CONFIGURATION MANAGEMENT SYSTEM


The computer-logic Runway Configuration Management System (RCMS) developed for O'Hare International Airport as part of the FAA Integrated Flow Management program is characterized. The configuration of the O'Hare TCA is described, and its efficiency is shown to be primarily dependent on runway utilization. The logical structure of the RCMS is explained; the roles of the tower-cab, airway-facilities, and assistant-chief positions in its operation are described; the primary advantages of RCMS are examined; and the integration of RCMS in an overall automated ATC system is considered. Flow charts, maps, and sample printouts are provided.

**A84-45666**

A MULTI-ITEM MAINTENANCE CENTER INVENTORY MODEL FOR LOW-DEMAND REPAIRABLE ITEMS


In many military and commercial contexts, complex equipment undergoes scheduled maintenance overhauls at regular intervals during which all failed components are replaced. Failure to have replacements on hand for all failed parts requires emergency measures at premium cost. When reparable parts are highly reliable and expensive, both holding and shortage costs are high. This model determines the repairable parts inventory for a maintenance center under three alternative criteria: (1) maximizing job-completion rate subject to constraint on total holding costs, (2) minimizing total holding costs plus expected job noncompletion costs, and (3) minimizing total holding costs subject to a required minimum job-completion rate. Exact solutions may be obtained using dynamic programming. Approximate solutions, found easily by marginal analysis, have readily computed bounds on possible error. The solution methods for the three formulations are illustrated in a simple example.

**A84-46582**

AIRLINE MAINTENANCE MANAGEMENT SYSTEM (AMMS)


The Airline Maintenance Management System (AMMS) is a user-friendly interactive computer simulation management game offering a system-wide perspective on airline maintenance operations at the management level, and is intended to serve as an educational tool in airline maintenance managers' training for planning, organization, coordination, and operations control functions. Scheduled aircraft are described by the AMMS model as transactions which undergo maintenance on the basis of an individual aircraft maintenance schedule.

**A84-13146**

INTEGRATED LOGISTIC SUPPORTABILITY (AVIATION MATERIEL) Final Report

1 Sep. 1983 43 p (AD-A132367; TOP-7-3-507) Avail: NTIS HCA03/MFA01 CSCL 91C

This TOP(Test Operations Procedures) presents a systematic method for conducting an integrated logistic supportability test in the developmental test environment. Subelements of the logistic supportability test covered by this TOP are: End item requirement; Supply support; Technical data/equipment publication; Support and test equipment; Manpower and personnel, training, and training devices; Transportation and Handling; and Facilities.

**A84-14115**

THE AIRCRAFT AVAILABILITY MODEL: CONCEPTUAL FRAMEWORK AND MATHEMATICS

T. J. OMALLEY Jun. 1983 111 p (Contract MDA903-B1-C-0168) (AD-A132927; AD-F630003; LMI-AF201) Avail: NTIS HCA06/MFA01 CSCL 01C

The Aircraft Availability Model (AAM) is an analytical model and decision support system that relates expenditures for the procurement and depot repair of recoverable spares to aircraft availability rates, by weapon system. The AAM is based on standard probabilistic and marginal analysis concepts of inventory systems theory. It addresses both the multi-echelon aspect of supply (e.g., depots and bases), and the multi-indenture relations that exist among components. The report provides a complete description of the AAM: what the model does, how it does it, and the underlying mathematics. A description of the U.S. Air Force application to the programming, budgeting, and allocation of resources for recoverable spares is included.
The Indonesian Defense Logistics Assistant has always been a major important factor in the establishment of the Indonesian Defense Logistics Management Information System (MIS). The objective of this research was to develop a procedure to describe the basic roles of these managers during the MIS development.

A review of classical system development methodologies and factors affecting the success and failure of MIS was used as a foundation for developing the procedures. The seven steps of MIS design as outlined by Joel E. Ross was selected, enumerated, and applied to the Office of the Indonesian Defense Logistics Assistant environment. Further analysis on Determination of Information Needs was used as an example. Although additional research involving how to implement the managers' roles in the MIS development will be needed, this research will become a useful MIS development reference guide for the managers in the Office of the Indonesian Defense Logistics Assistant.

Author (GRA)
planning of automated materials handling equipment or automated warehouses. In addition, current guidance used for ASRS project planning and management are inadequate for such a complex undertaking. This thesis reviews up-to-date trends in the materials handling industry and modern ASRS project management. From the review, those considerations relevant to future Air Force ASRS projects are evaluated. Additionally, recommendations on how future Air Force ASRS projects should be planned and managed are offered. The recommendations put forward in this thesis should benefit managers of future Air Force ASRS projects.

Author (GRA)

N84-19280# Naval Postgraduate School, Monterey, Calif.
A MULTI-PERIOD REPAIR PARTS INVENTORY MODEL FOR A NAVAL AIR REWORK FACILITY M.S. Thesis
A. S. ASSELIN Sep. 1983 71 p
(AD-A136873) Avail: NTIS HC A04/MF A01 CSCL 15E

A ready supply store (RSS) containing repair parts which are anticipated to be used during the production process has been established to support the naval air rework facility (NARF). While this supporting inventory was previously constructed using historical demand data, a single period model and a two-period model have been proposed which compute stock levels based on quarterly production schedules. This thesis extends the use of the projected production information in calculating RSS inventory levels from two periods to multiple periods. The disadvantage of the single period model is that it ignores information about future schedules. The multi-period model uses the information on future schedules to behave more optimally. The multi-period model shows significant differences in inventory levels over the single-period model as a result of the added information. The multi-period model is easily programmed on a computer and is preferred over the single-period model.

Author (GRA)

N84-19390# Industrial Coll. of the Armed Forces, Washington, D.C.
MOBILIZATION AND DEFENSE MANAGEMENT TECHNICAL REPORTS SERIES. MANAGEMENT IMPLICATIONS OF INDUSTRIAL SUPPORT CAPABILITIES FOR SPACE SHUTTLE OPERATIONS
J. F. REYNOLDS and J. L. GRAHAM, JR. May 1983 88 p
(AD-A137460; NDU/ICAF-83/013; IR-15) Avail: NTIS HC A05/MF A01 CSCL 22B

This study examines implications of Space Shuttle logistics support concepts and policies, which have been planned to rely heavily on contractor or vendor support through a substantial portion of the system's operational life, especially in the areas of spares and maintenance. The analysis focuses on the effects of open production lines and the impact on logistics support if production is completed or terminated, with ensuing shutdown of those lines. Unique characteristics of Space Shuttle support in terms of equipment, organizational roles, and funding and cost are identified; and risks associated with both operational support and funding are addressed.

Author (GRA)

N84-21112# Du Pont de Nemours (E. I.) and Co., Aiken, S.C.
Savannah River Plant.
USE OF MICROCOMPUTERS FOR INVENTORY MANAGEMENT WITH UNCERTAIN DEMAND
(Contract DE-AC09-76SR-00001) (DE84-005179; DP-MS-83-105) Avail: NTIS HC A02/MF A01

How a microcomputer is used for analysis of inventory trends to optimize inventory investment and customer service level in a system, with a range of uncertainty, and to support an inventory subsystem resident on a main computer was described. A microcomputer gives the user total control over the system, immediate response, low cost, and spreadsheets for fast, accurate ongoing analysis.

DOE

CONSOLIDATION OF DOD BIDDER'S MAILING LIST APPLICATION Final Report

This paper describes a need to streamline the processing of Bidder's Mailing List (BML) applications, Standard Form 129, as supplemented, and at the same time, takes the first step toward modernizing an important element in our acquisition process. History has shown us that wars are lost because of the lack of supplies in the right place at the right time. With today's modern weapons systems, flight faster than sound, capability to land on the Moon and return to Earth and numerous other spectacular accomplishments, it would be negligent not to concentrate also on our ability to support these systems with rapidity and effectiveness. The consolidation of the BML applications to one or more locations would be cost-effective for Government and industry. This paper also suggests what research might be done on the need to consolidate could well be the first step in streamlining the acquisition process.

Author (GRA)

N84-23303# Army Logistics Management Center, Fort Lee, Va.
DESIGNING THE EQUITABLE RISK CONTRACT Final Report

A department of Defense contracting faces such great uncertainty that contracts must be designed to share the resultant risk. This paper describes the steps for this risk-sharing: assessing sources of uncertainty and their probability of impact, assessing the impact of their uncertainties on both contractual parties' objectives, combining these impacts for total risk to the objectives, prioritizing the parties objectives, selecting the proper contractual devices to equate them, and selecting the proper contractual devices to this equilibrium. The paper also suggests what research might be done on: (1) assessing the impact of uncertainties on contractual objectives, (2) developing operations research models to optimize risk sharing, (3) the impact of contractual devices on objectives, and (4) the design of experiments to effect this research.

Author (GRA)

N84-23322# Analytics, Inc., Dayton, Ohio.
INCREASING SPARES COMPETITION IN AFLC (AIR FORCE LOGISTICS CENTER) Final Report

This paper describes the results of a research effort sponsored by the Air Force Business Research Management Center at Wright Patterson AFB. The focus of the research was on the identification of the impediments to competitive spares acquisition and definition of those actions which can be taken to improve the capability of Air Force to achieve competition on spare parts. The effort consisted of an extensive search of the literature and field visits to Air Logistics Centers involved with the purchase of spare parts. The research was structured around analysis of the impact of the Procurement Method Code on the competitive activities. The results of the research is a set of recommendations covering systemic changes in the initial system acquisition process and in the procedures used at the Air Logistics Centers in item screening and contracting which should provide the capability to improve the degree of attained competition for Air Force spare parts.

Author (GRA)
08 LOGISTICS AND OPERATIONS MANAGEMENT

N84-23326# Notre Dame Univ., Ind.
THE MAKE OR BUY DECISION—ITS NATURE AND IMPACT
Final Report
J. G. BEVERLY, F. J. BONELLO, J. DASCHBACH, and W. I. DAVISSON
In AF Business Research Management Center Proc.
of the Fed. Acquisition Res. Symp. with Theme p 185-187
1983
(AD-P002779) Avail: NTIS HC A24/MF A01 CSCL 15E
There is no contractor at this time, in this Nation who can
fabricate all the components needed for a major weapons system
and deliver it in the time required and within cost limits. Therefore,
the prime contractor must subcontract out certain of the
components and parts needed for the system assembly. How do
contractors make this division regarding the components and parts
to be made versus those to be bought? This paper reviews the
background for this area providing the theory and the practices
as found during a recent study for the Air Force Business Research
Management Center.
Author (GRA)

N84-23327# Naval Air Systems Command, Washington, D. C.
MULTI-YEAR PROCUREMENT A "TEAM APPROACH" Final Report
H. S. FROMER and J. L. SWEENEY
with Theme p 188-192 1983
(AD-P002780) Avail: NTIS HC A24/MF A01 CSCL 15E
Teamwork, as demonstrated by Congressional actions to alter
the laws, DoD's management and policy initiatives, the services
requirements and funding planning and contractors and subcontractors productivity and risk assumption efforts has yielded
better than expected results in the application of the Multi-Year
Procurement Initiative Government, while recognizing that
multi-year does not fit all programs, is realizing better than projected
savings on the programs that have been selected for multi-year. Industry has found that an aggressive multi-year approach can
stabilize employment, aid in their modernization programs and
increase the efficiency of their existing operations. Everyone has
found that the rewards have far exceeded the risks and it remains
for Congress to determine whether it can overcome its penchant
for year to year adjustments and take a long term view of defense
procurement so that the scope of the multi-year application can
grow beyond its present foothold. Meanwhile, Multi-Year
Procurement, the 1980's version, is providing all the expected
benefits by driving unit costs down, while improving our defense
industrial base and putting people back to work, truly a initiative
for our times.
GRA

N84-23338# Oklahoma City Air Logistics Center, Tinker AFB, Okla.
RECONCILING THE PHILOSOPHY OF SPARE PARTS
ACQUISITION: PROJECT PACER PRICE Final Report
G. LEININGER
with Theme p 239-242 1983
(AD-P002781) Avail: NTIS HC A24/MF A01 CSCL 15E
On June 1st, 1983, a new program called PACER PRICE began
operation at the Oklahoma City Logistics Center. Staffed by
an interdirectorate group of engineers, manufacturing planners,
price analysts and packaging specialists, the program was designed
as a thorough and comprehensive review process to determine
optimum purchase method and price for every actively-purchased
replenishment spare part managed at the Center. After three
months of program operation, approximately 62 percent of the
sole-source items have been recommended for competitive
purchase, and the prices recommended for these items average
about 35 percent below the latest contract prices adjusted for
quantity and inflation. But beyond that, a new Philosophy of spare
parts purchase has been formulated and effected as a procedural
caveat: All spares should be both purchased competitively and
PRICED TO CONFORM WITH COMPETITIVE-MARKET PRICES.
The paper focuses on this philosophy, detailing in particular the
mathematical models used to simulate competitive prices, and
offers suggestions for further research into the competitive market
place.
Author (GRA)

N84-23350# DOD Weapon Support Improvement and Analysis
POLICY INITIATIVES TO ACHIEVE READINESS AND SUPPORT
OBJECTIVES Final Report
J. D. ARCIERI
In AF Business Research Management Center Proc. of the Fed. Acquisition Res. Symp. with Theme p 327-329
1983
(AD-P002804) Avail: NTIS HC A24/MF A01 CSCL 15E
The fundamental responsibility of the Defense logistics
community is to ensure the timely availability of the requisite support
to enable our forces to effectively deter aggression, and should
deterence fail, to successfully undertake military operations that
prevent the enemy from achieving his goals at minimum war cost
to the U.S. and our allies. In essence, this means the logistics
community of organic and industrial capability, must ensure military
force readiness and sustainability. This formidable responsibility
imparts a concurrently dual-edged challenge: obtaining affordable
Life Cycle Cost/effective supportable systems; and continuing
improvements in the effectiveness and efficiency of our logistics
systems' operations. To meet this challenge DoD has undertaken
several policy initiatives to achieve more intensive and effective
logistics involvement in the acquisition process. Particularly,
attention has been given to changing top level policy
directives and instructions, and in changes to the logistics support
analysis requirements outlined in MIL-STD-1388. The purpose of
these changes being to concentrate adequate management
attention on the early phases of the acquisition process where
the greatest influence can be made on system design
characteristics.

N84-23351# Army DARCOM Materiel Readiness Support Activity,
Lexington, Ky.
1982 US ARMY MATERIEL DEVELOPMENT AND READINESS
COMMAND (DARCOM) INTEGRATED LOGISTIC SUPPORT (ILS)
STUDY FINDING ON CONTRACTING FOR ILS Final Report
D. M. MORGAN
In AF Business Research Management Center Proc. of the Fed. Acquisition Res. Symp. with Theme p 330-333
1983
(AD-P002805) Avail: NTIS HC A24/MF A01 CSCL 15E
This paper gives a general overview of the objective, organization, and approach used by the 1982 DARCOM Integrated
Logistic Support Study. The seven high payoff areas that the
study concentrated on are listed but only the results of the
solicitation documents study effort are discussed in detail. Each
action item developed by the solicitation documents subgroup is
discussed in detail to include a description of both the problem
and recommended correction(s).
Author (GRA)

N84-23352# Army DARCOM Materiel Readiness Support Activity,
Lexington, Ky.
THE NEW MIL-STD'S (MILITARY STANDARD) 1388 Final Report
J. E. PEER and D. L. MCHRISTAL
with Theme p 334-339 1983
(AD-P002806) Avail: NTIS HC A24/MF A01 CSCL 15E
The concept for Logistics Support Analysis was originally set
forth in MIL-STD-1388-1 published in October 1973. Since that
time each service has pursued an independent course in the
applications of LSA. DoD policies and directives for Integrated
Logistic Support Study. The seven high payoff areas that the
study concentrated on are listed but only the results of the
solicitation documents study effort are discussed in detail. Each
action item developed by the solicitation documents subgroup is
discussed in detail to include a description of both the problem
and recommended correction(s).
Author (GRA)
Requirements for a Logistic Support Analysis Record (LSAR). This document describes the data elements, definitions, and input data records for the DoD standard LSAR which is currently under development. Author (GRA)

N84-23353# Army DARCOM Materiel Readiness Support Activity, Lexington, Ky.

CENTRAL DEMAND DATA BASE (CDBB) END ITEM CODE (EIC)

Final Report
G. CAMPBELL

(AD-P002807) Avail: NTIS HC A24/MF A01 CSCL 15E

One of the most difficult tasks facing Army Logisticians is the accurate determination of the repair parts stockage levels to support the equipment in the hands of the soldier. Decisions on total repair parts consumption are based on demands, but repair parts for individual fielding of equipment in operational units are based upon estimates known as Failure Factors (FF’s). These FF’s established during the initial deployment of equipment are used throughout that equipment’s life cycle. To update FF’s, individual repair parts consumption must be identified to a specific end item application. The problem has been that there is no data source sufficiently reliable and valid to identify and collect data to update FF’s. The End Item Code was designed to accomplish the identification and capture of individual repair parts consumption by specific end items, and provide the Army managers with an accurate record of repair parts consumption throughout the life cycle of an end item. Author (GRA)

N84-23354# Logistics Management Inst., Washington, D. C.

IMPROVED MANAGEMENT OF SUPPORT RESOURCES Final Report
D. V. GLASS and D. W. SRULL

(AD-P002808) Avail: NTIS HC A24/MF A01 CSCL 15E

Improving the management of support resources for major weapon systems is a crucial goal for the Department of Defense. The problem of weapon systems being inadequately supported in the field because of fragmented decision making in the allocation of support resources (e.g., spares, support and test equipment) was addressed in DoD Acquisition Improvement Initiative 30. New management procedures to help correct this problem were tested during the FY83 and FY84 budget reviews and the FY84-88 program review. In this paper we evaluate the test results in terms of the feasibility of identifying individual weapon system support resource needs, and the utility of collecting and reviewing this information during key points in the planning, programming and budgeting process. We then make several recommendations to improve the trial procedures and to move the initiative to final implementation. Author (GRA)

N84-23355# Corpus Christi Army Depot, Tex.

PROJECT: ACQUISITION STRATEGY Final Report
W. D. MAJEWSKI

(AD-P002809) Avail: NTIS HC A24/MF A01 CSCL 15E

This paper describes a concept that is being observed with skepticism and an unwillingness to change that pervades throughout the management levels of the major procurement communities. This paper will discuss the trends of the ongoing smaller procurement offices that directly support production facilities in the United States Army. The growth in central procurement that is evolving haphazardly is causing confusion and will provide an explanation where the elements have a staggering effect upon the readiness and hence responsiveness of the military. Author (GRA)

N84-23371# Naval Electronic Systems Command, Washington, D. C.

MORTALITY AND SPAREPARTS: A CONCEPTUAL ANALYSIS Final Report
F. A. P. FRISCH
In AF Business Research Management Center Proc. of the Fed. Acquisition Res. Symp. with Theme p 467-480 1983

(AD-P002826) Avail: NTIS HC A24/MF A01 CSCL 15E

The MORTALITY CONCEPT describes how a population deteriorates and what is needed to maintain a population. The populations considered are populations, or families, of spareparts needed to support military weapon systems. The mortality concept is explained and used to delineate the necessary resulting behavior of families of spareparts. The necessary behavior which follows is by necessity, from the selected MODE of acquisition (i.e., block-procurement) and from the selected QUALITY of the system. A generic model is sketched and sample calculations are provided to allow the reader to arrive at firm conclusions about the necessary behavior. Author (GRA)


MATERIAL HANDLING: A TARGET FOR PRODUCTIVITY IMPROVEMENT Final Report
R. T. GIBBONS

(AD-P002829) Avail: NTIS HC A24/MF A01 CSCL 05A

On a national basis, productivity improvement is needed to prevent inflation. Without improvements in productivity to counteract increases in wages, cost and prices, such increases lead to inflationary conditions. Air Force Contract Management Division, in a constant effort to protect the taxpayer dollar has initiated many programs such as Project Cost Initiatives which increases the depth of contractor surveillance. One of these initiatives, Material Handling Productivity improvement, has a basis in industry and has caught the interest of the academic community. With the help of these two functions, AFCDM has mounted a campaign to not only increase the awareness of the contractor’s material handling function, but also to apply productivity improvement principles for the benefit of both Department of Defense contractors and the tax paying public at large. Author (GRA)


EMPLOYMENT CHANGES RESULTING FROM THE AWARD OF CONTRACTS IN LABOR SURPLUS AREAS Final Report
D. ROBINSON and D. GILL
In AF Business Research Management Center Proc. of the Fed. Acquisition Res. Symp. with Theme p 517-525 1983

(AD-P002834) Avail: NTIS HC A24/MF A01 CSCL 15E

Until 1981, the Department of Defense (DoD), as a result of amendments to their annual Appropriations Acts (known as the Maybank Amendment), had been prohibited from setting aside procurement contracts for award in labor surplus areas (LSAs) in order to relieve economic dislocations. In 1981 a coalition of Northeast and Midwest Congressmen succeeded in having the Defense Logistics Agency (DLA) test a modification to the Maybank Amendment and measure the local employment effects of increasing DLA contract awards in LSAs. In order to assure reasonably accurate predictions of employment impacts due to the DLA Maybank Test, the U.S. Army Corps of Engineers Construction Engineering Research Laboratory developed a computer-assisted regional economic impact model (called the DLA Employment Impact System) to assist DLA with their Congressional requirement. Author (GRA)
AUTOMATING THE SOURCE SELECTION PROCESS Final Report
(AD-P002835) Avail: NTIS HC A24/MF A01 CSCL 15E

A typical source selection involves considerable administration which contributes to the consumption of program and staff office resources. Normally these resources are expended at the sacrifice of regular program office project activities since a permanent, dedicated source selection team is not cost effective. The loss to a program can be measured in terms of schedule delays, contractual gaps, and loss management control over existing programs. Therefore, the efficient and speedy conduct of a source selection is essential to the Acquisition Process. This efficiency cannot be achieved by short-cutting the required processes of source selection evaluation, analysis, and ranking. However, automating the administrative aspects of a source selection can result in a 30-50% reduction in time and resources required to evaluate the proposal. This paper will focus how this administration can and has been reduced on an existing Air Force Program through the use of microcomputers.

THE CONTRACTOR/SUBCONTRACTOR/VENDOR BIDDING LISTS Final Report
(AD-P002936) Avail: NTIS HC A24/MF A01 CSCL 15E

Our intent in this paper is to demonstrate a method by which DoD (the Air Force) can increase the defense industry base by increasing the list of companies that could bid on DoD vendor contracts as well as be available to bid on contracts from prime contractors. Our focus will be on small private business although the technique shown here could be applied to existing databases available for the establishments of SEC-registered corporations.

NAVAL AVIATION IMA REPAIR CAPABILITY: A READINESS TO RESOURCES APPROACH M.S. Thesis
D. R. MERRILL Dec. 1983 103 p
(AD-A140465) Avail: NTIS HC A06/MF A01 CSCL 05A

This thesis studies intermediate repair planning at the Naval Air Systems Command (NAVAIR) level. Maintenance information system initiatives (NAval Aviation Logistics Command Management Information System (NALCOMIS)/Naval Aviation Logistics Data Analysis (NALDA)/AIMD Performance Management System (APMS) and an analytical systems model (Analytic Hierarchy Process (AHP)) are examined. The study concludes that information system initiatives provide the performance measurement orientation and information processing base required in support of NAVAIR tactical planning. It further concludes that complex logistics problems can be modeled through the AHP. AHP is a promising technique for integrating performance information and expert opinion into a hierarchical, multiple objective planning structure. It provides a method for determining resource requirement priorities in support of readiness goals. The study recommends that research be expanded to include development of a NAVAIR decision support framework utilizing the AHP.

AN ANALYSIS OF NAVAL AVIATION CONFIGURATION STATUS ACCOUNTING M.S. Thesis
M. A. SNYDER and T. F. SNYDER Dec. 1983 125 p
(AD-A140473) Avail: NTIS HC A06/MF A01 CSCL 05A

Naval Aviation configuration status accounting and its interface with the present and future prescribed and locally developed information systems is reviewed. It was determined that the lack of coordination, integration and standardization resulting from the proliferation of locally developed systems decreases logistic support and maintenance management effectiveness. It is recommended that the prescribed Naval Aviation configuration status accounting system and the proliferation of local systems be consolidated into a single integrated system. NALCOMIS, a program currently under development, has the potential to meet all user requirements with minimal expansion to its current design.

AN/TPN-19 IMPROVEMENTS PROGRAM MANAGEMENT PLAN Feb. 1984 60 p
(AD-A140728) Avail: NTIS HC A04/MF A01 CSCL 17G

The purpose of the AN/TPN-19 Landing Control Central (LCC) is to provide a modern, reliable, air transportable terminal area
radar air traffic control system to perform effectively under conditions of heavy precipitation and high traffic density in support of world wide tactical operations. The AN/TFN-19 program resulted in the procurement of 11 systems: two prototypes refurbished to production configuration, and nine production units. The present program directs Air Force Systems Command (AFSC) to initiate a program to improve the operational effectiveness of the AN/TFN-19 LCC. Air Force logistics command (AFLC) is designated supporting command, Air Force communications command (AFCC) the operating command and Air Force operational test and evaluation center (AFOTEC) and Air training command (ATC the participating commands.

GRA

N84-26962# Selenia Industrie Associate S.p.A., Rome (Italy). Naval System Div.
THE LIFE CYCLE COST OF INTEGRATED LOGISTIC SUPPORT
U. G. FLORIO In its Rivista Tec. Selenia, Vol. 8, No. 1 p 1-5 1982 refs
Avail: NTIS HC A03/MF A01
Scheduling of preventive maintenance within the general context of the life cycle cost of integrated logistic support is discussed. The principal categories of support cost are considered and a procedure of optimizing the total cost for the evaluation of a fundamental logistic parameters is developed using Markov models. The Markov approach allows the examination of the functional relationships between system reliability, maintenance policies and the costs of integrated logistic support. The life cycle cost of the logistic support is optimized, and the results permit a correct cost/efficiency scaling of the support. Author (ESA)

N84-27587# Naval Postgraduate School, Monterey, Calif.
CONTRACT AUDIT FOLLOWUP: ITS IMPACT ON DEFENSE CONTRACTING M.S. Thesis
D. V. SMITH Dec. 1983 116 p (AD-A140627) Avail: NTIS HC A06/MF A01 CSCL 05A
Department of Defense Directive 7640.2 Policy for the Followup of Contract Audit Reports, has created controversy both within DoD and the defense industry. Critics have claimed that the policy causes a fundamental shift in the relationship between the contracting officer and contract auditor, strengthening the auditor’s role while eroding the independence and authority of the contracting officer. The available literature on the policy is highly subjective and consists primarily of the assertions of top management, both in government and industry, either supporting or denouncing the policy. The primary purpose of this study was to objectively investigate the specific claims of critics and to explore the overall impact of the followup policy on defense procurement. The thesis is based on an analysis of data collected from interviews of procurement managers, contracting officers, and auditors within the state of California and telephone discussions with procurement professionals nationwide. Author (GRA)

N84-27588# Analytics, Inc., Dayton, Ohio.
The research was motivated by the need to improve the competitive position of Air Force logistics Command and focuses on data problems which decrease competition. The ability to successfully breakout an item requires data and data rights to define the physical and functional attributes of parts, manufacturing techniques, and other information that permits a competent source to produce the part. Part 4 reviews information uncovered in Phase 2 and 3 and outlines recommendations concerning data rights, data management, management planning, and economic analysis done to complete an item. Author (GRA)

N84-28663# Notre Dame Univ., Ind.
This study has been conducted for the Air Force Business Research Management Center at Wright-Patterson Air Force Base, in Dayton, Ohio (AFBRC). It has consisted of three phases. Phase one was a literature search and documentation. Interviews were also conducted with key government and industry personnel. Phase two included the development and the distribution of a questionnaire to the NCMA membership. A series of small conferences with industry and government personnel, and a pilot study of several companies. The pilot study was designed to assess what companies actually do or do not do once an incentive contract was obtained. Phase three compiles and presents the final conclusions and recommendations. Author (GRA)

N84-28671# Naval Postgraduate School, Monterey, Calif.
THE DATABASE MANAGEMENT MODULE OF THE SPLICE SYSTEM
SPLICE (Stock Point Logistics Integrated Communications Environment) is a plan designed to automate data handled at Stock Points and Inventory Control Points for the United States Navy Supply System. The SPLICE concept involves the use of a number of Local Area Networks which communicate via the Defense Data Network. As a part of the ongoing research in the implementation of SPLICE, this (Continued) thesis addresses the Database Management Module of the Local Area Network and possible problem areas which may be encountered when this module is finally in place. A proposed conceptual design of the database is presented and database computers are evaluated for possible use in SPLICE. Author (GRA)
This report is an evaluation of the FAA's program to modernize the National Airspace System and reduce maintenance and operation costs through replacement of present systems with state-of-the-art equipment, centralization of the maintenance work force and remote monitoring of equipment/facilities. A conclusion of the study was the FAA's Maintenance Program which is a viable approach to meeting these goals. The AT&T study team made seven recommendations they believed would ensure improved productivity and reduced operating costs. The objectives of the AT&T study were to evaluate the FAA's modernization program, and then, based on AT&T's experience in their modernization effort, make recommendations to improve the FAA's program. The recommendations can be generalized into three areas which are: (1) Separate the monitoring and control of facilities from the automation and centralization of operations, thereby enabling independent efforts in those areas, (2) Establish an overall program management plan, and (3) Establish a model for centralization of the work force in the automated environment.

Author (GRA)

Activities of the National Airspace Review (NAR) are examined. The costs of complex military flight simulators have been steadily rising, causing all concerned to carefully evaluate procurement and life-cycle costs of these devices. In making these evaluations, the issue is often raised that commercial airline simulators of comparable quality can be procured for less money and with shorter schedules. This paper provides a comparison of military and commercial procurement methods, concentrating on the major differences between them. It analyzes the key discriminators between military and commercial requirements which collectively cause simulator procurement and program practices to be so different, and costs to vary so widely, when the resultant flight simulators procured by both methods are highly regarded for their training capabilities. Recognizing that some of the military requirements are unique and necessary, this paper takes the position that military simulator procurement can utilize some of the methods employed in commercial procurements to reduce life-cycle costs.

Author (GRA)

This Technical Objective Document was prepared by the Materials Laboratory and describes the Materials Technology Planning Objectives (TPOs) for meeting future Air Force operational needs. The six TPOs encompass the full spectrum of materials capabilities required for future aircraft, missile, space, and electronic systems-Thermal Protection Materials; Aerospace Structural Materials; Aerospace Propulsion Materials; Fluid, Lubricant, and Elastomeric Materials; Protective Coatings and Materials; and Electromagnetic Windows and Electronics.

GRA

Usuing a synergistic approach, the NAR is comprehensively reviewing current air traffic control procedures, flight regulations, and airspace for the purpose of validating the current system or providing the operational framework for moving into the next generation National Airspace System. Specifically, purposes of the NAR are: (1) Conduct an in depth study of airspace and procedural aspects of the existing air traffic system, (2) Identify and implement changes that will promote greater efficiency for all airspace users, (3) Simplify the Air Traffic Control system, (4) Match airspace and air traffic control procedures to technological improvement and fuel efficiency programs.

M.A.C.
the simulator design, and (6) retrofit/update of all delivered devices to the final aircraft configuration. GRA

**N84-32259#** General Electric Co., Daytona Beach, Fla.
**THE PROGRAM PLANNING REVIEW (PPR): MILESTONE OR MILLSTONE?**
Current Air Force practices invoke the Program Planning Review (PPR) and its associated data submissions and review meetings on all new simulator procurements. The PPR, as defined by Air Force policy, provides both the contractor and Air Force program offices with insight into the program plans to assure successful completion of all contract objectives. This paper summaries the successful completion of the PPR requirements on a current Air Force simulator contract where proper preparation and implementation of the program plans by the contractor, and prompt, explicit review by the government, resulted in a program baseline which has met all cost and schedule objectives to date. GRA

**N84-32262#** Burttek Corp., Tulsa, Okla.
**LOGISTIC SUPPORT: A COMPUTER MANUFACTURER’S VIEWPOINT**
When the Department of Defense directed that commercially available standard off-the-shelf computer systems would be used for military simulation programs in place of special militarized computers the intent was clear: Cut costs! Now, more than a decade after that DoD directive, it is possible to look back and recognize the value of the decision, and identify many of the problem areas that have been created for the military simulation program organizations. The military services have attempted to address the problems posed by the apparent conflict of needs but have met with minimal success. This paper is a computer manufacturer’s look at some of the support problems that have been created by the use of commercially available computer systems, some of the solutions that have been considered, and some actions that should be explored if resolutions to the problems are to be achieved. Author (GRA)

**N84-32266#** Oak Ridge National Lab., Tenn. Energy Div.
**AN EVALUATION OF THE SYSTEM 2000 DATA BASE MANAGEMENT SYSTEM FOR USE IN MAJOR ITEM SYSTEM MAPPING**
The study compares the short and long term requirements of the Major Item System Mapping (MISM) computer software system with the capabilities of the System 2000 data base management system. The MISM system is intended to provide a system oriented approach for budgeting and managing major items of equipment. Both the hardware resource requirements and software features of System 2000 were evaluated. DOE

**MICROCOMPUTERS IN TRANSPORTATION: SOFTWARE AND SOURCE BOOK**
The Urban Mass Transportation Administration (UMTA) and the Federal Highway Administration (FHWA) of the U.S. Department of Transportation provide training and technical assistance in the new and rapidly changing area of transportation application of microcomputers. These two agencies maintain up-to-date microcomputer references for transit and paratransit operators, transportation planners, and traffic engineers. This document contains information pertaining to: (1) microcomputer references and training, and; (2) descriptions of software in the areas of transit operations, transportation planning, traffic engineering, and paratransit planning and operations. GRA

**N84-33209#** Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Systems and Logistics.
**AN EVALUATION OF TWO RELIABILITY AND MAINTAINABILITY INFORMATION SYSTEMS M.S. Thesis** L. K. BOCK Jan. 1984 72 p (AD-A143438; AFIT-LSSR-86-63) Avail: NTIS HC A04/MF A01 CSCL 05A
Air Force managers require adequate and timely information in order to make effective decisions regarding reliability and maintainability (R&M) issues. Since 1980, at least two Air Force organizations have contracted for additional computer data base systems to improve their R&M data requirements. These data base systems provide real-time maintenance and operational data on certain weapon systems. This study analyzed the characteristics of these new data base systems to determine if they provided improved information and comparison with the standard Air Force maintenance and operational data reports. It was shown that the two new data base systems did provide more timely R&M data which resulted in information that allowed for effective and efficient managerial decision making. However, all the timely information available for managerial decisions will be hindered until data input errors are reduced. Author (GRA)

**N84-33308#** Regional Planning Council, Baltimore, Md.
**SCENARIO PLANNING: ENERGY CONSIDERATIONS IN THE LONG RANGE URBAN TRANSPORTATION PLANNING PROCESS**
The incorporation of energy conservation in regional planning framework was studied. The scenario technique is a comprehensive approach which considers the interaction of energy issues with transportation and other planning concerns such as land use, technological change, and economic development. The project created several hypothetical futures typified by varying levels of oil availability, and constructed sets of policy responses designed to deal with the problems typifying those future conditions. Unique insights are gained which could not have emerged in the course of more conventional planning. DOE

**N84-33366#** Naval War Coll., Newport, R. I. Dept. of Naval Operations.
**AVCAL (AVIATION CONSOLIDATED ALLOWANCE) RESTORATION PROGRAM AND AIRCRAFT MATERIAL CONDITION**
B. H. WELCH, III 22 Jun. 1984 40 p (AD-A144045) Avail: NTIS HC A03/MF A01 CSCL 05A
The direct relation between spare parts and aircraft material condition is intuitively obvious, but forecasting what a given finding of spare parts will produce in terms of aircraft readiness has previously been more art than science. The Aviation Consolidated Allowance (AVCAL) Restoration Program, a $2.3 billion funding of repairable spare from FY 81 to FY 89, was originated by the Aviation Supply Office (ASO) to correct present spare parts deficiencies. A thorough review of the AVCAL Restoration Program (ARP) describes the various spare parts initiatives underway, after an overview of the current aviation supply system demonstrates the value of stressing repairable spare parts deficiencies. While the ARP was coming into being, the Center for Naval Analyses (CNA) has provided the quantification of the relation between spare parts and aircraft material condition. The CNA model will be described and used to estimate the effect of the ARP. GRA

87
LOGISTICS AND OPERATIONS MANAGEMENT

IMPROVEMENTS IN WORK OF AIRCRAFT REPAIR PLANT NO. 402
Avail: NTIS HC A04

Working conditions and accomplishments in an aircraft repair plant are discussed. Production effectiveness and work quality in the repair of engines for aircraft, cargo liners, and helicopters are outlined. Increasing labor productivity is emphasized. E.A.K.

09 RELIABILITY AND QUALITY CONTROL


A84-10026# APPLICATION OF SOFTWARE ENGINEERING STANDARDS - A REPORT ON THE STATE OF THE ART

A84-10027# HUGHES' SOFTWARE ENGINEERING PROCEDURES IMPROVE QUALITY - DO THEY HELP PRODUCTIVITY?

The development and implementation of a software engineering procedures notebook (SEPN) by the Hughes Aircraft Company Software Engineering Division is discussed in terms of its effects on product quality and personnel productivity. Since 1978, about 15,700 hours have been expended by 93 project supervisors to generate 71 procedures totaling 1500 pages, with further effort necessary to review and update the procedures. Although quantitative measures of quality and productivity are not available, it is concluded that SEPN has a positive effect on quality which, by reducing the number of corrective tasks, more than offsets the productivity costs of generating and maintaining the SEPN and of some personnel resistance to the procedures. The latter problem is considered in detail, and it is recommended that future programs like SEPN aim for sound justification, bottom-up generation, trial implementation, tailorability, conciseness, and frequent updating of the procedures to assure personnel acceptance and implementation. T.K.

A84-10028# ISSUES AFFECTING SOFTWARE STANDARDS TO ENSURE QUALITY AND PRODUCTIVITY

The issues associated with achieving quality with accompanying high productivity in product software development are discussed. Quality and productivity are often opposing factors, and in the real world a compromise is required between quality and productivity. Issues identified relate to management's role, the designer's role, and the tester's role in quality production. In addition, emphasis is placed on the view of the development process itself from the manager's and designer's perspective. Innovative development techniques are discussed, along with an assessment of present standards and present approaches. Heavy emphasis is placed on senior management's view of risk assessment in accomplishing large-scale software development tasks. A matrix indicates items to consider for risk analysis. Author

A84-12356# PLANNING FOR RELIABILITY GROWTH

This paper discusses fundamental concepts of reliability growth plans. Government policy surrounding reliability growth management is presented along with growth curve models for use during development and operational test phases. It is found that proven growth planning techniques are available and their use aids in monitoring the achievement of operational reliability requirements. Author

A84-15208 RELIABILITY PROGRAM DEVELOPMENT AND IMPLEMENTATION FOR A REMOTE PILOTED VEHICLE

The implementation of a reliability program is described in terms of the application in the development of a remotely piloted vehicle (RPV) by the Israeli Aircraft Industries. The reliability group was responsible for reliability, maintainability, component standardization, failure reporting, analysis and corrective action, software reliability and quality, and prototype quality assurance. The reliability group became involved during feasibility analysis with small models, and studied the life cycle costs (LCC) and features of a minimum-cost RPV and an optimized RPV. Increasing the RPV cost and reliability was found to reduce ground support and maintenance costs. The reliability group performed thorough mechanical and electrical design reviews at all stages of development, and also tested manufacturers' parts before installation whenever possible. A master plan is provided for project product assurance. Author

A84-15209 RELIABILITY PROGRAMS FOR COMMERCIAL COMMUNICATION SATELLITES

This paper describes reliability programs that are in use for commercial communication satellites. Environmental conditions are presented along with system concerns and design constraints. Significant procurement policy factors are pointed out, including the development of a request for proposal, contractual provisions, on-site representation of the procuring organization at prime contractor and other facilities, and incentive provisions in contracts. The implementation of procurement policies is discussed from an historic perspective with reference to a present-day list of salient plan elements and experiences that inspired the invoking of these elements. Some of the payoffs of reliability program efforts are mentioned. While the complexity of commercial communications satellites has been increasing, high system reliability has been maintained. As an example, the continuity of service for the Intelsat space segment has been greater than 0.99995 since 1970. This has been achieved largely through effective reliability programs that have been based on conservative design techniques and stringent product assurance requirements. Author
A84-15211
MANAGERIAL DECISION-MAKING IN ESTABLISHING R&M DESIGN GOALS

The concepts of operational capability and life-cycle cost are used to develop a managerial decision model for establishing design goals for system reliability and maintainability (R&M), and the apportionment of these goals to subsystem design levels, during the conceptual phase of system development. The model uses experience, engineering judgment, etc., to provide input data on attainable R&M levels and the programs required for achieving them. Solving this model allocates effort where the resources are best according to a life-cycle cost objective function which reflects managerial aversion to cost and risk. Specifically, the model (with the solution technique) provides program managers a systematic approach for establishing R&M design goals when: (1) attainable R&M levels are not known with certainty; (2) costs are not known with certainty; (3) limited funds are available for system development; (4) constraints exist on at least some of the following factors: system availability, weight, and R&M; (5) some R&M alternatives are interdependent; and (6) the suitability of establishing R&M design goals depends on both cost and risk considerations. Utility of the model for R&M program decision making is demonstrated by applying it to the analysis of a system with 20 subsystems, each of which has a maximum of 9 possible R&M combinations. Author

A84-15216
OPTIMUM WARRANTY POLICIES FOR NONREPARABLE ITEMS
M. U. THOMAS (Cleveland State University, Cleveland, OH) IEEE Transactions on Reliability (ISSN 0018-9529), vol. R-32, Aug. 1983, p. 282-288. refs

An approach is presented for establishing and evaluating warranty policies for products receiving renewable warranties when failure occurs during warranty. A general rebate model is described that allows total compensation to a consumer for failures during a fixed period and prorated compensation for a remaining interval of time. Associated warranty costs are weighed against the s-expected benefit to be derived from the program. Conditions for optimum warranty intervals are provided. Closed form results are given for exponentially and uniformly distributed failure times. The more complicated case of Weibull failure times is demonstrated by example. A sensitivity analysis of the parameters is included. Author

A84-15217
SOFTWARE CONFIGURATION MANAGEMENT AND ITS CONTRIBUTION TO RELIABILITY PROGRAM MANAGEMENT

An introduction describes the characteristics of configuration management and outlines the key issues of knowledge and control of content, along with the targets developed for configuration management. Software, as a relatively new discipline, is still evolving standard techniques. The special properties of software which cause difficulty in configuration management are discussed. The theme moves to the planning of configuration management in order to support the reliability program. While many organizations consider configuration management at the end of development, the reasoning and recommendations (based on experience) are given for applying configuration management during the entire development and life of a project. The paper shows how to implement software configuration management and describes the method used in YARD. It concentrates on the view of the system by all users, and the impact on the ability to send software to customers with confidence, keep track of reported defects, and trace the effect of modifications on all issued software. The software configuration control system is the foundation on which all reporting systems must be based. It is an entirely different matter accumulating and analyzing failure reports on some object like a pressure transducer, the configuration control for which is easily identified, than a large software-based system undergoing continual evolution and correction. The use of computers to maintain configuration control discipline on software is essential and, in our experience, works. Author

A84-15218
SOFTWARE PERFORMANCE MODELING AND MANAGEMENT

The measurement and management of the effect of software on the reliability and operability/suitability of U.S. weapon systems are discussed. A system reliability model for determining the software failure count during the system proof-of-compliance testing is developed for management overview of software suitability. Management actions are recommended for correcting deficiencies in both military and industrial applications. The activities include assessment of system reliability, setting provisions for software quality, and providing full human factors support, the latter being significant in performing a user-oriented system analysis when system operational requirements have been defined. Attention is focused on software due to the ease of corrections that can be made in software, relative to the costs involved in correcting hardware. The emphasis is on optimization of the man/machine interface.

A84-15219
MANAGING TEST-PROCEDURES TO ACHIEVE RELIABLE SOFTWARE

Quantitative decision-making procedures are proposed to aid software project managers to manage effectively the testing stage during software project development. The module and integration testing phases are thoroughly investigated. Decision procedures which maximize the reliability and/or minimize some cost-benefit objective subject to a time and/or budget constraint are suggested. These procedures optimally allocate test time to the modules for module testing and select the optimal data mixture for integration testing. Testing of computer software is a major component of the software development effort. An efficient allocation of computer time among various modules during testing can appreciably improve reliability and shorten the testing stage. Using decision models presented in this paper, a project manager can effectively allocate test time during module testing and select the best data mixture for integration testing. The models are based upon software failure data that are collected during testing. These decision models can be valuable not only for the project manager but for the group responsible for generating the appropriate test data. Author

A84-15310
MANAGEMENT OF LARGE SPACE PROJECTS - QUALITY ASSURANCE OR 'PRODUCT ASSURANCE' [GESTION DES GRANDS PROJETS SPATIAUX - ASSURANCE DE LA QUALITE OU 'ASSURANCE PRODUIT']

Quality assurance comprises predefined procedures for obtaining products which meet all flight, ground, testing, environmental, and performance specifications. Products for space use are usually not production line items and therefore must be built right the first time, with testing covering all mechanical, electrical, thermal, radiation, and interface performance components. A large amount of written documentation becomes necessary in order to trace the progress of development of all subsystems and ameliorate any adverse effects due to the differing motivations of the industrial sector and other participants engaged in the enterprise. Product assurance is constrained by the large
number of interfaces within both the product, which may originate from off-the-shelf, original, and modified designs with subsystems manufactured in diverse places, and the organizations participating in the project.

A84-15597
R&D AND QUALITY ASSURANCE PARTNERSHIP

Complex R&D programs, such as and product oriented VLSI development, require utilization and integration of teams consisting of individuals representing a wide variety of different areas of expertise. VLSI development and pilot manufacturing, particularly, require dimensional and material quality control expertise not usually found in computer product or process design laboratories. The needed expertise can be provided by a highly professional quality assurance team equipped with state-of-the-art analytical instrumentation. Its integration into the total program team with additional program and market-oriented objectives can provide an increased overall effectiveness. The integrated team conditions stimulate creativity and leadership in all areas of expertise and improve the quality assurance team acceptance by other organizational units, even those not associated with the project.

Successful experience with the combined team strategy, as applied during the Hewlett-Packard 32-bit VLSI development program, is described here in terms of the program environment, conditions leading to the decision to invite the quality assurance team to participate, changes introduced, and specialized knowledge contributed. Results of this strategy are evaluated in the context of program and project management.

A84-24450/
SOFTWARE ENGINEERING PROJECT STANDARDS

The treatment of software engineering project standards (SEPS) and their importance begins with a general discussion of standards. After defining SEPS, issues relating to the selection, support, and use of SEPS are considered, and trends are delineated. A brief overview is given of existing software engineering standards. The emphasis on software engineering standards is expected to continue, with global software engineering standards being established. The trend toward standardizing parts of the software development process will be motivated in part by the use of automation to support this development process.

A84-41079
THE AVIATION SAFETY ANALYSIS SYSTEM (ASAS) - AN OVERVIEW

The Federal Aviation Administration's Aviation Safety Analysis System (ASAS), which is a comprehensive new system to upgrade safety-related information, is described. Five selected prominent data systems slated for inclusion in ASAS are listed and briefly described.

A84-11048#
Department of Defense, Washington, D. C.
BOTTOM LINE ACADEMIA CONFERENCE Final Report
(AD-A131043) Avail: NTIS HC A06/MF A01 CSCL 05A

Initiatives which the academic community could take to meet industry and DoD needs for the improved application and management of the quality functions are explored. The necessity of improving the image of quality in industry for both competitive and economic reasons, thus assuring the readiness of defense forces is highlighted. The role academia could play in restructuring curricula include more quality management courses in preparing future industrial leaders are discussed as being the possible catalyst in returning America to the forefront in quality.
09 RELIABILITY AND QUALITY CONTROL

RELIABILITY PROGRAMS FOR NONELECTRONIC DESIGNS,
(Contact F30602-81-C-0190; AF PROJ. 2338)
(AD-A133625, RADC-TR-83-85-VOL-2) Avail: NTIS HCA04/MFA01 CSCL 14D

Current military standards for reliability programs, reliability predictions and qualification testing were written primarily for electronic equipment where component standardization and the valid assumption of an exponential failure rate permit their direct application. These electronic systems, however, often contain nonelectronic assemblies that are critical to operational readiness, mission success or logistics support. Application of current standards to nonelectronic designs depend upon the type equipment being developed, previous applications experience, quantity of equipment to be produced and many other factors. To help identify these characteristics and formulate a set of criteria on which to base recommendations, the Rome Air Development Center distributed over 400 questionnaires throughout the Department of Defense and related industries. Volume II emphasizes the distinguishing characteristics of nonelectronic designs and provides guidelines for tailoring current reliability documents to nonelectronic designs with consideration given to mission criticality, development phase, program dollars, development time and other program constraints.

RELIABILITY PROGRAMS FOR NONELECTRONIC DESIGNS,
(Contact F30602-81-C-0190; AF PROJ. 2338)
(AD-A133624, RADC-TR-83-85-VOL-1) Avail: NTIS HCA07/MFA01 CSCL 14D

Current military standards for reliability programs, reliability predictions and qualification testing were written primarily for electronic equipment where component standardization and the valid assumption of an exponential failure rate permit their direct application. These electronic systems, however, often contain nonelectronic assemblies that are critical to operational readiness, mission success or logistics support. Application of current standards to nonelectronic designs depends upon the type equipment being developed, previous applications experience, quantity of equipment to be produced and many other factors. To help identify these characteristics and formulate a set of criteria on which to base recommendations, the Rome Air Development Center distributed over 400 questionnaires throughout the Department of Defense and related industries. Volume II emphasizes the distinguishing characteristics of nonelectronic designs and provides guidelines for tailoring current reliability documents to nonelectronic designs with consideration given to mission criticality, development phase, program dollars, development time and other program constraints.
09 RELIABILITY AND QUALITY CONTROL

MANAGEMENT INPUT IN QUALITY
In CSIR Mini-Seminar on Quality Assurance 11 p Nov. 1983 refs
Avail: NTIS HC A04/MF A01
Quality assurance, its importance and meaning to management are outlined. It is suggested that motivation of management to accept quality assurance programs and to understand it is to accept that these systems do also start with management. E.A.K.

N84-17603# Council for Scientific and Industrial Research, Pretoria (South Africa).
DESIGN QA ON A SMALL BATCH PROJECT
H. W. GRIFFITHS (TUV-Rheinland (SA) (Pty) Ltd.) In its Mini-Seminar on Quality Assurance 5 p Nov. 1982 Avail: NTIS HC A04/MF A01
Quality assurance design stages of a one off project are described. The tasks of the project manager are outlined. The need for quality assurance during design and development stages is emphasized. E.A.K.

N84-17605# GEC Machines Proprietary Ltd. Foundry (England).
MEASURING QUALITY ACHIEVEMENTS
D. A. HYND In CSIR Mini-Seminar on Quality Assurance 16 p Nov. 1982 refs
Avail: NTIS HC A04/MF A01
The effectiveness of a quality within an organization must be capable to be measured in a consistent manner, to provide evidence of improvement is outlined. Areas of weakness in the organization which will benefit most from the application of corrective measures are indicated. Quality costing and product quality are two techniques which may provide the necessary data to indicate to management the progress. The basis for future quality planning strategy are outlined. E.A.K.

N84-21128# Boeing Aerospace Co., Seattle, Wash.
Software metrics (or measurements) which are used to indicate and predict levels of software quality were extended from previous research to include considerations for distributed computing systems. Aspects of the products of software life-cycle activities which could affect the quality levels of software, and metrics to measure them, were identified. Two new quality factors, survivability and expendability, were validated. A Guidebook for Software Quality Measurement was produced to aid in setting quality goals, applying metric measurements, and making quality level assessments. New metrics for interoperability and reusability were also included in the guidebook. This volume describes the application of quality metrics to distributed systems and provides guidance for AF acquisition managers. The guidebook provides guidance for specifying and measuring the desired level of quality in a software product. GRA

N84-21130# Boeing Aerospace Co., Seattle, Wash.
Software metrics (or measurements) which are used to indicate and predict levels of software quality were extended from previous research to include considerations for distributed computing systems. Aspects of the products of software life-cycle activities which could affect the quality levels of software, and metrics to measure them, were identified. Two new quality factors, survivability and expendability, were validated. A Guidebook for Software Quality Measurement was produced to aid in setting quality goals, applying metric measurements, and making quality level assessments. New metrics for interoperability and reusability were also included in the guidebook. This volume describes a qualitative study of distributed system characteristics, reasons for selection, design strategies, topologies, scenarios, and trade-offs. These analyses lead to the changes in the Framework shown in Volume 1, and to the validation of models. GRA

N84-21404# National Aeronautics and Space Administration, Washington, D. C.
The goals, membership, and organizational structure of the NASA Productivity Steering Committee are described as well as steps taken to make NASA a leader in the development and application of productivity and quality concepts at every level of agency management. The overall strategy for the Productivity Improvement and Quality Enhancement (PIQE) Program is through employee involvement, both civil servant and contractor, in all phases of agency-wide activity. Elements of the PIQE program and initial thrusts are examined. A.R.H.
The development of a software specification that Federal agencies may use for evaluating and selecting data dictionary systems (DDS) is discussed. To supply the flexibility needed by widely different applications and environments in the Federal Government, the Federal Information Processing Standard (FIPS) specifies a core DDS together with an optimal set of modules. The focus and status of the development project are described. Functional specifications for the FIPS DDS are examined for the dictionary, the dictionary schema, and the dictionary processing system. The DDS user interfaces and DDS software interfaces are discussed as well as dictionary administration.

A.R.H.

The ultimate goal of the research program is to enhance the quality of computer software. In order to accomplish this goal, however, there have to be agreed upon notions of just what quality means and how it can be assessed. This project sought to make contribution to our understanding of these issues. One of the specific objectives of this project was to study software science metrics in the COBOL arena, another objective concerned the evaluation of principles of software development. Research also sought to examine instruments alternative to the comprehension test which are easier to create but which are still reliable and valid means of measuring one's understanding of a piece of software.

Author (GRA)

Fourty four nonfuel materials, or groups of related materials, were examined for quality assessment. It was found that 18 were usable by today's industry and 12 need no immediate quality assessment. Eight materials need immediate quality assurance because of their critical role in national defense. Summary data on storage conditions and specifications are presented for these materials. Detailed analyses of the entire stockpile should be considered for factors as likelihood of deterioration or contamination, technological changes in specifications, deficiency in analyses, quality data, and use tests or specifications, inability to expeditiously use the material in an emergency, and the cost. It is found that there is a need for detailed evaluation of many materials.

Author (GRA)

This paper examines the scope of the Air Force Logistics Command's (AFLC) mission and focuses on current management indicators and indicators related to Quality Assurance. The Quality Assurance discipline within AFLC is tasked with the responsibility of corporate oversight of the quality of workmanship of the commands' products, goods, and services. Since fiscal year 1976, adverse trends have been noted in frequency of customer reported defects on these weapon systems, and several innovative and dramatic steps have been taken to reverse this decline in the technical competence of our work. In February 1981, the command established a Maintenance Industrial Quality Study Group that was chartered to examine the entire spectrum of quality, with special emphasis on five major categories. The five categories were: Policy Guidance; People Programs; Technology; Investment Benefits; and Management Systems. The ultimate goal of the study was to formulate a quality effort which placed maximum emphasis on defect prevention rather than defect correction.

Author (GRA)
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product. All topics presented today are trying to help the
government get the most for its money. The negative cost effects of
material review boards, standard fixes (shop arrangements and field activities), statistical quality control, surplus parts procurement and contractor field service are usually figured in overhead and are not carefully examined and/or controlled. This paper will point out experiences in these areas and leave to your imagination how the heavy manpower involvement and costs associated with these areas could be minimized if quality incentives are provided at the point of manufacturing.  

Author (GRA)

A QUALITY IMPROVEMENT STRATEGY FOR SYSTEMS
ACQUISITION Final Report
(AD-P002820) Avail: NTIS HC A24/MF A01 CSCL 05A
Affordability and readiness are among the most prominent concerns in the defense establishment today—to say nothing about the Congress and the media. Any number of techniques, procedures and controls have been established to improve management of systems acquisition and to minimize cost growth, the perennial nemesis of large, complex human endeavors. Cost/schedule control systems and reporting, for example, are now standard practice. No one technique, or combination of techniques, has yet been found to provide a satisfactory solution for today’s acquisition managers. It is our purpose to portray quality in systems acquisition from this commercially-oriented perspective. An improvement strategy which is relevant to both readiness and affordability is outlined. It treats quality in its broadest, multifunctional sense. The bottom line is that if quality/productivity improvement is important to us in defense, then we must manage to get it. The strategy to be discussed is not a one-shot program or a quick fix. Rather, it is a basic shift in how we approach our work and is based on application of successful commercial practice to the system acquisition environment.  

Author (GRA)

ENGINE PRODUCT PERFORMANCE AGREEMENTS AND THE FUTURE Final Report
(AD-P002821) Avail: NTIS HC A24/MF A01 CSCL 05A
Engine Product Performance Agreements may take many forms. One of these is warranty. The Model Engine Warranty developed by Air Force, iteratively, over a three year period is one of the many variations. It is to be tailored to fit the situation and was designed to help engine program managers formulate a warranty if one is part of their strategy. One possible outcome of considering warranty is that a warranty is not needed. This paper explores aspects of the Model Engine Warranty and its improvements over earlier warranties. Future forms of engine product performance agreements are mentioned. The concept of future commonality or standardization is discussed, with some of its perceived benefits.  

Author (GRA)

ASSESSMENT OF THE NASA FLIGHT ASSURANCE REVIEW PROGRAM
J. HOLMES and G. PRUITT Aug. 1983 172 p refs
(Contract NASW-3787)
The NASA flight assurance review program to develop minimum standard guidelines for flight assurance reviews was assessed. Documents from NASA centers and NASA headquarters to determine current design review practices and procedures were evaluated. Six reviews were identified for the recommended minimum. The practices and procedures used at the different centers to incorporate the most effective ones into the minimum standard review guidelines were analyzed and guidelines for procedures, personnel and responsibilities, review items/data checklist, and feedback and closeout were defined. The six recommended reviews and the minimum standards guidelines developed for flight assurance reviews are presented. Observations and conclusions for further improving the NASA review and quality assurance process are outlined.  

E.A.K. (GRA)

RELABILITY IN SPACE: PROGRAM MANAGER AND USER AWARENESS
refs (AD-P002148) Avail: NTIS HC A07/MF A01 CSCL 05A
Space systems and satellite communications are now a reality. As these systems become more important to our military missions, we must ensure we have reliable equipment. The role of reliability is not just the responsibility of the project reliability engineer. The program manager and the user must understand the importance of the reliability program. The designers and users must have a mutual understanding of the program goals. If the engineer is the only one who can understand the system, the user will not agree that what is needed and the program manager will not support the funding requirement.  

Author

DEVELOPMENT OF A PROPOSED STANDARD FOR THE EXCHANGE OF SCIENTIFIC MICROCOMPUTER PROGRAMS Summary Report
J. M. FISCHELLA Nov. 1983 16 p
(P84-157940; ULT-2002) Avail: NTIS HC A02/MF A01 CSCL 09B
The incompatibility problems encountered between different microcomputer and supermicrocomputer systems for the exchange of software are reviewed. It examines the causes of exchange incompatibility for some of the most widely used hardware and operating systems, with the aim of specifying a set of exchange standards. More than one standards set is required because of the diversity of operating systems and mass storage formats. The exchange standard developed include specifications of what types of files are to be included on the mass storage exchange medium, as well as a full description of the mass storage format (including medium, density, operating system, etc.). Three different exchange standard sets are recommended, all utilizing diskettes.  

Author

QUALITY CONTROL IN LARGE SYSTEMS DEVELOPMENT PHASE
(SNIAS-832-422-102) Avail: NTIS HC A02/MF A01 CSCL 09B
The most important means used to assure, progressively during the whole development phase, that a large system will be able to satisfy the users are presented. In other words, the objective is to present the means of assuring the system’s quality. First the problems to be solved are exposed, the major phases of a program from the initial requirements to the system utilization are recalled, some definitions for mutual understanding are explained and the different management specifications which have to be available when the development begins are mentioned as the management plans which must answer to this specifications.  

Author
The Quality Assurance (QA) plan for Department 1510 is described and all standards, requirements and participant responsibilities for its implementation are provided.

SAFETY TRAINING PRIORITIES Final Report

The Air Force is interested in identifying potentially hazardous tasks and prevention of accidents. This effort proposes four methods for determining safety training priorities for job tasks in three enlisted specialties. These methods can be used to design training aimed at avoiding loss of people, time, materials, and money associated with on-the-job accidents. Job tasks performed by airmen were measured using task and job factor ratings. Combining accident reports and job inventories, subject-matter experts identified tasks associated with accidents over a three-year period. Applying correlational, multiple regression, and cost-benefit analysis, four methods were developed for ordering hazardous tasks to determine safety training priorities.

MATE STANDARDIZATION

The MATE (Modular Automatic Test Equipment) program was developed to combat the proliferation of unique, expensive ATE within the Air Force. MATE incorporates a standard management approach and a standard architecture designed to implement a cradle-to-grave approach to the acquisition of ATE and to significantly reduce the life cycle cost of weapons systems support. These standards are detailed in the MATE Guides. The MATE Guides assist both the Air Force and Industry in implementing the MATE concept, and provide the necessary tools and guidance required for successful acquisition of ATE. The guides also provide the necessary specifications for industry to build MATE-qualifiable equipment. The MATE architecture provides standards for all key interfaces of an ATE system. The MATE approach to the acquisition and management of ATE has been jointly endorsed by the commanders of Air Force Systems Command and Air Force Research, Development, and Acquisition, has asked the Electronic Industries Association for policy level participation in the Air Force's avionics standards program. This paper reports on the initial step of the response of industry. It analyzes a survey made under the sponsorship of the EIA. Defense industry managers and senior engineers experienced in the development and production of mission-critical avionics and software were questioned about their experiences and opinions concerning the Air Force standards for J-73 (JOVIAL), Ada, 1553 Data Bus, and 1750 Instruction Set Architecture. The responses are cross-correlated with experience levels and nature of the respondent's field of expertise. Results are presented as a summary of current attitudes which can serve as a database for focusing issues for further discussion with industry.

STANDARDS AND INTEGRATED AVIONIC DIGITAL SYSTEM ARCHITECTURE

Integrated digital system design and development of the hardware, software, and interfaces that integrate the avionic flight control, fire control, and man-machine display and control must emphasize the man-rated weapon system's availability and survivability. The scope of tasks including detailed trade studies such as CMOS/SOS versus ECL semiconductor use, and parallel pipelining versus multi-microprocessor architecture usually requires an engineering team with backgrounds from requirements and integration, electronics hardware, packaging, and software. System attributes of fault tolerance, fail safe, and fail soft operation requires total team adherence to a set of design, documentation, implementation, and test standards of which few have complete familiarity. Since use of these standards has prevented costly errors and overruns in procurement, and decreased maintenance costs over the life cycle, this paper shows how to make each effective contributor on the task force aware of the standards controlling performance and product specifications, change and configuration control, test planning, and test procedure generation for the other areas of expertise.

DEFENSE INDUSTRY ATTITUDES ABOUT AF INTERFACE STANDARDS REPORT OF AN ELECTRONICS INDUSTRIES ASSOCIATION SURVEY

The Defense Industrial Board, a member of the Department of Defense's Executive Board, has asked the Electronic Industries Association to identify defense industry attitudes about AF interface standards. The standards in question include those for J-73 (JOVIAL), Ada, 1553 Data Bus, and 1750 Instruction Set Architecture. The responses are cross-correlated with experience levels and nature of the respondent's field of expertise. Results are presented as a summary of current attitudes which can serve as a database for focusing issues for further discussion with industry.
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Logistics Command as the way of doing business in the future.

Author (GRA)

A84-32705# ARCO Solar, Inc., Woodland Hills, Calif. QUALIFICATION TESTING AND ELECTRICAL MEASUREMENT EXPERIENCE: A MANUFACTURER'S VIEW J. C. ARNETT, J. E. COOLEY, and T. L. WINGERT In JPL Proc. of the Flat-Plate Solar Array Proj. Res. Forum on the Design of Flat-Plate Photovoltaic Arrays for Central Sta. p 277-281 1983 Avail: NTIS HC A14/ MF A01 CSCL 09C ARCO Solar's experiences as a participant in an industry-utility-government environmental qualification team examining photovoltaic devices are discussed. Included is an assessment of the applicability, completeness and appropriateness of the testing procedures and of the acceptance criteria for megawatt-sized procurements for utilities. Like the stand-alone users, the utility industry is interested in obtaining low costs, but additional concerns exist related to reliability and durability, safety, grounding and overall system criteria including performance prediction (related to output power acceptance testing), power quality and dispatchability. For purposes of this first major purchase of photovoltaic modules and panels by the utility industry, there was a carry-over of the JPL specifications. The need exists for further development, assessment, and selection of qualification and testing standards and evaluation criteria specifically addressing these additional concerns for utility-connected PV power-plant applications.

R.J.F.

10 LEGALITY, LEGISLATION, AND POLICY


A84-11311 PRODUCT LIABILITY IN AVIATION AND ITS INSURABILITY (PRODUKTFAHRLICHT IN LUFTVERKEHR UND IHRE VERSICHERBARKEIT) W. D. MUELLER-ROST/Zeitschrift fuer Luft- und Weltraumrecht (ISSN 0340-8329), vol. 32, Sept. 1983, p. 225-241. In German. refs The provisions of FRG, European Parliament, Common Market, and U.S. law and jurisdiction regarding the liability of the manufacturers and sellers of aviation equipment are reviewed, with an emphasis on the recent increase in the amount of liability litigation. Consideration is given to such topics as contractually fixed warranties, negligence, strict liability in tort, the definition of 'manufacturer', and the different classifications of defects (fabrication defects, series defects, instruction defects, and quality-control outliers). It is shown that manufacturers, both of the finished aircraft and of its components, can be held liable for damages in many cases under all three legal systems; hence an umbrella insurance plan covering all participants in the construction of the aircraft is recommended. Policy provisions defining the insured parties, the losses insured, the contract duration, and the basis for calculating premiums are proposed.

T.K.

A84-14048 AVIATION - THE NEED FOR UNIFORM LEGISLATION J. J. KENNELLY Journal of Air Law and Commerce (ISSN 0021-8642), vol. 48, Spring 1983, p. 613-645. refs The problems arising from the nonuniformity of state legislation governing the rights of claimants and defendants after aircraft accidents are reviewed, and possible solutions are considered. The differences in applicable laws and in the choice-of-law provisions of the states are illustrated and the current situation is shown to be patently inconsistent. Federal bills proposed to correct this situation, including HR 1027 and the Air Travel Protection Act are found to be deficient in correcting the problems or overly protective of carriers and aircraft manufacturers, to the detriment of passengers. Precedents are also cited to show that federal legislation will not be sufficient to create 'uniform' treatment of claims. The basic provisions of a uniform state statute to be initiated by the National Commissioners on Uniform State Laws are outlined.

D.G.

A84-16892 SPACE INSURANCE - ISSUES AND PROBLEMS B. STOCKWELL (Corroon and Black Inspace, Inc., Washington, DC) Space Communication and Broadcasting (ISSN 0167-9368), vol. 1, Oct. 1983, p. 261-267. It is pointed out that over the last several years more and more space system owners have sought insurance coverage for their operations. The types of insurance coverage available are examined, taking into account political risk coverage, investment protection coverage, prelaunch coverage, aerospace liability coverage, launch and commissioning coverage, in-orbit/failure coverage, service interruption coverage, transponder coverage, and revenue stream protection. Attention is given to aspects of risk management, launch and commissioning rates, and special problems. Special problems considered are related to multiple payload interactions, abort possibilities and abort modes of the Shuttle, the time sensitivity of Shuttle operations, the short history of Ariane, and aspects of market fragility.

G.R.

A84-17055# THE LAW APPLICABLE TO CONTRACTS ON SPACE ACTIVITIES K.-H. BOECKSTIEGEL (Koeln, Universitat, Cologne, West Germany) IN: Colloquium on the Law of Outer Space, 25th, Paris, France, September 27-October 2, 1982, Proceedings . New York, American Institute of Aeronautics and Astronautics, 1983, p. 203-209. refs (IAF PAPER 82- ISIL-39) The importance of contracts has to do with the growing number of participants, governmental and nongovernmental, in space activities. It is noted that whenever the parties include in their contractual instrument an express clause designating a particular body of law as the proper law of their contract, that designation is today recognized as valid. If the parties do not expressly or by contractual indication choose a particular substantive law, the applicable substantive law will normally have to be found by the methods developed in traditional private international law. The applicability of mandatory and public law is discussed, along with that of public international law.

C.R.

A84-20150 GOVERNMENT LIABILITY UNDER THE FEDERAL TORT CLAIMS ACT FOR NEGLIGENT INSPECTION AND CERTIFICATION OF AIRCRAFT W. M. STEVENS Air Law (ISSN 0165-2079), vol. 8, no. 4, 1983, p. 230-237. The question of FAA liability under the Federal Tort Claims Act (FTCA) for damages resulting from negligent inspection or certification of aircraft is examined in a review of arguments in two cases awaiting appeal to the US Supreme Court. The Ninth Circuit Court of Appeals has ruled in both United Scottish Insurance Co. vs. US and Vang vs. US that Good Samaritan liability provisions (as defined in the Federal Aviation Act) are outlined, and precedents involving the applicability of the FTCA are surveyed. It is concluded that the Court of Appeals decision, if upheld, will expose the FAA to liability claims in almost every crash case; hence great care in performing and documenting inspections will be required.

T.K.
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A84-20454
THE LIABILITY OF THE UNITED STATES FOR NEGLECTFUL INSPECTION 1983
C. F. KRAUSE (Speiser, Krause and Modole, New York, NY) and J. T. COOK (Speiser, Krause and Modole, Los Angeles, CA) Journal of Air Law and Commerce (ISSN 0021-8642), vol. 48, Summer 1983, p. 725-751. refs
The current status of litigation involving US government liability for negligent inspection of aircraft by the FAA is reviewed. Such liability is based on the exemption from sovereign immunity granted by the Federal Tort Claims Act (FTCA), but specific criteria must be applied because there are numerous exceptions allowed under that act. The regulations governing the FAA certification and inspection of aircraft are explained, and the recent court decisions involving the applicability of the FTCA are surveyed. The two appellate decisions in United Scottish Insurance Company vs US and the decision consolidating Varig Airlines vs US and Mascher vs US are analyzed in detail, considering the absence-of-duty, misrepresentation, and discretionary-function defenses proposed by the US side. In essence, the US is liable when an FAA employee fails negligently, in an actual physical inspection, to detect a defect which is covered by an objectively measurable publicly known regulation and which can be shown to have caused the injury to the plaintiff.
T.K.

A84-20456
THE GROWTH OF AMERICAN JUDICIAL HOSTILITY TOWARDS THE LIABILITY LIMITATIONS OF THE WARSAW CONVENTION
US court decisions with regard to the provisions of the Warsaw Convention are discussed in a critical review. The Convention articles and later additions and amendments are summarized, and the cases adjudicated are surveyed. Special attention is given to cases dealing with ticketing requirements and with the gold-franc conversion standard in the liability-limitation clause. It is argued that the courts, and especially the Supreme Court, must make greater use of statutory construction, constitutional review, and judicial constraint to resolve the existing uncertainties and inconsistencies, which are attributed to the unwillingness of the Senate and the executive to take any decisive action to affirm, revise, or abrogate the Convention.
T.K.

A84-20646
THE LAUNCH AND PERFORMANCE OF SPACECRAFT - AN INSURANCE PERSPECTIVE
The importance of insurance to the commercialisation of space for telecommunications applications can hardly be exaggerated. This paper traces the evolution of the space insurance field as a whole and then proceeds to define the types of insurance coverage which can currently be obtained by the spacecraft supplier, the procurement authority, and the ultimate user, to protect against the various risks which exist at different stages of a program. Predictions are made on probable future developments in this dynamic field, developments which will be of fundamental importance for all parts of the private sector engaged in space activities.

A84-20675
IMPACT OF CURRENT U.S. POLICY ON INTERNATIONAL CIVIL AVIATION
The newly introduced U.S. Air Transportation Policy has led to great changes in the field of civil aviation. The initiation of the process of change is related to the signing of the Airline Deregulation Act by President Carter on October 24, 1978. The effect of these developments on international civil aviation is discussed. A brief background picture is presented regarding the civil aviation industry, and salient features of liberal agreements are examined. An analysis of the global effects of the U.S. liberalization policy is conducted, taking into account the impact on airlines, the impact on consumers, the impact on manufacturers of aviation products, the impact on civil aviation policies of other nations, and the impact on international institutions of civil aviation.
G.R.

A84-24961
REGULATIONS AND THE AIR AMBULANCE
H. L. GIBBONS Aviation, Space, and Environmental Medicine (ISSN 0009-0562), vol. 55, March 1984, p. 239-243. refs
The recent biopolitical history of air ambulance development and the need for regulations is reviewed. There has been significant interaction between Aerospace Medical Association committees, the Federal Aviation Administration, and the Civil Aeronautics Board. The Federal Aviation Administration's Advanced Notice and Withdrawal of Proposed Rulemaking, the latter based on the FAA supposition that the 'majority' of states had enacted regulations and guidelines, is compared to actual data that only seven states have regulations and two have guidelines. The precedence for FAA to act on regulations is established. The Aerospace Medical Association and the National Highway Traffic Safety Administration - not the FAA have established and documented excellent guidelines. The FAA is providing a valuable service to aviation in general and air ambulance operations specifically through physiological training at military facilities which can provide information to promote patient protection in air ambulance operations.
Author

A84-25032
AIRWORTHINESS DIRECTIVES - RECOVERING THE COST OF COMPLIANCE
D. WILSON (Grant, McHendrie, Haines, and Crouse, Denver, CO) Journal of Air Law and Commerce (ISSN 0021-8642), vol. 49, Fall 1983, p. 1-30. refs
The legal status of liability questions arising when FAA Airworthiness Directives (AD) mandate modifications to an aircraft is reviewed. Aircraft owners often attempt to recover from the manufacturer the costs of compliance to an AD, claiming either breach of warranty, negligence, strict product liability, or a private cause (implied) under the Federal Aviation Act of 1958. A survey of the case law in each of these areas reveals that owners have only very limited prospects of recovering compliance costs. A negotiated solution to this problem in the form of specific, strong AD-compliance warranties is considered more desirable than a legislative requirement that manufacturers bear all compliance costs.
T.K.

A84-25033
AIR CARRIER LIABILITY UNDER DEREGULATION
The effect of the Airline Deregulation Act of 1978 (effective January 1, 1983) on air-carrier liability for baggage loss or damage, overbooking, delayed or cancelled flights, lack of nonsmoking seats, and similar claims is discussed in a review of legislative, treaty, and administrative provisions and case law. The regulatory powers remaining to the CAB (at least until its planned 'sunset' in 1985) are defined, and the applicable articles of the Warsaw Convention and the common law are summarized. It is shown that carriers are exposed to greater liability in the areas which are no longer regulated and hence subject to stricter common-law standards. This liability can in general be limited by properly notifying passengers of the terms and conditions of carriage.
T.K.
A84-27410
AIRCRAFT ACCIDENT INVESTIGATION PROCEDURES IN JAPAN

The organization of aircraft-accident investigation in Japan is reviewed in the light of international requirements that the prevention of future accidents be the primary aim of such investigations. The overlapping interests, responsibilities, and powers of the government-appointed Aircraft Accident Investigation Board (AAIB), the military, the police and prosecutors, the airlines, and passengers are examined. The generally high level of cooperation among the parties involved is illustrated for the case of the DC-8-61 crash of February 9, 1982 (attributed to a psychological disturbance of the pilot). A potential problem is seen in the fact that AAIB or international-body reports can be used as evidence in criminal proceedings: constitutional protections against self-incrimination may conflict with the need for complete disclosure to prevent future accidents.

T.K.

A84-27412
AIRCRAFT ACCIDENT ENQUIRIES - WHOSE INTEREST PREVAILS?

Aircraft-accident investigation procedures in the UK are examined from the airline point of view. The main investigations by the Accidents Investigation Board (AIB) of the Transport Ministry, with the aim of establishing the causes of the accident and recommending action to prevent future accidents, are found to be thorough and professional, and their aims are fully endorsed. Concurrent coroner's inquests, fatal-accident inquiries, or criminal proceedings are often more emotional, receive greater press coverage, and may be less thorough than the AIB inquiry. Potential conflicts of interest arising from an accident (e.g., between an airline and the manufacturer, the maintenance facility, the ATC authority, the airport, or the rescue authority) are listed, and the priority of flight safety in resolving them is stressed.

T.K.

A84-27416
NTSB PROCEDURES

The investigative procedures of the US National Transportation Safety Board (NTSB) are reviewed, with a focus on their relationship to litigation resulting from aircraft accidents. The current limitations imposed by NTSB rules on the ability of claimants and insurers to take part in hearings or gain access to evidence are defended as not overly important point of difference preventing the adoption of uniform international procedures.

T.K.

A84-29626
EFFECTS OF FAR 25. 1309 ON AIRPLANE OPERATION AND MAINTENANCE

Common misconceptions about the numerical methods of analysis and the effects on aircraft maintenance and operations are examined. Topics covered include the meaning of 'failure condition', erroneously related to component failure; the verification of the failure condition, incorrectly assumed to be based on a single component failure; and the reasons for periodic inspections, used to test a system operating infrequently or part of a multiple system. With regard to the maintenance tasks on the type certificate data sheet, a new procedure is proposed that will permit airline operators to change the initial certification maintenance requirements based on service experience without involving the manufacturer. Finally, attention is given to the reliability of tracking programs and the minimum equipment list authorized by FAR 121.627.

C.M.
principles of international law, it is shown that state exercise of supervision and authorization may range from state operation of all space activity to state responsibility for all space activity. C.R.

A84-29870
EMERGING GOVERNMENT REGULATION OF AMERICAN SPACE ENTREPRENEURS

(AAS PAPER 83-227)
The emergence of American space entrepreneurs, who have questioned some of the most fundamental operating assumptions of both the Federal Government and large aerospace government contractors, is accompanied by the need for supervision of these private sector activities to protect governmental interests and satisfy international obligations. The role of the FAA, the State Department, and the FCC in governing private entities doing business in outer space is discussed. It is noted that the Senior Interagency Group for Space, as established through the Presidential Space Policy issued on July 4, 1982, is considering a policy statement regarding ownership and operation by private entities of the Space Shuttle and expendable launch vehicles. The roles of other agencies and institutions with influence over the approvals process for launch operations, space stations, positioning systems, etc., such as the U.S. Congress, NASA, and the Department of Defense, are also considered.

J.N.

A84-36942
DEREGULATION AND COMMUTER AIRLINE SAFETY

The effect of the 1978 Airline Deregulation Act on the level of safety in the commuter airline industry is examined. Through a comparison of the safety records of different segments of the commuter industry with that of the major jet carriers, the question of whether the growing role of commuter airlines is inconsistent with the goal of maintaining air safety is analyzed. As part of the analysis, the safety performance of the commuter industry between 1970 and 1980 is examined with a focus on systematic differences among major subsets of the industry. It is concluded that, in general, the safety record of domestic commuter airlines has not been affected by deregulation, and that it is virtually identical to the superior safety record of the larger jet carriers. Moreover, the introduction of the next generation of turbine-powered commuter aircraft should contribute to improved commuter safety due to the small carriers' ability to operate turbine-powered aircraft much more safely than piston aircraft.

I.H.

A84-38475#
LEGAL STATUS OF MEMORANDA OF UNDERSTANDING IN THE UNITED STATES

NASA and ESA have a long-standing and successful history of cooperation in space, mainly in the area of space science. The modalities of such cooperation are laid down in legal instruments which, in the majority of cases, take the form of Memoranda of Understanding (MOUs). There is no doubt that under international law such MOUs constitute international agreements which are binding upon the parties. However, questions can be raised regarding the order of precedence under national law between international agreements and, in this case, U.S. domestic legislation.

Author

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A84-42618
PATENT GUIDELINES FOR RESEARCH MANAGERS

Basic considerations of corporate patent policy are discussed, with emphasis on the complex questions addressed by attorneys engaged in patent law practice. Attention is given to corporation employee inventions, the ascertainment of true inventorship, the reduction of an invention to practice, the importance of record-keeping in patenting procedures, relationships between company inventors and laws, department, invention reviews by technical committees, and the issues of infringement, interference, and licensing that may arise after the granting of a patent.

O.C.

A84-43385
FEDERAL GOVERNMENT REGULATION OF COMMERCIAL OPERATIONS USING EXPENDABLE LAUNCH VEHICLES

Policies and regulations enacted or under discussion by the U.S. government to stimulate and regulate privately owned expendable launch services are described. Supervisory authority is vested in the FAA, the State Department, and the FCC. Input is also received from Congress, NASA, the DOD, the National Security Council, the DOC, OMB, etc. Bills are under consideration to be both regulate and promote private space ventures. NASA is asserted to have claimed jurisdiction, responsibility, or interest in private ventures, but it will inevitably furnish, sell, advise on, or supervise the use of much of the technology that will be used for private launches. Areas of interest for other governmental branches are discussed.

M.S.K.

A84-44852
LEGAL ASPECTS OF COMMERCIAL SPACE ACTIVITIES

As a result of past space-related developments, the private sector is already participating in commercial activities in space communications. Future space endeavors will provide increasing opportunities for extensive private sector participation. The present investigation is concerned with the legal aspects of such a participation. The government role in space activities is examined, taking into account questions regarding authorization and supervision, planning by Department of Commerce actions and on the basis of NASA requirements, problems of liability, and questions of jurisdiction. The status of private sector space activities is also discussed, giving attention to a compliance with U.S. Treaty obligations, the personnel of a commercial concern who are aboard an object in outer space, FAA responsibilities over private sector space flight, the exploitation of resources of celestial bodies, and aspects of government-industry cooperation.

G.R.

A84-44854
THE WARSAW CONVENTION - A DISCUSSION OF THE PRESENT POSITION

The Warsaw Convention was adopted in 1929. The present investigation is concerned with the objectivity of this convention and its position in 1982. The Warsaw Convention involved a deal by which protection was given to infant airlines in the form of limitation of liability in exchange for the passenger, or his dependents, or the shipper of cargo, being given the benefit of the reversal of the burden of proof of negligence. A second purpose of the Convention was related to the desire to achieve some international uniformity. A study is conducted regarding the need for a protection of airlines by limited liability, taking into account current conditions in the U.S., the developing countries, the Soviet block countries, and the other countries. Attention is given to the incentive provided by the percentage free system, the Hague Protocol of 1955, the Montreal Agreement, developments in Europe, and the Guatemala City Protocol.

G.R.
performance of the deregulated industry is analyzed from an
reviewed and the deregulation process is described. The economic

E. E. BAILEY, D. R. GRAHAM, and D. P. KAPLAN May 1983

WASHINGTON, D. C. Ad Hoc Committee on Government-University

STRENGTHENING THE GOVERNMENT-UNIVERSITY

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BIBLIOGRAPHY. SECTION 1: ABSTRACTS


Abstracts are provided for 167 patents and patent applications entered into the NASA scientific and technical information system during the period July 1983 through December 1983. Each entry consists of a citation, an abstract, and in most cases, a key illustration selected from the patent or patent application. A.R.H.

BIBLIOGRAPHY. SECTION 2: INDEXES


A subject index is provided for over 4300 patents and applications for patent for the period from May 1983 through December 1983. Additional indexes list personal authors, corporate authors, contract numbers, NASA case numbers, U.S. patent class numbers, U.S. patent numbers, and NASA accession numbers. A.R.H.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION AUTHORIZATION ACT, 1985


Avail: US Capitol, House Document Room

Appointments to the National Aeronautics and Space Administration for research and development, space flight, control and data communications, construction of facilities, and research and program management, and for other purposes are authorized. The provisions of the bill are presented. S.L.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION AUTHORIZATION ACT, 1985


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United Nations Industrial Development Organization, Vienna (Austria).

LICENSED COMPUTER SOFTWARE: BASIC CONSIDERATIONS AS TO PROTECTION AND LICENSING OF COMPUTER SOFTWARE AND ITS IMPLICATIONS FOR DEVELOPING COUNTRIES

3 Nov. 1982, 27 p refs Presented at 7th Meeting of Heads of Technol. Transfer Registries, New Delhi, 7-10 Dec. 1982

(PB84-150868; UNIDO/WG.393/3-ADD-1) Avail: NTIS HC A03/MF A01 CSCL 095

Definitions, overview of current patentability of computer software: USA, EEC, Japan; WIPO model provisions on the protection of computer software; protection of software in developing countries channels for transfer of software: custom software contracts; agreements for packaged software suggestions as to DCOs approach toward licensing of software are covered. GRA

Air Force Business Research Management Center, Wright-Patterson AFB, Ohio.

NEEDED HELP FOR THE FEDERAL ACQUISITION REGULATION COUNCIL Final Report


(A-D-P002769) Avail: NTIS HC A24/MF A01 CSCL 15E

Writing and maintaining of the FAR regulation will be a tough job as it has been with the DAR. The subjects covered will be complex and technical. All available capabilities should be brought to bear in the process if regulations which are fair, which can be administered economically and which effectively accomplish their purposes are to be achieved. Discussion of a few aspects of DAR 1-324 Warranties and DAR 1-330 Contractor Liability for Damage to Government Property and the related contract clauses shows the two coverages to be deficient in many aspects. A need particularly for more and earlier assistance from industry in the writing of regulations is indicated. The experience and expertise of industry personnel should supplement that of the government personnel who will be rotated in and out of the FAR Council. A document with the impact the FAR will have deserves full use of available talent.

Author (GRA)

Air Force Inst. of Tech., Wright-Patterson AFB, Ohio.

NAILING DOWN THE LIABILITY ISSUE ONCE AND FOR ALL Final Report


(A-D-P002777) Avail: NTIS HC A24/MF A01 CSCL 15E

This paper contrasts the present Defense Acquisition Regulation requirements for liability determinations for loss, damage, or destruction of government property in the hands of contractors, with new guidance in the Federal Acquisition Regulation for property administrators and administrative contracting officers. Discussion includes the cumbersome method of shifting the liability for loss, damage, or destruction of government property by disapproving the contractor's property control system, and the liability clauses used in government contracts. The rationale behind the government's position as a self-insurer is presented, along with the procedure to follow in making liability decisions. Finally, certain conclusions are drawn with respect to strengthening the function of the property administrator, and the need for the support of the administrative contracting officer.

Author (GRA)


DOES THE PROMPT PAYMENT ACT INSURE TIMELY CONTRACT PAYMENT? Final Report


(A-D-P002778) Avail: NTIS HC A24/MF A01 CSCL 15E

On 21 May 1982, President Reagan signed Public Law 97-177, the Prompt Payment Act, which has an objective of timely contract payment. Since the Act was implemented nearly one year ago, the question is: Does the Prompt Payment Act Insure Timely Contract Payment? This report addresses this question. GRA

Air Force Inst. of Tech., Wright-Patterson AFB, Ohio.

CONTRACTER FRAUD: GOVERNMENT RESPONSE Final Report


(A-D-P002833) Avail: NTIS HC A24/MF A01 CSCL 15E

Air Force Logistics support is adversely affected by the presence of fraud in Government contracts. Fraud occurs in the award of contracts, in the technical aspect of performance, and in the submission of false claims. Dishonest contractors, a small minority,
must be found out and brought to justice. The response of the Government is channeled along several lines. Fraud is both a civil and a criminal matter. The Government may sue for financial recompense and may also invoke criminal penalties, and may debar bidders. The Contracting Officer and eventually the whole contracting team may be needed to detect fraud. The using activity, the Office of Special Investigation, the FBI and ultimately the Justice Department attorney and Federal Court are involved.

Author (GRA)

N84-23388# Joint Publications Research Service, Arlington, Va. INCENTIVES FOR NEW PRODUCTION DISCUSSED


Avail: NTIS HC A04

Patent policy and the incentives used to develop new technologies are examined. Patents are divided into three categories based on importance of the invention and government control of the license for foreign use. Possible incentive techniques and general suggestions for the development of a monetary bonus system for inventors is presented. M.A.C.


J. W. DANIEL 27 Jan. 1984 117 p (AD-A139078; ONR-R-2-84) Avail: NTIS HC A06/MF A01 CSCL 05A

This report summarizes the European Economic Community's (EEC's) new scientific policy, provides the EEC Commission's assessment of the community's international position in science policy, and presents the detailed scientific and technological goals of a program for coordinating and planning future policy. GRA

N84-24503# Committee on Commerce, Science, and Transportation (U. S. Senate). TRANSFER OF CIVIL METEOROLOGICAL SATELLITES


The primary objective of this resolution is to curtail present efforts by the administration to all the Government's civil meteorological satellite (METSAT) systems by sending a definite signal that the Congress does not believe such a transfer is timely.

Author

N84-24504# Committee on Small Business (U. S. House). PAPERWORK REDUCTION ACT OF 1980


How Government paperwork requirements are affecting America's small businesses is examined with emphasis on the effectiveness of the 1980 Paperwork Reduction Act, Public Law 96-511. Some specific recommendations as to how the paperwork burden can be further reduced are advanced. A.R.H.

N84-24506# Committee on Commerce, Science, and Transportation (U. S. Senate). NATIONAL AERONAUTICS AND SPACE ADMINISTRATION AUTHORIZATION BILL, 1984


The advanced communication technology satellite, space commercialization, space station development, and the design of a single rotation or counter rotation turboprop are among the NASA research and development programs funded. Appropriations for other research and development activities are itemized as well as those for space flight, control, and data communication; construction, modification, and repairs to facilities; and program management. The National Commission on Space Act comprises Title 2 of the legislation.

A.R.H.

N84-25525# Committee on Science and Technology (U. S. House). THE 1985 NASA AUTHORIZATION


Budget requirements and appropriations for NASA research programs are examined. Current structures, aerodynamics, propulsion systems, flight controls, rotorcraft, and high performance aircraft research projects are discussed with particular emphasis on cost effectiveness and technological advancement. M.A.C.

N84-28408# Oakland Univ., Rochester, Mich. Dept. of Sociology. RELEVANT AND IRRELEVANT LEGAL STRUCTURES: DISTINGUISHING PRIVATE SECTOR FROM DOD CONTRACTING

E. J. MCCABE In AF Academy Proc. of the 9th Symp. on Psychol. in the DOD p 25-29 Apr. 1984 (AD-P003241) Avail: NTIS HC A99/MF A01 CSCL 05J

Based on interviews and observational data of contract formation and administration dealing with hardware and publications development by the U.S. Army Tank-Automotive Command, the social process of government contract law as an example of law in action is compared with the typical use of contracts between merchants in the private sector. While the formal law of contracts is, for the most part, irrelevant in normal business exchanges, the formal legal structure is found to be routinely relied upon in the case of government contracts. This unusual role of the formal law is explained by the absence of normal reciprocal relationships between contractors and the Government.

Author (GRA)
the passage of the airport and airway development act of 1970. This act provided grants for airport planning under the planning grant program (PGP) and for airport development under the airport development aid program (ADAP). These programs were funded from a newly established airport and airway trust fund, into which were deposited revenues from several aviation user taxes on such items as airlines fares, air freight, and aviation fuel. The authority to issue grants under these two programs expired on September 30, 1981. During this 11 year period, 8,809 grants totaling $4.5 billion were approved for airport planning and development. The current grant program, known as the airport improvement program (AIP), was established by the airport and airway improvement act of 1982; it continues to provide funding for airport planning and development, but under a single program. Funding through the Airport and Airway Trust Fund is also continued, along with many other features in the previous legislation. The 1982 Act also authorizes funds for noise compatibility planning and to carry out noise compatibility programs as set forth in the Aviation Safety and Noise Abatement Act of 1979 (P.L. 96-193).

The act was intended to help reduce fraud, waste, and abuse across the spectrum of federal government operations through annual agency self-assessments of their internal controls and accounting systems. This report highlights the progress made and problems encountered by NASA in its first year of experience with this new act. The report focuses on NASA's effort to evaluate internal controls, review accounting systems, and improve the evaluation processes as a result of identified problems. GRA

**10 LEGALITY, LEGISLATION, AND POLICY**

1 May 1984 33 p (PB84-188770; GAO/NSIAD-84-100; B-202205) Avail: NTIS HC A03/MF A01 CSCL 05A

GAO conducted a review of 22 federal agencies' efforts to implement the Federal Managers' Financial Integrity Act of 1982. The act was intended to help reduce fraud, waste, and abuse across the spectrum of federal government operations through annual agency self-assessments of their internal controls and accounting systems. This report highlights the progress made and problems encountered by NASA in its first year of experience with this new act. The report focuses on NASA's effort to evaluate internal controls, review accounting systems, and improve the evaluation processes as a result of identified problems. GRA

**N84-34319#** Committee on Science and Technology (U. S. House). THE ROLE OF INFORMATION TECHNOLOGY IN EMERGENCY MANAGEMENT

The ability of the government to anticipate and respond to emergencies (crises) is assessed with emphasis on the adequacy of existing warning systems, ability to predict emergencies, response time, and sufficiency of current technology. The Federal Emergency Management Agency (FEMA) is described and pertinent issues are discussed, including: The cooperative use of information technology by governmental agencies and the private sector; the value of simulating emergency situations; establishment and utilization of analyst work stations; the current effectiveness of emergency operation centers; and other public policy issues.

S.B.

**N84-34329#** Committee on Science and Technology (U. S. House). COMMERCIAL SPACE LAUNCH ACT

A congressional report of a bill which provides for the commercialization of expendable launch vehicles and associated services is presented. The bill provides for the promotion of economic growth in the United States by encouraging the private sector to provide space launch services and the utilization of space for peaceful purposes; the simplification and expedient of the process of licensing commercial launch operations and the facilitation of commercial application of government developed space technology; and the assignment of the principal responsibility to a single agency in the Executive Branch (DOT) the promotion and supervision of commercial launch operations and for the issuance and enforcement of licenses to conduct such activities.

E.R.

**N84-34454#** Federal Aviation Administration, Washington, D.C. Office of Airport Planning and Programming. INTRODUCTION TO THE AIRPORT IMPROVEMENT PROGRAM
Nov. 1983 17 p (AD-A144555) Avail: NTIS HC A02/MF A01 CSCL 05A

To promote the development of a system to meet the Nation's needs, the Federal Government embarked on a grants in aid program to units of state and local government shortly after the end of World War II. This early program, the Federal aid airport program (FAAP), was authorized by the Federal airport act of 1946 and drew its funding from the general fund of the treasury. In 1970, a more comprehensive program was established with
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### Abstracts and Keywords

- **Title**: Two-level compromise designs for estimating main effects and detecting interactions
  - **Authors**: [MORRISON, J. M.](#mor) and [MORGAN, J. M.](#mor)
  - **Abstract**: Two-level compromise designs for estimating main effects and detecting interactions are described. The designs are based on a compromise between estimation and detection. The designs are compared with classical two-level factorial designs and with certain fractional factorial designs. The results indicate that the compromise designs are more efficient than the factorial designs in terms of the number of runs required for a given level of experimental error. They are also more efficient than certain fractional factorial designs in terms of the number of runs required for a given level of detection accuracy. The compromise designs are shown to be particularly useful when the experimenter is interested in both estimating main effects and detecting interactions.
  - **Reference**: [DEE84-002997](#ref)

- **Title**: Automated storage and retrieval systems — a system for embedding data displays in graphical user interfaces
  - **Authors**: [MURPHY, R. L.](#mor) and [MURPHIE, S. J.](#mor)
  - **Abstract**: The Automated Storage and Retrieval System (ASRS) is a new technology that is being developed to improve the efficiency of storage and retrieval operations in large, automated warehouses. The ASRS is based on the concept of a computer-controlled, robotic storage and retrieval system that can automatically locate and retrieve items from a storage area. The ASRS is designed to operate in conjunction with a graphical user interface (GUI) that allows operators to interface with the system through a menu-driven, point-and-click interface. The GUI is designed to provide real-time feedback to the operator about the status of the system, including the location of items and the status of the robotic arm.
  - **Reference**: [DEE84-002764](#ref)

- **Title**: A survey of contractor productivity measurement practices
  - **Authors**: [MURDOCK, D. L.](#mor) and [MURPHY, R. L.](#mor)
  - **Abstract**: The purpose of this study was to survey contractor productivity measurement practices and to identify best practices that could be adopted by contractors and government agencies to improve contractor productivity. The survey was conducted with a sample of 100 government contractors and 100 government agencies. The survey results indicated that the majority of contractors and government agencies were using productivity measurement practices that were not standardized. The survey results also indicated that contractors and government agencies were using a variety of productivity measurement practices, including time and motion studies, work measurement systems, and statistical process control. The results of the survey suggest that there is a need for a standardized approach to contractor productivity measurement.
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Listings in this index are arranged alphabetically by corporate source. The title of the document is used to provide a brief description of the subject matter. The page number and the accession number are included in each entry to assist the user in locating the abstract in the abstract section. If applicable, a report number is also included as an aid in identifying the document.
Defense Research Information Centre, Orpington (England). The application of management techniques to defense and other information services: The British approach [AD-P002778] p 101 N84-23325
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Virginia Polytechnic Inst. and State Univ., Blacksburg.
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**Order with the AIAA accession numbers appearing which the citation is identified in the abstract section. Preceding the accession number is the contract number. Under each contract number, Listings in this index are arranged alphanumerically by contract number. Under each contract number, the accession numbers denoting documents that have been produced as a result of research done under that contract are arranged in ascending order with the AIAA accession numbers appearing first. The accession number denotes the number by which the citation is identified in the abstract section. Preceding the accession number is the page number on which the citation may be found.**
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# NTIS Price Schedules

## Schedule A

### Standard Paper Copy Price Schedule

*(Effective January 1, 1983)*

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2/ Add $3.00 for each additional 25-page increment or portion thereof for 601 pages and more.

## Schedule E

### Exception Price Schedule

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