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# Management Ma ent Management ement Management agement Manage Management Mar nt Management M ment Manage

## PREVIOUS ISSUES IN THIS SERIES

DOCUMENT NUMBER	DATE	COVERAGE	SCOPE
NASA SP-7500	March 1968	1962-1967	Documents generated or sponsored by NASA
NASA SP-7500(02)	May 1968	1962-1967	Documents generated or sponsored by non-NASA organizations
NASA SP-7500(03)	June 1969	1968	NASA and non-NASA documents
NASA SP-7500(04)	June 1970	1969	NASA and non-NASA documents, with special DOD section
NASA SP-7500(05)	May 1971	1970	NASA and non-NASA documents, with special DOD section
NASA SP-7500(06)	March 1972	1971	NASA and non-NASA documents
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NASA SP-7500(10)	March 1976	1975	NASA and non-NASA documents
NASA SP-7500(11)	March 1977	1976	NASA and non-NASA documents
NASA SP-7500(12)	March 1978	1977	NASA and non-NASA documents
NASA SP-7500(13)	March 1979	1978	NASA and non-NASA documents
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**NASA SP-7500(15)**

# MANAGEMENT

## **A CONTINUING BIBLIOGRAPHY**

**– With Indexes –**

**A selection of annotated references to unclassified reports and journal articles that were introduced into the NASA Scientific and Technical Information System during 1980.**



Scientific and Technical Information Branch

1981

**National Aeronautics and Space Administration**

Washington, DC



# INTRODUCTION

## COVERAGE

*Management* is a compilation of references to selected reports, journal articles, and other documents on the subject of management. This publication lists 551 documents originally announced in the 1980 issues of *Scientific and Technical Aerospace Reports (STAR)* or *International Aerospace Abstracts (IAA)*.

## SCOPE

This publication series includes references on the management of: research and development, contracts, production, logistics, personnel, safety, reliability and quality control. It also includes references on: program, project and systems management; management policy, philosophy, tools, and techniques; decisionmaking processes for managers; technology assessment; management of urban problems; and information for managers on Federal resources, expenditures, financing, and budgeting.

## ORGANIZATION

Each entry in this bibliography consists of a bibliographic citation accompanied in most cases by an abstract. The listing of the entries is arranged in two sections: *IAA Entries* and *STAR Entries*, in that order. The citations, and abstracts when available, are reproduced exactly as they appeared originally in *IAA* and *STAR*, including the original accession numbers from the respective announcement journals. This procedure, which saves time and money, accounts for the slight variation in citation appearances.

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All publications abstracted in this bibliography are available to the public through the sources as indicated in the *STAR Entries* and *IAA Entries* sections. It is suggested that the bibliography user contact his own library or other local libraries prior to ordering any publication inasmuch as many of the documents have been widely distributed by the issuing agencies, especially NASA. A listing of public collections of NASA documents is included on the inside back cover.

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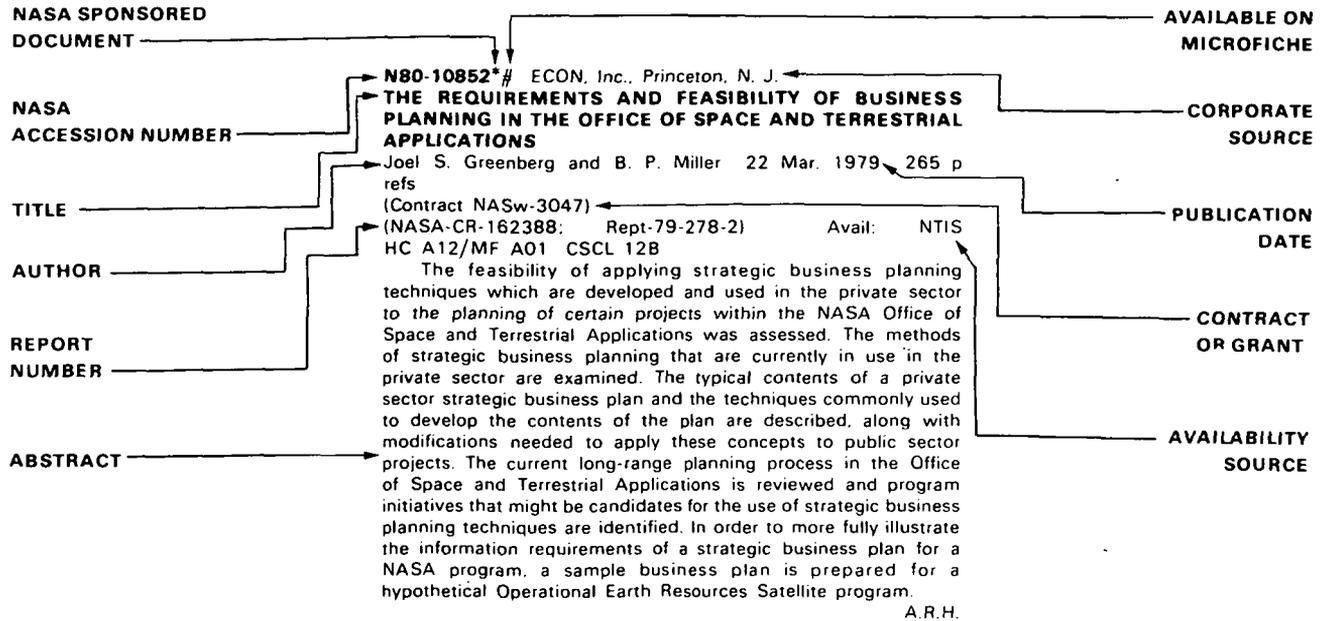
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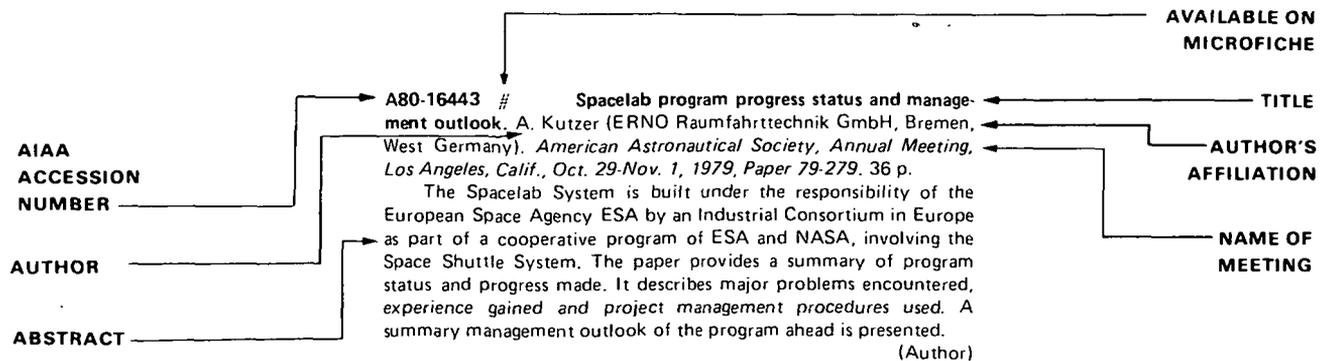
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# MANAGEMENT

*A Continuing Bibliography*

MARCH 1981

## IAA ENTRIES

**A80-10351**      **Quality control and diagnostics of mechanisms (Kvalimetriia i diagnostirovanie mekhanizmov).** Edited by E. G. Nakhapetian. Moscow, Izdatel'stvo Nauka, 1979. 135 p. In Russian.

The papers deal with qualimetric methods of investigating the mechanisms of machine automata and industrial robots, and with diagnostics methods for such mechanisms. Qualitative estimates of the quality of mechanisms of various technological automata are obtained and analyzed. Approaches to the study and evaluation of the technological state of mechanisms are examined.      V.P.

**A80-11013**      **Methods for obtaining a distribution-free prediction interval for the median of a future sample.** M. A. Fligner and D. A. Wolfe (Ohio State University, Columbus, Ohio). *Journal of Quality Technology*, vol. 11, Oct. 1979, p. 192-198. 8 refs. Grant No. NIH-1-R01-GM-23053-02.

In this paper some quality control applications of distribution-free prediction intervals for the median of a future sample are described. Methods for obtaining such intervals are presented, and their use is illustrated by examples. Tables are provided for calculating such prediction intervals for small samples; approximations are provided for sample sizes beyond the scope of the tables. The Appendix provides formulae for constructing prediction intervals to contain not only the median of a future sample, but also any future sample percentile.      (Author)

**A80-11014**      **Confidence limits for the number of defectives in a lot.** J. L. Tomsky (Lockheed Missiles and Space Co., Inc., Palo Alto, Calif.), K. Nakano (Lockheed Missiles and Space Co., Inc., Sunnyvale, Calif.), and M. Iwashika. *Journal of Quality Technology*, vol. 11, Oct. 1979, p. 199-204. Research supported by the Lockheed Missiles and Space Co.

One of the basic concerns in industrial quality control and reliability is to infer the nature of a population from a sample. In many real-life applications, the lot size is small or moderate. For these cases, the correct approach is to use the hypergeometric distribution for constructing confidence limits on the number of defectives in the lot. The hypergeometric distribution describes how the number of observed defectives in a sample from a finite lot is distributed; it includes the lot size as a known parameter. Confidence limits based on the hypergeometric distribution provide more accurate limits than the usual binomial limits, especially for smaller lot sizes. Tables for selected lot sizes up to 100, for various sample sizes and standard confidence levels, are provided along with instructions on their use.      S.D.

**A80-11140**      **A policy-sensitive model of technology assessment.** R. S. Ahmad and A. N. Christakis (Battelle Columbus

Laboratories, Washington, D.C.). *IEEE Transactions on Systems, Man, and Cybernetics*, vol. SMC-9, Sept. 1979, p. 450-458. 17 refs. Research supported by the Battelle Memorial Institute; U.S. Environmental Protection Agency Contract No. 68-02-2622.

Two approaches to technology assessment are examined and their implications for the actual conduct of technology assessment are briefly discussed. The epistemological differences between the approaches are studied and it is determined that the fundamental differences between the two lead to divergent conceptions of technology. The first approach is driven by the question 'how can society be organized to take full advantage of technology and to mitigate its adverse impacts', while the second one concerns itself with the question 'what does it mean to choose and deploy a certain technology'. The broader relationships between technology assessment, social change, and public policy making are reexamined and it is determined that the assessment of technologies entails socio-political choices since the two are both reciprocally linked. Attention is given to the linkage between technical-analytic and policy-analytic components of technology assessment and a policy-sensitive model is proposed.      C.F.W.

**A80-11151**      **Military Electronics Defence Expo '78; Proceedings of the Conference, Wiesbaden, West Germany, October 3-5, 1978.** Conference sponsored by Kiver Communications and Industrial and Scientific Conference Management. Geneva, Interavia, S.A., 1979. 852 p. \$75.

Papers are presented on solid state microwave technology, simulation systems, software applications, command and control communications, military microprocessor technology, airborne radar, as well as on subsystems for countermeasures technology, digital and satellite communications, precision guided weapons, and reconnaissance/ESM. The topics discussed include array processors, GaAs devices and monolithic integrated circuits, parallel computing, hybrid systems software, acquisition management, military microprocessor systems, and weapon systems improvement using airborne radar. Other subjects include digital technology for military applications, missile electronics and various laser technologies.      C.F.W.

**A80-11161**      **Software acquisition management.** G. Neil (System Development Corp., Santa Monica, Calif.). In: *Military Electronics Defence Expo '78; Proceedings of the Conference, Wiesbaden, West Germany, October 3-5, 1978.* Geneva, Interavia, S.A., 1979, p. 125-137.

The paper addresses the acquisition management of embedded software within military systems. The purpose is to summarize the nature of the concepts for software acquisition and management.

Attention is given to the five steps necessary for implementation: (1) software acquisition life cycle, (2) contracting for software, (3) software development and testing, (4) configuration management, and (5) controlling and monitoring software acquisition. The procedures that are described were initially developed by the U.S.A.F. and later adopted by the DOD for use by all military organizations involved in weapons systems procurement. It is determined that this concept is not only applicable to military systems, but has also been successfully implemented in business applications that warrant the use of computer management techniques. C.F.W.

**A80-12950** On the activity of a designer - Results of a preliminary investigation (Zur Tätigkeit des Konstrukteurs - Ergebnisse einer Voruntersuchung). W. Hesser (Berlin, Technische Universität, Berlin, West Germany). *VDI-Z*, vol. 121, no. 20, Oct. 1979, p. 1031-1035. 11 refs. In German.

An analysis of an interview with 34 designers including technicians and engineers is presented emphasizing the subjective assessment of the designers' personal situations versus their working conditions. Attention is given to the type of work each designer specializes in as well as to their creativity and its realization in daily jobs. C.F.W.

**A80-13994 \*** Quality assurance and control in the production and static tests of the solid rocket boosters for the Space Shuttle (Qualitätssicherung und Kontrolle in der Produktion und in statischen Tests der Festbrennstoff-Raketen für das 'Space Shuttle'). O. F. Cerny (NASA, Marshall Space Flight Center, Huntsville, Ala.). *Astronautik*, vol. 16, no. 2, 1979, p. 52-54. In German.

The paper surveys the various aspects of design and overhaul of the solid rocket boosters. It is noted that quality control is an integral part of the design specifications. Attention is given to the production process which is optimized towards highest quality. Also discussed is the role of the DCA (Defense Contract Administration) in inspecting the products of subcontractors, noting that the USAF performs this role for prime contractors. Fabrication and construction of the booster is detailed with attention given to the lining of the booster cylinder and the mixing of the propellant and the subsequent X-ray inspection. M.E.P.

**A80-14301** Space, space telecommunications and satellite radio broadcasting: Objectives for the next decade; International Conference, Toulouse, France, March 5-9, 1979, Lectures (Espace, télécommunications spatiales et radiodiffusion par satellite: Les objectifs de la prochaine décennie; Colloque International, Toulouse, France, March 5-9, 1979, Conférences). Toulouse, Centre National d'Etudes Spatiales, 1979. 809 p. In French and English. \$48.

Advanced satellite communication techniques for the 1980s are reviewed. Papers are presented on such topics as satellite data transmission techniques, image transmission systems, satellite broadcasting services, direct television systems, communications technology, and legal and economic aspects of space telecommunications. B.J.

**A80-14309** Time division multiple access system for inter-business traffic (Système en accès multiple par répartition dans le temps pour trafic interentreprise). D. Lombard and J. C. Bousquet (CNET, Issy-les-Moulineaux, Hauts-de-Seine, France). In: Space, space telecommunications and satellite radio broadcasting: Objectives for the next decade; International Conference, Toulouse, France, March 5-9, 1979, Lectures. Toulouse, Centre National d'Etudes Spatiales, 1979, p. 45-54. In French.

The paper describes the structure of a satellite-based time division multiple access (TDMA) system for interoffice communications. Emphasis is placed on the definition of a reference station centralizing most of the synchronization tasks and on network management. B.J.

**A80-14355** The 1979 World Administrative Radio Conference - Implications and perspectives for space radio communications (La Conférence Administrative Mondiale des Radiocommunications de 1979 - Enjeu et perspectives pour les radiocommunications spatiales). A. Berrada (Union Internationale des Télécommunications, Geneva, Switzerland). In: Space, space telecommunications and satellite radio broadcasting: Objectives for the next decade; International Conference, Toulouse, France, March 5-9, 1979, Lectures. Toulouse, Centre National d'Etudes Spatiales, 1979, p. 653-660. In French.

After a review of the historical background of international radio regulations, the paper discusses the 1979 WARC conference along with its implications for future space telecommunications. Particular attention is given to the development of satellite communications systems and direct broadcasting satellites. B.J.

**A80-14360** Regulation of satellite broadcasting in conjunction with other services (Aspects réglementaires de la radiodiffusion par satellite, notamment partagés avec les autres services). M. Huet (Télédiffusion de France, Montrouge, Hauts-de-Seine, France). In: Space, space telecommunications and satellite radio broadcasting: Objectives for the next decade; International Conference, Toulouse, France, March 5-9, 1979, Lectures.

Toulouse, Centre National d'Etudes Spatiales, 1979, p. 697-702. In French.

The 12 GHz band is allocated not only to satellite broadcasting, but also to terrestrial broadcasting, to the fixed and mobile services, and, in America only, to the fixed service by satellite also. In order to permit the coexistence of these various services, it was foreseen that the satellite broadcasting service would have priority in drawing up a plan, and that, in any particular area, the unoccupied frequencies could be used by the other services. For that reason the satellite broadcasting plan drawn up in 1977 is associated with an agreement stipulating the way in which modifications can be made to that plan and also the conditions which must be respected by the stations of the other services in order not to cause interference to the broadcasting satellites. (Author)

**A80-14361** Coordination of space systems with ground networks (La coordination des systèmes spatiaux avec le réseau à terre). D. Garidou (Direction Générale des Télécommunications, Paris, France). In: Space, space telecommunications and satellite radio broadcasting: Objectives for the next decade; International Conference, Toulouse, France, March 5-9, 1979, Lectures.

Toulouse, Centre National d'Etudes Spatiales, 1979, p. 703-718. In French.

The paper elaborates specifications for the legal coordination of satellite communication systems with ground broadcasting networks. The coordination is to be enforced by the International Telecommunications Union and implies sharing of the same frequency bands with an obligation to avoid mutual interference. B.J.

**A80-14367** The economics of satellite communications. P. Schneider (Western Union Telegraph Co., Upper Saddle River, N.J.). In: Space, space telecommunications and satellite radio broadcasting: Objectives for the next decade; International Conference, Toulouse, France, March 5-9, 1979, Lectures. Toulouse, Centre National d'Etudes Spatiales, 1979, p. 765-779.

The present paper deals with the prehistory of the launching, in April 1974, of the first domestic communications satellite, Westar, and with the service offerings developed by Western Union to meet the requirements of all communications users. A comprehensive range of tariffs are filed which, in conjunction with a liberal interconnection policy under which customers are encouraged to access the satellite system with their own equipment, provide substantial cost benefits to the users. Types of services offered cover the range of full transponder to individual voice circuits to occasional use of transponders for video service. The services available with discounts for volume users to take into account the economics of size are tabulated. V.P.

**A80-14413** Outline of PADIS. D. Andrews. *Aeronautical Journal*, vol. 83, Sept. 1979, p. 344-349.

PADIS (Procedure for Analyzing the Design of Interactive Solutions) is a practical system of design management based on the paradigm (meaning that way of looking at a problem that permits a solution to that problem to be found) which was discovered in the course of design reviews of Ariane propulsion systems. It is believed that PADIS embodies the formal expression of the natural design process, wherein an enormous amount of detail can be resolved, once a comparatively small number of conceptual decisions has been made, as recently shown (1979) in a paper describing a design study for an airframe of a four-engined high-wing military and commercial monoplane with a wide body fuselage and swing nose. Without attempting to impose a logically rigid procedure for deriving design solutions, PADIS seeks to establish the formal logic chains relating both the technological and subjective constraints to the criteria needed for impartial evaluation of the completed designs. The range of possible interactions between individual constraints and/or decisions in isolation can be analyzed with the aid of an interactions matrix and the findings related to each critical conceptual decision. J.P.B.

**A80-14771** Space - The best is yet to come; Proceedings of the Sixteenth Space Congress, Cocoa Beach, Fla., April 25-27, 1979. Congress sponsored by the Canaveral Council of Technical Societies. Cocoa Beach, Fla., Canaveral Council of Technical Societies, 1979. 325 p. S30.

Papers are presented on such areas as Shuttle update, DOD initiatives in space, Spacelab, payload planning, space commercialization, and technology transfer. Particular consideration is given to the Shuttle orbital flight test, leased military space communication systems, Spacelab flight operations, commercialization of materials processing in space, and medical applications of aerospace technology. B.J.

**A80-14775 \*** KSC facilities status and planned management operations. R. H. Gray (NASA, Kennedy Space Center, Space Transportation System Projects Office, Cocoa Beach, Fla.) and T. J. O'Malley (Rockwell International Corp., Space Div., Cocoa Beach, Fla.). In: Space - The best is yet to come; Proceedings of the Sixteenth Space Congress, Cocoa Beach, Fla., April 25-27, 1979. Cocoa Beach, Fla., Canaveral Council of Technical Societies, 1979, p. 1-50 to 1-64.

A status report is presented on facilities and planned operations at the Kennedy Space Center with reference to Space Shuttle launch activities. The facilities are essentially complete, with all new construction and modifications to existing buildings almost finished. Some activity is still in progress at Pad A and on the Mobile Launcher due to changes in requirements but is not expected to affect the launch schedule. The installation and testing of the ground checkout equipment that will be used to test the flight hardware is now in operation. The Launch Processing System is currently supporting the development of the applications software that will perform the testing of this flight hardware. B.J.

**A80-14780** Spacelab development status. K. Berge (ERNO Raumfahrttechnik GmbH, Bremen, West Germany). In: Space - The best is yet to come; Proceedings of the Sixteenth Space Congress, Cocoa Beach, Fla., April 25-27, 1979. Cocoa Beach, Fla., Canaveral Council of Technical Societies, 1979, p. 3-1 to 3-14.

At the beginning of 1979 the Spacelab Engineering Model is fully assembled according to planned test configurations and is operating and demonstrating its functional capability. Delivery of Flight Unit Hardware to the ERNO Integration Center has begun and preparations for FU integration and test activities are set up accordingly. This paper reviews the current Spacelab development status with attention given to the following areas: implementation of requirements, model philosophy, Spacelab systems/subsystems, in-

dustrial organization, qualification program, and status of integration and test activities. B.J.

**A80-14788** The challenge of managing a Spacelab program. J. Fuller, Jr. In: Space - The best is yet to come; Proceedings of the Sixteenth Space Congress, Cocoa Beach, Fla., April 25-27, 1979. Cocoa Beach, Fla., Canaveral Council of Technical Societies, 1979, p. 4-50 to 4-53.

The paper addresses the Shuttle Spacelab payloads project's (SSPP) role in developing payloads which take advantages of space transportation system (STS) capabilities and in establishing an efficient process for executing Spacelab missions. Consideration is given to Spacelab utilization, program goals and objectives, mission development, and refining the process of the Spacelab program. Implementation strategies are discussed including production line similarities, autonomy, flexibility, and risk management. V.T.

**A80-16434 \* #** A review of Spacelab mission management approach. H. G. Craft, Jr. (NASA, Marshall Space Flight Center, Huntsville, Ala.). *American Astronautical Society, Annual Meeting, Los Angeles, Calif., Oct. 29-Nov. 1, 1979, Paper 79-258*. 17 p.

The Spacelab development program is a joint undertaking of the NASA and ESA. The paper addresses the initial concept of Spacelab payload mission management, the lessons learned, and modifications made as a result of the actual implementation of Spacelab Mission 1. The discussion covers mission management responsibilities, program control, science management, payload definition and interfaces, integrated payload mission planning, integration requirements, payload specialist training, payload and launch site integration, payload flight/mission operations, and postmission activities. After 3.5 years the outlined overall mission manager approach has proven to be most successful. The approach does allow the mission manager to maintain the lowest overall mission cost. S.D.

**A80-16443 #** Spacelab program progress status and management outlook. A. Kutzer (ERNO Raumfahrttechnik GmbH, Bremen, West Germany). *American Astronautical Society, Annual Meeting, Los Angeles, Calif., Oct. 29-Nov. 1, 1979, Paper 79-279*. 36 p.

The Spacelab System is built under the responsibility of the European Space Agency ESA by an Industrial Consortium in Europe as part of a cooperative program of ESA and NASA, involving the Space Shuttle System. The paper provides a summary of program status and progress made. It describes major problems encountered, experience gained and project management procedures used. A summary management outlook of the program ahead is presented. (Author)

**A80-17226** Guidelines for public transit planning for U.S. metropolitan areas in the decade of the 1980's. J. A. Kieffer. *Journal of Advanced Transportation*, vol. 13, Fall 1979, p. 1-16.

This paper suggests guidelines and thereby raises issues concerning the suitability of various technologies and service concepts for meeting the transit needs of U.S. metropolitan areas in the decade of the 1980's. The paper begins with certain assumptions and conclusions that form the basis for suggested guidelines. These assumptions and conclusions were developed by projecting current trends for the ten year period. (Author)

**A80-18185** The office of the future - Information management for the new age. P. A. Strassmann (Xerox Corp., Rochester, N.Y.). *Technology Review*, vol. 82, Dec.-Jan. 1980, p. 54-65.

Some basic problems of information management in modern economy are discussed, such as rapid growth of workers involved in manipulating information, relative inefficiency of 'knowledge workers' (professional and technical workers, managers and administrators), exponential growth in information overload, increasing complexity of intraorganizational structures and particularly communications: sometimes for every one communication or transaction

## A80-19474

with a customer the organization may have to generate more than 40 internal messages. These and other problems of information management are to be solved with the transition to the office of the future, a process which could be compared in importance with the industrial revolution. Three major innovations are proposed: introduction of an 'information middleman', an adaptable decentralized information link; creation of personal 'work stations', i.e. highly individualized computer capabilities, to help the information middleman to deal with information users; and, introduction of a new set of economic terms and conditions to describe how information activities are conducted. V.L.

**A80-19474**      **Prospects for the near-term commercialization of shale oil in the United States.** G. Marland (Oak Ridge Associated Universities, Inc., Oak Ridge, Tenn.). *Energy* (UK), vol. 4, Dec. 1979, p. 1161-1174. 38 refs. Research supported by the Exxon Research and Engineering Co.; Contract No. EY-76-C-05-0033.

Political, economic and environmental aspects of commercial exploitation of shale oil resources in the United States are discussed. The identified resources of the highest grade shale oil in the U.S. are estimated at more than 400 billion barrels and it is certain that oil can be produced with the energy yield greater than the energy investment. However, the cost of the oil and the environmental impact of its production are not known. Three bills providing economic incentives for the development of a shale oil industry have been introduced in the U.S. Congress and a \$3 per barrel tax credit is debated. Differences exist over the incentives and the environmental issues, such as air and water quality impacts, water supply problems, and solid waste disposal. These problems and financial risks involved impede the commercialization of shale oil. V.L.

**A80-20638**      **Designing to life cycle cost in the Hornet program.** R. D. Dighton (McDonnell Aircraft Co., St. Louis, Mo.). *Society of Allied Weight Engineers, Annual Conference, 38th, New York, N.Y., May 7-9, 1979, Paper 1293.* 24 p.

A primary requirement in the Hornet program is significant reduction in life cycle cost from current Navy systems. In the present paper, the design and management techniques used to develop a new fighter/attack system at an affordable life cycle cost are described. V.P.

**A80-20862**      **Modeling and simulation. Volume 10 - Proceedings of the Tenth Annual Pittsburgh Conference, University of Pittsburgh, Pittsburgh, Pa., April 25-27, 1979. Part 2 - Systems and control.** Conference sponsored by the University of Pittsburgh. Edited by W. G. Vogt and M. H. Mickle. Pittsburgh, Pa., Instrument Society of America, 1979. 515 p. Price of five parts, \$125.

Papers are presented on such topics as models in air transportation, time series applications in modeling and simulation, reduced order modeling, machine system selection and failure, missile modeling, fire control, and large-scale systems. Attention is also given to traffic operations and control, system identification, advanced estimation methods, and probabilistic reliability. B.J.

**A80-20881**      **Modeling and simulation. Volume 10 - Proceedings of the Tenth Annual Pittsburgh Conference, University of Pittsburgh, Pittsburgh, Pa., April 25-27, 1979. Part 3 - Energy and environment.** Conference sponsored by the University of Pittsburgh. Edited by W. G. Vogt and M. H. Mickle. Pittsburgh, Pa., Instrument Society of America, 1979. 603 p. Price of five parts, \$125.

Papers are presented on the following subjects: an energy allocation model for periods of severe energy shortage; modeling and simulation of coal conversion for electric power; application of nonlinear programming algorithms to the modeling of energy systems; solar energy systems; the modeling of aquatic environments; optimization techniques in power distribution planning; and models

for pest ecosystem management. Attention is also given to: the modeling of social impacts of energy related development; recent advances in the modeling and simulation of electrical power/energy systems; plasmas and lasers; and air and water environmental systems. B.J.

**A80-20889**      **Analysis of resource pricing for geothermal electric power production.** P. Blair, M. Ervolini (Pennsylvania, University, Philadelphia, Pa.), and T. Cassel. In: *Modeling and simulation. Volume 10 - Proceedings of the Tenth Annual Pittsburgh Conference, Pittsburgh, Pa., April 25-27, 1979. Part 3.*

Pittsburgh, Pa., Instrument Society of America, 1979, p. 1075-1080. 9 refs. Contract No. ET-78-S-02-4713.

This paper discusses the structure of a decision model for analyzing investment behavior of geothermal resource developers involved in electric power production. In particular, the sensitivity of a number of key investment decision criteria to variations in the geothermal resource price is investigated using the model. In addition a number of alternative resource pricing alternatives being considered by the industry today are reviewed and discussed. (Author)

**A80-21911 #**      **Air Force targets computerized aerospace factory for 1984.** J. Miklosz. *High Technology*, Feb. 1980, p. 7-9.

A projected USAF automated sheet metal plant being developed for the mid-80s as a segment of a total aerospace factory is presented. The facility is the first step in validating the ICAM (Integrated Computer-Aided Manufacturing) concepts and is designed to serve as a model for U.S. industry. Every phase of design, manufacturing and management will be integrated with computer software, management information, and rapid communication at every level and the manufacturing processes are to be reduced to discrete 'factory-center-cell-station-process' hierarchies. An integrated system definition language, or IDEF, was also developed to enable the use of simple diagrams consisting of three to six boxes to express various phases of a manufacturing process. Although the program is targeted specifically for aerospace, the results should be applicable to any type of manufacturing. L.M.

**A80-21917**      **An overview of photovoltaic market research.** D. Costello and D. Posner (Solar Energy Research Institute, Golden, Colo.). *Solar Cells*, vol. 1, Nov. 1979, p. 37-53. 21 refs. Research supported by the U.S. Department of Energy.

Available information on current and potential markets for photovoltaics is compared and contrasted. The major markets considered are communications, cathodic protection, international agricultural pumping and remote general power, and U.S. residential applications. Each of these markets is described by market size, competing power sources and system prices required for photovoltaics to compete. It is concluded that some growth in sales to communications and cathodic protection markets can be expected in the near term. International markets for agricultural pumping and general power systems show the greatest potential for sales in the early to mid 1980s. Major energy-displacing markets in the U.S., particularly in the residential sector, can be a large and profitable long-term market for photovoltaics. (Author)

**A80-21935**      **Systems analysis for planning of air fleets and maintenance facilities.** V. V. S. Sarma, A. K. Rao (Indian Institute of Science, Bangalore, India), and K. Ramchand (Central Servicing Development Organization, Kanpur, India). *Indian Academy of Sciences, Proceedings, Section C: Engineering Sciences*, vol. C 2, May 1979, p. 243-261. 24 refs.

The paper presents a study aimed at developing simulation and systems analysis techniques for the effective planning and efficient operation of small fleets of aircraft, typical of the airforce of a developing country. Consideration is given to an important aspect of fleet management: the problem of resource allocation for achieving prescribed operational effectiveness of the fleet. Attention is given to the steady state availability which is computed under the assump-

tions of Poisson arrivals, exponential service times and an equivalent single server repair-depot. This analysis also brings out the effect of fleet size on availability. Finally, a simulation model of the system has been developed using GPSS to study sensitivity to distributional assumptions, to validate the principal assumptions of the analytical model such as the single-server assumption and to obtain confidence intervals for the statistical parameters of interest. M.E.P.

**A80-21989 \*** **Issues in assessing the contribution of research and development to productivity growth.** Z. Griliches (Harvard University, Cambridge, Mass.). *Bell Journal of Economics*, vol. 10, Spring 1979, p. 92-116. 40 refs. NASA-NSF-supported research.

The article outlines the production function approach to the estimation of the returns to R&D and then proceeds to discuss in turn two very difficult problems: the measurement of output in R&D intensive industries and the definition and measurement of the stock of R&D 'capital'. Multicollinearity and simultaneity are taken up in the next section and another section is devoted to estimation and inference problems arising more specifically in the R&D context. Several recent studies of returns to R&D are then surveyed, and the paper concludes with suggestions for ways of expanding the current data base in this field. (Author)

**A80-21995** **From the S-IV to the S-IVB - The evolution of a rocket stage for space exploration.** R. E. Bilstein (Houston, University, Houston, Tex.). *British Interplanetary Society, Journal (Astronautics History)*, vol. 32, Dec. 1979, p. 452-458. 41 refs.

The paper follows the development of the S-IV used as the upper stage of the Saturn I vehicle and its evolution to the S-IVB stage of the Saturn V launch vehicle used in the manned flight to the moon. It is shown how major technological decisions were made that determined the choice of propellants and the design of the propulsion systems and tankage. Managerial aspects of the Apollo/Saturn program are also discussed, such as the selection of outside contractors by NASA, coordination between contractors and information exchange between subsequent programs. V.L.

**A80-21996** **Project Ranger - Forging a new era in space science.** R. Cargill Hall (USAF, Office of the Historian, Omaha, Neb.). *British Interplanetary Society, Journal (Astronautics History)*, vol. 32, Dec. 1979, p. 459-462. 5 refs.

The achievements of the NASA sponsored Ranger project and its role in the development of space research are evaluated. The project which consisted of 9 flights over the period from 1959 to 1965, provided the first close-up television pictures of the moon surface which confirmed the design selected for the Apollo lander. Ranger made visual imaging a basic exploratory tool of planetary science, and also proved the technologies and the designs for NASA's automatic probes for deep-space exploration: attitude stabilization on three axes, onboard computer and sequencer, directional scientific observations, midcourse trajectory and terminal maneuver capability, and steerable high-gain antennas. The project established the respective responsibilities of scientists and engineers within a large space project and indicated possible tradeoffs between schedule, performance and costs. V.L.

**A80-22066** **A fault tree approach to quality control by variables.** L. F. Pau (Ecole Nationale Supérieure des Télécommunications, Paris, France) and G. G. Weber (Karlsruhe, Kernforschungszentrum, Karlsruhe, West Germany). *IEEE Transactions on Reliability*, vol. R-28, Dec. 1979, p. 344-352. 14 refs. Research supported by the Ministère de l'Industrie et de la Recherche and Kernforschungszentrum Karlsruhe.

The paper investigates acceptance testing by variables, based on the analogy between the events 'component failed' (in reliability) and 'measurement out of tolerances' (in quality control), when using the measurements made at several check points for each device to be tested. A method is presented which makes use of the fault-tree approach (especially in terms of min-cuts and min-paths) and of

finite-sample hypothesis testing. Estimates are made of consumer and producer risks of a quality control procedure taking into account the internal design (functional diagram) of each device. By way of example, a tuneable frequency multiplier is treated. M.E.P.

**A80-22766** **Incineration of industrial waste.** R. K. Tanner (European Environmental Enterprise, Zurich, Switzerland). *Progress in Energy and Combustion Science*, vol. 5, no. 3, 1979, p. 245-251.

Consideration is given to the problem of the disposal of industrial wastes, and solutions offered by the design of an industrial waste incineration plant are presented. The characteristics of the industrial wastes produced in West Germany and the facilities provided for their disposal are surveyed, with particular emphasis on those in the area of Hessen. The special waste incineration plant under construction for the Hessische Industriemüll GmbH is then described, taking into account the rotary kiln for the combustion of solid wastes, the combustion chamber for liquid wastes and polluted water, the heat recovery boiler, electrostatic precipitator, flue gas scrubber, flue gas reheater, and turbogenerator system contained in each of the two 25,000-ton/year capacity units of the plant. The commissioning of the plant is scheduled for autumn, 1980. A.L.W.

**A80-23317** **New standards in research and development (Neue Massstäbe für Forschung und Entwicklung).** M. Grüner (Bundesministerium für Wirtschaft, Bonn, West Germany). *DFVLR-Nachrichten*, Feb. 1980, p. 3, 4. In German.

It is pointed out that in the present situation of energy and raw materials shortage, research and development problems can no longer be solved by customary or traditional means, and certainly not by seeking short-term solutions. It is imperative that the present scientific, economic, and administrative effort be planned and implemented with a view to the distant future. V.P.

**A80-23958** **Environmental stress screening of electronic hardware; Proceedings of the National Conference and Workshop, San Jose, Calif., February 28-March 2, 1979.** Conference and Workshop sponsored by the Institute of Environmental Sciences. Mt. Prospect, Ill., Institute of Environmental Sciences, 1979. 173 p. \$20.

The papers deal with the stress screening of electronic hardware with particular emphasis placed on the establishment of cost-effective environmental stress selection criteria. The screening of standard electronic modules, standardizing environmental testing, and screening of high-reliability parts are discussed along with all equipment production reliability tests for the F-15. V.T.

**A80-23959** **Screening of Standard Electronic Modules (SEM) and field results.** N. Riegler (U.S. Navy, Naval Weapons Support Center, Crane, Ind.). In: Environmental stress screening of electronic hardware; Proceedings of the National Conference and Workshop, San Jose, Calif., February 28-March 2, 1979.

Mt. Prospect, Ill., Institute of Environmental Sciences, 1979, p. 6-9.

The Standard Electronic Modules (SEM) program organized with the Naval Electronics System Command designated as a technical management activity is described. The SEM requirements are shown through the life of a module starting with the procurement requirements placed on components which make up a SEM module through system failures. V.T.

**A80-24026** **Human Factors Society, Annual Meeting, 23rd, Boston, Mass., October 29-November 1, 1979, Proceedings.** Edited by C. K. Bensei (U.S. Army, Clothing, Equipment and Materials Engineering Laboratory, Natick, Mass.). Santa Monica, Calif., Human Factors Society, Inc., 1979. 605 p. Members, \$15.; nonmembers, \$20.

## A80-24039

The papers presented at this meeting cover such topics as models of muscle strength regulation, psychological and physiological reactions associated with repetitive tasks, computer systems, consumer products, environmental design, industrial economics, safety, both occupational and transportation, and training. V.P.

**A80-24039** Actual vs simulated equipment for aircraft maintenance training - Cost implications of the incremental vs the unique device. R. E. Vesterwig and F. T. Eggemeier (USAF, Human Resources Laboratory, Wright-Patterson AFB, Ohio). In: Human Factors Society, Annual Meeting, 23rd, Boston, Mass., October 29-November 1, 1979, Proceedings. Santa Monica, Calif., Human Factors Society, Inc., 1979, p. 334-338. 9 refs.

Life cycle cost estimates were developed for use of simulated test equipment vs actual test equipment in a maintenance training program of the type used for current advanced fighter aircraft. Previous lift cycle cost comparisons had not explicitly considered the cost implications of procurement and support of a unique training device vs an incremental device. This effort included the unique vs the incremental device factor. Total estimated fifteen year costs for simulated equipment trainers were significantly lower than comparable estimates for actual equipment trainers. The results indicate that the cost implications of a unique device vs an incremental device are important determinants of both acquisition and support cost estimates and should be considered fully in future life cycle costing efforts. (Author)

**A80-24727** Air freight: Regulation and liabilities (Le fret aérien: Réglementation, responsabilités). J.-L. Magdelénat (McGill University, Montreal, Canada). Toronto, Carswell Co., Ltd.; Paris, Editions A. Pedone, 1979. 224 p. 476 refs. In French. \$20.

Consideration is given to the air cargo transport contract and liability proceedings which may arise under it. Historical, economic, technological and legal aspects of the air freight industry are reviewed, and the various entities, including carriers, intermediaries, expeditors and recipients, involved in the transport of goods by air are presented. The air freight contract is then examined, with attention given to its nature, legal basis, content and rights and obligations set out in it. Legal liability in air freight transactions is discussed as it relates to cargo destruction, loss, damage or lateness, with consideration given to reparation and its limits and to liability actions. A.L.W.

**A80-25226** Annals of air and space law. Volume 4. Edited by N. M. Matte (McGill University, Montreal, Canada). Toronto, Carswell Co., Ltd.; Paris, Editions A. Pedone, 1979. 724 p. In English and French. \$25.

Attention is given to such topics as the distinction between scheduled and nonscheduled flights, the concentration of air carriers in Canada, the Scandinavian contribution to air chartering, and the impact of bilateral air agreements between the U.S. and Europe on Latin America. Also considered are an ecological approach to aerospace law, the protection of space from environmental harms, the law concerning direct broadcast satellites, and the liability and insurance aspects of the Space Transportation System. B.J.

**A80-25245 #** The re-organization of airport administration in Canada. D. Varty. In: Annals of air and space law. Volume 4. Montreal, McGill University; Toronto, Carswell Co., Ltd.; Paris, Editions A. Pedone, 1979, p. 359-365. 11-refs.

The centrally controlled administrative organization of Canada's airports is discussed, as well as the changes recommended by a Task Force on Airport Management (TFAM). The objectives of the TFAM included finding a management structure that emphasized local autonomy, financial viability, managerial efficiency, effectiveness and accountability, with the constraint that land ownership at principal airports remain federal. To provide more local direction of operations at each major airport, the Airport Commission concept

was proposed. This commission would consist of members of the local community and would not be subject to federal public service acts or directions from an Ottawa headquarters, but would be accountable to the Minister of Transportation. J.P.B.

**A80-26343 #** The cautious course to introducing new SDM technology into production systems. R. N. Hadcock (Grumman Aerospace Corp., Bethpage, N.Y.). *Astronautics and Aeronautics*, vol. 18, Mar. 1980, p. 31-33.

The article reviews major improvements in structural efficiency, durability, and cost effectiveness which have been realized during the past fifty years through a series of continuing advances in SDM technology. It is concluded that the emergence of advanced composites and advanced metallic structures offers significant additional improvements, provided opportunities are made available for using them. M.E.P.

**A80-26635** Integrating mechanical testing into the design and development process. E. L. Peterson (Structural Dynamics Research Corp., Cincinnati, Ohio). *Society of Automotive Engineers, Aerospace Meeting, Los Angeles, Calif., Dec. 3-6, 1979, Paper 791077*. 16 p. 13 refs.

The paper examines technical management, coordination, and application of new test technology within mechanical product development. It discusses the current state-of-the-art approach to design and development of mechanical products. The tools and techniques available to enable test engineers to contribute optimally to development programs for new mechanical products are presented, and special attention is given to computer-aided engineering. C.F.W.

**A80-26652** Quantitative Evaluation of Deficiencies /QED/ and Deficiency Analysis Ranking Technique /DART/. W. B. Lindquist (USAF, Test and Evaluation Center, Kirtland AFB, N. Mex.). *Society of Automotive Engineers, Aerospace Meeting, Los Angeles, Calif., Dec. 3-6, 1979, Paper 791111*. 4 p.

During Air Force test and evaluation of new systems, a considerable number of deficiencies are found in the logistics and operational areas. To determine in what order the deficiencies should be fixed, a disciplined approach for ranking deficiencies was developed. A weighted matrix method was used to alloy quantitative and qualitative deficiencies to be ranked. The quantitative method used the Logistics Composite Model and a Monte Carlo computer simulation, to determine a deficiency's impact in a measure of effectiveness (MOE). The MOE change was then incorporated into the matrix of qualitative deficiencies. The qualitative deficiencies were evaluated by a scoring technique based on the judgement of personnel familiar with the deficiency and its possible impact. (Author)

**A80-26776** EASCON '79; Electronics and Aerospace Systems Conference, Arlington, Va., October 9-11, 1979, Conference Record. Volumes 1, 2 & 3. Conference sponsored by the Institute of Electrical and Electronics Engineers, et al. New York, Institute of Electrical and Electronics Engineers, Inc., 1979. Vol. 1, 113 p.; vol. 2, 248 p.; vol. 3, 216 p. Price of three volumes, \$18.75.

Topics presented include environmental factors affecting the development and use of millimeter systems for naval applications, architecture for signal processing, and atmospheric attenuation of millimeter and submillimeter propagation data. Also discussed are the use of radar at nonattenuating wavelengths as a tool for the estimation of rain attenuation at frequencies above 10 GHz and an assessment of electromagnetic remote sensing systems for the detection of perched water tables. C.F.W.

**A80-26795 \* #** National Aeronautics and Space Administration plans for space communication technology. R. E. Alexovich

(NASA, Lewis Research Center, Cleveland, Ohio). In: EASCON '79; Electronics and Aerospace Systems Conference, Arlington, Va., October 9-11, 1979, Conference Record, Volume 2.

New York, Institute of Electrical and Electronics Engineers, Inc., 1979, p. 273-278. 10 refs.

A program plan is presented for a space communications application utilizing the 30/20 GHz frequency bands (30 GHz uplink and 20 GHz downlink). Results of market demand studies and spacecraft systems studies which significantly affect the supporting research and technology program are also presented, along with the scheduled activities of the program plan. C.F.W.

**A80-26920 # Radio-propagation research by the European Space Agency.** G. Brussaard (ESA, Space Communications Div., Noordwijk, Netherlands). *ESA Journal*, vol. 3, no. 4, 1979, p. 253-264.

A Technological Research Dossier has recently been issued by the Agency, defining a medium-term plan for radio-propagation research for telecommunications applications at frequencies above 10 GHz. This paper summarizes the contents of the Dossier. It describes the main subjects to be investigated, the methods to be used, and the plan of action for the execution of the work. (Author)

**A80-27202 Value analysis and the optimum cost concept applied to aerospace (L'analyse de la valeur et le principe conception pour un coût optimum /C.C.O./ appliqué à l'aérospatiale).** R. Tassinari (Société Nationale Industrielle Aérospatiale; Association Française pour l'Analyse de la Valeur, Paris, France). *L'Aéronautique et l'Astronautique*, no. 80, 1980, p. 29-37. In French.

The concept of optimum cost considered as part of the design stage for new aircraft is discussed. Attention is given to the economics concerning costs of production and maintenance, known as life-cycle-cost, as well as to economics and performance criteria. In addition, the design-to-cost method of program administration is considered, taking U.S. Defense Department experience into account. J.P.B.

**A80-27229 Are we spending too much on flight test instrumentation.** C. M. Miller (USAF, Flight Test Center, Edwards AFB, Calif.). In: Society of Flight Test Engineers, Annual Symposium, 10th, Las Vegas, Nev., September 4-6, 1979, Proceedings. Lancaster, Calif., Society of Flight Test Engineers, 1979. 7 p.

The paper considers the problem of expenditures on flight test instrumentation. The reasons for these expenditures including instrumentation users' inadequate time for participation in the design process, ignorance of instrumentation and of data reduction costs, and a lack of shelf hardware to provide a cheaper method are discussed; alternatives to digital data instrumentation systems including photo panel, gun camera, tape recorder, and analog strip recorder are considered. Finally, involvement in cost analysis by the flight test engineer is examined, concluding that the solution of the problem of overspending on flight test instrumentation lies in the involvement of the instrumentation engineer at the start of the instrumentation process. A.T.

**A80-27256 R & D performance as a function of internal communication, project management, and the nature of the work.** T. J. Allen (MIT, Cambridge, Mass.), D. M. S. Lee (Northeastern University, Boston, Mass.), and M. L. Tushman (Columbia University, New York, N.Y.). *IEEE Transactions on Engineering Management*, vol. EM-27, Feb. 1980, p. 2-12. 18 refs. Research supported by the General Electric Foundation and Owens-Corning Fiberglass Corp.; NSF Grant No. SIS-75-11829.

Both the amount and value of internal communication vary with the specific R & D function to be performed. Product and process development projects benefit far more than research or technical service projects from good internal communication. Technical service projects show higher performance when the project manager assumes

primary responsibility for coupling the project to other parts of the organization. (Author)

**A80-27726 767 - A Boeing for the 'eighties.** *Air International*, vol. 18, Feb. 1980, p. 59-66, 99.

The article surveys the development of the 767 into its present twin engine, low tail configuration. Attention is given to the 7X7 wide body studies and the 7N7 narrow body using the 727/737 fuselage cross section. Discussion also covers the various twin and three engines proposals, low and T-tails, and upper surface blowing configurations which have the engines forward of and above the wing leading edge. Finally, complete specifications for 767-200 are given. M.E.P.

**A80-27874 User systems, their developments, projections and realization - Solutions to problems of standard systems (Anwendersysteme, ihre Entwicklung, Projektierung und Realisierung - Problemangepasste Lösungen, erläutert am Beispiel einiger typischer Systeme).** W. Volkman (Siemens AG, Karlsruhe, West Germany). *VDI-Z*, vol. 122, no. 5, Mar. 1980, p. 167-173. 9 refs. In German.

The paper examines boundary conditions and solutions to problems of typical user systems. Three typical systems are discussed, which range in factors from adaptation and implementation optimization to program development and system service. Program techniques and project development means are studied and evaluated with regard to the user. Attention is given to various software processing methods such as the Hip-technique and Jackson's methods. C.F.W.

**A80-28428 International Symposium on Traffic and Transportation Technologies, Hamburg, West Germany, June 18-20, 1979, Proceedings. Volumes A1 & A2 - Public transit technologies.** Symposium sponsored by the Studiengesellschaft Nahverkehr and Bundesministerium für Forschung und Technologie. Bonn, Bundesministerium für Forschung und Technologie, 1979. Vol. A1, 380 p.; vol. A2, 352 p. In English, German, and French.

Papers are presented concerning the technologies of public transportation systems. Specific topics include computer-controlled bus traffic control systems, the adaptation of bus systems and technology to the changing needs of urban life, track guidance systems and alternative propulsion systems for buses, the development of rapid rail transit systems in the U.S., France, Britain, the U.S.S.R. and West Germany, the status of the Downtown People Mover project in the U.S., automatic guideway transit systems in Japan, France and West Germany, and the C-Bahn, H-Bahn and M-Bahn systems. Attention is also given to the market potential of automatic guideway transit systems in the U.S., citizen cooperation in the operational planning of new transportation systems, factors influencing consumer choice in urban transportation and the trial operation of a computer-controlled transit information system. A.L.W.

**A80-28438 # Status of DPM projects in the USA.** G. J. Pastor (Urban Mass Transportation Administration, Washington, D.C.). In: International Symposium on Traffic and Transportation Technologies, Hamburg, West Germany, June 18-20, 1979, Proceedings. Volume A2. Bonn, Bundesministerium für Forschung und Technologie, 1979, p. 1-23.

Fully automated downtown people movers (DPMs) for potential use in transporting tens of thousands of people daily in Los Angeles, St. Paul, Houston, Detroit and Miami are considered. The DPM Program allows the evaluation of different system technologies in varying geographic and demographic environments. Alternative methods of propulsion, vehicle sizing, suspension, guideway concepts (including the open design), construction methods and materials, communication and control design, and switching techniques are also

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being studied, while a separate winterization program has been initiated. J.P.B.

**A80-28486** International Symposium on Traffic and Transportation Technologies, Hamburg, West Germany, June 18-20, 1979, Proceedings. Volume E - Aeronautics. Symposium sponsored by the Studiengesellschaft Nahverkehr and Bundesministerium für Forschung und Technologie. Bonn, Bundesministerium für Forschung und Technologie, 1979. 224 p.

The volume contains discussions of air traffic demand, systems design for future aircraft, and advanced aviation technologies. Particular consideration is given to airports and the needs of the future, the Airbus family concept for the 1990s, and avionics for flight guidance and air traffic control. B.J.

**A80-28491 #** Major areas of research in aeronautics and air traffic at the German Aerospace Research Establishment /DFVLR/. F. Thomas (Deutsche Forschungs- und Versuchsanstalt für Luft- und Raumfahrt, Braunschweig, West Germany). In: International Symposium on Traffic and Transportation Technologies, Hamburg, West Germany, June 18-20, 1979, Proceedings. Volume E.

Bonn, Bundesministerium für Forschung und Technologie, 1979, p. 108-136.

The paper examines the large experimental facilities and some significant research achievements of the DFVLR; medium-term and long-term planning of DFVLR research activities is also described. It is shown that requirements of high cost efficiency, good energy conversion, improved ATC, and far-reaching integration of air traffic into the overall transport system will significantly determine the technological development of aviation for decades to come. Attention is given to the utilization of such new technologies as cryogenics in wind tunnel design, digital control concepts, automated ATC procedures, and advanced composites and ceramics. B.J.

**A80-28497** Automated information retrieval in science and technology. T. E. Doszkocs, B. A. Rapp, and H. M. Schoolman (National Library of Medicine, Bethesda, Md.). *Science*, vol. 208, Apr. 4, 1980, p. 25-30. 13 refs.

The development of data bases at the National Library of Medicine is discussed in order to illustrate the evolution, present capabilities and potential of automated information retrieval systems for science and technology. Consideration is given to the Medical Literature Analysis and Retrieval System which became operational in 1964 to support bibliographic publications and allow batch searching and the MEDLINE system introduced in 1971 to allow direct access to the bibliographic data bank. The present realizations and status of the various types of data bases (bibliographic data bases, data banks and knowledge bases) are then examined in detail. Limitations to the applicability of retrieval systems including limited awareness of their existence, uneven quality of retrieval and reliance on specially trained personnel, are considered, and work in improving these factors in the areas of data base and terminology selection, common access and retrieval protocols, and the development of natural language-user interfaces is indicated. A.L.W.

**A80-28696** Space Shuttle: Dawn of an era; Proceedings of the Twenty-sixth Annual Conference, Los Angeles, Calif., October 29-November 1, 1979. Parts 1 & 2. Conference sponsored by the American Astronautical Society. Edited by W. F. Rector, III (TRW, Inc., Redondo Beach, Calif.) and P. A. Penzo (California Institute of Technology, Jet Propulsion Laboratory, Pasadena, Calif.). San Diego, Calif., American Astronautical Society (Advances in the Astronautical Sciences. Volume 41, Pts. 1 & 2); Univelt, Inc., 1980. Pt. 1, 451 p.; pt. 2, 525 p. Price of part one, \$30.; part two, \$35.

Aspects of the Space Shuttle program are considered with attention given to DOD applications, the role of the astronaut, industry in space, large platforms in space, the Space Transportation

System, and the second generation Shuttle. Also considered are small self-contained payloads, attached payloads, free flying science payloads, free flying applications payloads, space medicine and life sciences, international payloads, and deep-space payloads. B.J.

**A80-28697** Organization for Space Shuttle. B. D. Browning (USAF, Space Div., Los Angeles, Calif.). In: Space Shuttle: Dawn of an era; Proceedings of the Twenty-sixth Annual Conference, Los Angeles, Calif., October 29-November 1, 1979. Part 1. San Diego, Calif., American Astronautical Society; Univelt, Inc., 1980, p. 13-18. (AAS 79-201)

The paper examines how Space Shuttle responsibilities are currently distributed throughout SAMSO. Attention is given to the current structure for managing the development and planning activities as well as to some factors that will tend to change this structure during the operational phase. B.J.

**A80-28703 \*** Space Shuttle system capability. R. F. Thompson (NASA, Johnson Space Center, Houston, Tex.). In: Space Shuttle: Dawn of an era; Proceedings of the Twenty-sixth Annual Conference, Los Angeles, Calif., October 29-November 1, 1979. Part 1. San Diego, Calif., American Astronautical Society; Univelt, Inc., 1980, p. 187-192. (AAS 79-270)

The Space Shuttle system capability is described in the historical context of previous pioneering transportation systems. A general overall report on the program's development status and currently programmed system and operational capabilities is presented. B.J.

**A80-28712 \*** NASA's program in communication satellites. J. N. Sivo (NASA, Lewis Research Center, Communications and Applications Div., Cleveland, Ohio). In: Space Shuttle: Dawn of an era; Proceedings of the Twenty-sixth Annual Conference, Los Angeles, Calif., October 29-November 1, 1979. Part 2. San Diego, Calif., American Astronautical Society; Univelt, Inc., 1980, p. 659-675. (AAS 79-247)

It is noted that NASA is currently proceeding with a revitalized R&D program aimed at the development and demonstration of advanced communication satellite system concepts and the related enabling technologies. The paper reviews the important elements of this program thrust, the approach NASA is taking to assure proper involvement of both the system supplier industry and the service supplier industry and the specific technology focus in the near term. Finally, highlights of the current NASA and industry activities related to opening up the 30/20 GHz frequency band for both commercial and military use are presented. M.E.P.

**A80-29005** Stimulating transportation innovation - The federal role. H. Eschwege and J. Vialet (U.S. General Accounting Office, Community and Economic Development Div., Washington, D.C.). *Traffic Quarterly*, vol. 34, Apr. 1980, p. 305-312.

The role of the General Accounting Office in improving transportation innovation and productivity is discussed with regard to automobiles, airlines, and railroads. Barriers to productive changes in the U.S. transportation system that are considered include the mistrust and antagonism between government and the private sector, fragmentation within the federal government, excessive government regulation, and inconsistent regulatory policy. J.P.B.

**A80-29334** Laser 79 opto-electronics; Proceedings of the Fourth Conference, Munich, West Germany, July 2-6, 1979. Edited by W. Waidelich (München, Universität, Munich, West Germany). Guildford, Surrey, England, IPC Science and Technology Press, Ltd., 1979. 673 p. In English and German. \$78.

Papers are presented on optoelectronic components, laser systems, optoelectronic signal transmission, materials processing with laser emission, lasers in environmental measuring techniques, and optoelectronic solar technology. Individual topics presented include: blue-light emitting diodes, results and perspectives of hollow cathode

gas lasers, digital fiber-optic communications link for 1 Gbit/s, programming laser marking systems, and new semiconductor laser technology for cloud altimeters. C.F.W.

**A80-29385 Commercial lidar systems (Kommerzielle Lidar-Anlagen).** G. Kuper (Impulsphysik GmbH, Hamburg, West Germany). In: Laser 79 opto-electronics; Proceedings of the Fourth Conference, Munich, West Germany, July 2-6, 1979.

Guildford, Surrey, England, IPC Science and Technology Press, Ltd., 1979, p. 487-490. In German.

It is noted that in recent years the differences between those lidar devices which are specially constructed by research organizations and those which are commercially produced are usually economic in nature. Through the use of examples three important factors are examined: (1) the user who does not specialize in lidar technology, (2) the emphasis on standardization, and (3) cost factors. M.E.P.

**A80-29526 Communications Satellite Systems Conference, 8th, Orlando, Fla., April 20-24, 1980, Technical Papers.** Conference sponsored by the American Institute of Aeronautics and Astronautics. New York, American Institute of Aeronautics and Astronautics, Inc., 1980. 792 p. \$85.

Present developments and future trends in communication satellite (CS) technology are presented. The GEO-SPAS platform, a third generation CS concept, is discussed. Network and control for tactical CS systems is considered along with emergency response CS systems, digital facsimile communication over satellite links and high-speed satellite data transmission of maritime seismic data. Attention is given to satellite broadcasting, antenna design, and international systems. V.T.

**A80-29580 # The present status and future development of the Intelsat leased system.** T. M. Kelley (International Telecommunications Satellite Organization, Communications Engineering Dept., Washington, D.C.). In: Communications Satellite Systems Conference, 8th, Orlando, Fla., April 20-24, 1980, Technical Papers.

New York, American Institute of Aeronautics and Astronautics, Inc., 1980, p. 419-424. (AIAA 80-0546)

The first section of the paper addresses the current status of the 16 nations who lease spare Intelsat transponders for domestic communications. Each domestic system is categorized by its choice of antenna coverage and by the amount of bandwidth leased. The widely varied communications services provided by Intelsat leases are described, along with the earth station configuration chosen by the leasing nation to provide these services. The second section addresses Intelsat's recent reassessment of its role as a supplier of domestic satellite service. The central issues in the debates over Intelsat's pricing philosophy and over the provision of fully guaranteed vs. preemptible service will be discussed. Some preliminary design concepts for new lease satellites are also addressed. (Author)

**A80-29601 # Multiple satellite operations and management.** F. W. Weber (Communications Satellite Corp., Washington, D.C.). In: Communications Satellite Systems Conference, 8th, Orlando, Fla., April 20-24, 1980, Technical Papers. New York, American Institute of Aeronautics and Astronautics, Inc., 1980, p. 592-598. (AIAA 80-0575)

The paper examines Intelsat in-orbit experience and the operational procedures employed for the management of the Intelsat space segment based on over nine years of in-orbit experience with the Intelsat IV and IVA satellites. In-orbit experience is considered with emphasis on the interaction with the orbital environment, communications receiver problems, power subsystems, and output TWT failure. It is concluded that the ability to demonstrate and refine new operational procedures with the in-orbit satellites ensures a smooth and efficient introduction of the Intelsat V. B.J.

**A80-29991 AUTOTESTCON '79; Proceedings of the International Automatic Testing Conference, Minneapolis, Minn., September 19-21, 1979.** Conference sponsored by the Institute of Electrical and Electronics Engineers. New York, Institute of Electrical and Electronics Engineers, Inc., 1979. 398 p. \$25.

Various aspects of ATE are examined including design applications, control and support software, special purpose systems, standards, international systems, test generation techniques, automatic test system selection techniques, calibration, testability, and software verification and validation. Particular attention is given to commercial test program sets, built-in test/system integrated test, military systems, and automatic test program generation. B.J.

**A80-30005 # Air Force Automatic Test Equipment /ATE/ life cycle technical and logistics support considerations.** J. B. Sides (USAF, San Antonio Air Logistics Center, Kelly AFB, Tex.). In: AUTOTESTCON '79; Proceedings of the International Automatic Testing Conference, Minneapolis, Minn., September 19-21, 1979.

New York, Institute of Electrical and Electronics Engineers, Inc., 1979, p. 141-146.

The Air Force Logistics Command is responsible for the technical and logistics support of ATE after production of a particular weapon system is complete. A significant part of the total ATE system life cycle cost is incurred during this period of the system's use. It is believed useful to inform ATE system suppliers of the AFLC management concepts and processes, and to describe some ATE support problems and the type solutions obtainable. This will aid ATE contractors in arriving at system design characteristics that can be supported most effectively in the AFLC 'post PMRT' era of system life cycle. (Author)

**A80-30006 Development production and in-service with truly reconfigurable ATE.** P. J. Hand (Marconi Space and Defence Systems, Ltd., Hillend, Scotland). In: AUTOTESTCON '79; Proceedings of the International Automatic Testing Conference, Minneapolis, Minn., September 19-21, 1979.

New York, Institute of Electrical and Electronics Engineers, Inc., 1979, p. 152-154.

The paper discusses various problems associated with testing in complex military projects. Emphasis is placed on the problems caused by the diversity of test methods and equipment required during the various stages of a project. The problem of production tests is considered with reference to a hierarchy of ATE that can be used, including pseudo-manual test equipment, mini ATE, multiple function ATE, and distributed ATE. It is shown that the lack of consistent testing policy is mainly due to the high cost of ownership of the ATE. This problem could be overcome by the use of a reconfigurable ATE with a high degree of mechanical modularity and a standard digital control interface. V.L.

**A80-30030 # F-16 independent assessment - An Air Force viewpoint.** N. E. White (USAF, Systems Command, Wright-Patterson AFB, Ohio). In: AUTOTESTCON '79; Proceedings of the International Automatic Testing Conference, Minneapolis, Minn., September 19-21, 1979.

New York, Institute of Electrical and Electronics Engineers, Inc., 1979, p. 342-344.

The paper deals with the benefits that have been derived to date from specific independent assessment efforts, and it defines those benefits that are expected to accrue as a result of having applied independent assessment techniques to the F-16 AIS and Depot programs. The paper introduces the management approach applied on the F-16 program. It next describes the amount and type of recommendations that were obtained from the independent assessment team and the mechanism for getting such recommendations to the attention of the prime contractor. Statistics relating to the number of recommendations submitted and the number accepted by the prime contractor are presented in order to show positive acceptance by the prime contractor of the IA team's recommenda-

tions. Finally, the paper illustrates the benefits achieved as a result of having an IA contractor involved in the AIS and Depot test requirements and test program generation process. (Author)

**A80-30031**      **Analysis and definition of test requirements.** S. Krafcik and H. Markee (ATE Associates, Inc., Northridge, Calif.). In: AUTOTESTCON '79; Proceedings of the International Automatic Testing Conference, Minneapolis, Minn., September 19-21, 1979. New York, Institute of Electrical and Electronics Engineers, Inc., 1979, p. 345-348.

A review process for effective assessment of the testability of avionic systems and their components early in the development phase, allowing timely correction of problems with minimum cost impact, is presented. Subjectivity is reduced to a minimum by using the review methodology based on detailed checklists and built around a chief reviewer who monitors and approves the output of the entire review team. The following five formal review phases are pointed out: compliance, completeness, adequacy, adaptability, and implementation. It is concluded that the process proves to be an effective medium for determining and correcting test-related problems as documentation is delivered to the contractor. L.M.

**A80-30033**      **ATE system acquisition for E-3A sentry /AWACS/.** R. D. P. Duncan (USAF, Electronic Systems Div., Bedford, Mass.), J. H. Wilson (USAF, Warner Robins Air Logistics Center, Robins AFB, Ga.), and R. R. Schellenbach (Support System Associates, Inc., Burlington, Mass.). In: AUTOTESTCON '79; Proceedings of the International Automatic Testing Conference, Minneapolis, Minn., September 19-21, 1979. New York, Institute of Electrical and Electronics Engineers, Inc., 1979, p. 365-369.

The paper describes the systems engineering and management decisions for the support of the organic depot maintenance operation of the E-3A Sentry Aircraft. In order to provide cost effective acquisition of ATE, a listing is given of the alternatives and considerations required to form an overall picture of the technical capability and total ownership cost of a particular ATE system. Special attention is given to ATE useful life requirements, efficiencies, and personnel skill level. The methodology employed in support of the E-3A mission avionics is considered. L.M.

**A80-30035**      **Programme management of an international consortium producing ATE for second line support of the Tornado aircraft /MRCA/.** J. A. G. Luck (Marconi Avionics, Ltd., Rochester, Kent, England). In: AUTOTESTCON '79; Proceedings of the International Automatic Testing Conference, Minneapolis, Minn., September 19-21, 1979. New York, Institute of Electrical and Electronics Engineers, Inc., 1979, p. 375-380.

A multinational project for the design, development, and production of an Automatic Test System for the Tornado aircraft is discussed with reference to work sharing and management organization. It is shown that such complicated objectives as collaboration between a large number of companies, worksharing, and technology transfer, have an effect on the cost and timescale, and their value to the participating countries has to be weighed against this. However, with proper management, any negative effects can be minimized and international projects can be made to work successfully. Some guidelines for worksharing and management arrangement are suggested. V.L.

**A80-30575**      **ATC flow management - Fuel is the spur and data links the key.** D. Boyle and C. Bulloch. *Interavia*, vol. 35, Apr. 1980, p. 327-331.

The article looks at the problems and possibilities for an airline management system in USA and Europe, especially ATC flow management. The existing systems are analyzed and criticized stressing the fact of fuel cost growth. Improvements through an airline data-link system are proposed. The latter might be based on existing advanced systems, such as FAA's DABS (Discrete Address Beacon System) in the U.S. and ADSEL (ADdress SElective

secondary surveillance radar system) in the UK whose capabilities could be extended to provide a digitized, essentially computer-controlled and transponder-actuated communications system. In situations requiring executive action by an airline pilot the resulting messages could be transmitted to specifically-identified aircraft, with little or no human intervention. O.L.

**A80-31249**      **WELS - An international approach to range instrumentation support.** W. P. Lustina (RCA, Missile and Surface Radar Div., Moorestown, N.J.). *RCA Engineer*, vol. 25, Feb.-Mar. 1980, p. 41-46.

It is noted that reliable, on-demand operation of precision tracking radars is a key element in supporting critical missions on today's test ranges. Such radars are located at various sites around the world which complicates the problem of keeping them operational. The paper describes an interagency approach to the problem, the Worldwide Engineering and Logistics Support (WELS) Program. Attention is given to the scope and operation of the program, including the diversity of range user requirements and the engineering/technical assistance and logistics support needed. M.E.P.

**A80-31342 #**      **Influence of engine rotor inertia on the systematic drift of a triaxial gyroscopic stabilizer (Vliianie inertsii rotora dvigatel'ia na sistematicheskii ukhod trekhosnogo girokopi-cheskogo stabilizatora).** A. A. Al'diakov and V. I. Borzov. *Akademiia Nauk SSSR, Izvestiia, Mekhanika Tverdogo Tela*, Jan.-Feb. 1980, p. 3-11, 6 refs. In Russian.

In analytical treatments of gyrostabilizer drifts, either the gimbal vibrations or the moments of external forces acting on the gyroscopic stabilizer are assumed to be known. In the present analysis, it is the base vibrations that are given. In the case of gyrorotors with reduction-gear connection to the body, base vibrations give rise to perturbations. The systematic drift rate of a triaxial gyroscopic stabilizer in the presence of periodic vibrations of the base is calculated by a successive approximation technique, taking into consideration the harmful moments at the stabilization axes, generated by the inertia of the gyrorotors. V.P.

**A80-31345 #**      **Integration of the equations of motion of a two-degrees-of-freedom gyroscope on a rotating base (Ob integrirovanii uravnenii dvizheniia dvukhstepennogo girsokopa na vrashchaisushchemsya osnovanii).** V. P. Il'chaninov and V. G. Tereshin. *Akademiia Nauk SSSR, Izvestiia, Mekhanika Tverdogo Tela*, Jan.-Feb. 1980, p. 48-50. In Russian.

**A80-31346 #**      **The virtual work principle and the Rice path-independent integrals (Printsip virtual'noi raboty i vesovye integraly Raisa).** S. A. Nazarov. *Akademiia Nauk SSSR, Izvestiia, Mekhanika Tverdogo Tela*, Jan.-Feb. 1980, p. 72-76. 7 refs. In Russian.

Rice (1968) has proposed two path-independent integrals for analyzing stress concentrations at notches and cracks, and also an approximate method for calculating stress intensity factors at crack tips. Knowles and Sternberg (1972) have used Noether's theorem to derive two additional path-independent integrals and have shown that these and the two integrals obtained by Rice constitute unique conservation laws. In the present paper, a new approach to the construction of the path-independent integrals is proposed. The approach is based on the principle of virtual work, making it possible to derive the necessary and sufficient conditions for the existence of analogs of the J-integral for inhomogeneous and anisotropic materials. V.P.

**A80-31348 #**      **Application of exponential-fractional functions to the description of the viscoelastic behavior of polymers over a wide range of temperatures and times (Primenenie drobnopoklonsiontsial'nykh funktsii dlia opisaniia v'iazkouprugogo povedeniia polimerov v shirokom temperaturno-vremennom diapazone).** V. S.

Ekel'chik. *Akademiia Nauk SSSR, Izvestiia, Mekhanika Tverdogo Tela*, Jan.-Feb. 1980, p. 116-123. 38 refs. In Russian.

The paper deals with the problem of selecting the kernel for the resolvent relations of linear viscoelasticity from given generalized creep and relaxation curves. Use is made of some published experimental data obtained for polymers by means of the analogy between temperature and time. It is shown that application of Robotnov's exponential-fractional functions provides a description of improved accuracy. The required constants are obtained by a graph-analytic method. V.P.

**A80-31767** Second generation U.S. rail transit systems - Prospects and perils. R. E. Skinner, Jr. and T. B. Deen (Alan M. Voorhees and Associates, McLean, Va.). *Transportation*, vol. 9, Mar. 1980, p. 17-32. 8 refs.

Second generation rail systems proposed for some urban areas are discussed with reference to system utilization, cost, environment, land use, economic development, energy, and service reliability. It is shown that in terms of ridership per line-mile, capital cost, and capital cost per rider, the reviewed systems are similar. Negative permanent environmental effects have been reduced through the use of existing transportation rights-of-way and/or subway construction. The ultimate worthiness of the investments in second generation rail systems will largely depend on future energy availability and cost. V.L.

**A80-31768** Coordination of urban transit services - The German model. J. A. Dunn, Jr. (Rutgers University, Camden, N.J.). *Transportation*, vol. 9, Mar. 1980, p. 33-43. 28 refs.

In Germany, the need for coordination and integration of transport services has been seen as a pre-condition to improving public transportation. A major step in this direction, which attracted world-wide attention, has been the institution of the Transport Federation (Verkehrsverbund). The paper discusses the operation of the Hamburg Transit Federation and considers a number of factors which have created a favorable climate for the development of public transportation in Germany. (Author)

**A80-31769** Enhancing the developmental impact of rail transit. D. E. Priest (Urban Land Institute, Washington, D.C.). *Transportation*, vol. 9, Mar. 1980, p. 45-55.

A number of forces currently at work in the United States are fostering the rebirth of urban rail transportation. In order to maximize the beneficial economic and developmental impact of future rail investment, certain procedures and techniques must be employed in the planning, design, and implementation of rail systems. The paper offers a set of guidelines and principles for transportation and land use policy makers. (Author)

**A80-32600** Acute microwave irradiation with regard to a case recently monitored at Begin Hospital (Irradiation aiguë aux micro-ondes à propos d'un cas récemment suivi à l'Hôpital Begin). R. P. Delahaye, P. Doury, J. Conrad, P. J. Metges, and S. Pattin (Hôpital d'Instruction des Armées Begin, Saint Mandé, Val-de-Marne; Service de Santé pour l'Armée de l'Air, Ecole d'Application; Service de Santé pour l'Armée de Terre, Ecole d'Application, Paris, France). *Médecine Aéronautique et Spatiale, Médecine Subaquatique et Hyperbare*, vol. 18, 4th Quarter, 1979, p. 293-296. In French.

The case history of a radar technician exposed to 20 min of global microwave irradiation is reported. The subject experienced a sensation of heat in his hands and lower back pain during the accidental exposure during routine antenna maintenance, which intensified following the exposure, resulting in inability to move and nausea for a period of four days. A comprehensive examination on the fourth day, however, revealed no clinical, hematological, biochemical or ophthalmological irregularities. Recommendations concerning the prevention of further accidental exposure to microwaves by workers are presented. A.L.W.

**A80-33298** The duty of the manufacturer to recall aircraft. G. M. Fleming (Byrd, Davis and Eisenberg, Austin, Tex.). *Journal of Air Law and Commerce*, vol. 45, Spring 1980, p. 581-593. 70 refs.

The continuing post-sale duty of aviation manufacturers to adequately warn users of defects is discussed, considering the duty to give a warning which is adequate and sufficient to the danger and also serves fair notice of the potential consequences. Methods of advising aircraft operators of unsafe conditions are presented, such as airworthiness directives and manufacturers' service bulletins. Various court cases affirming this post-sale duty of manufacturers are cited, including *Noel v. United Aircraft Corp.*, a case which sets out an independent actionable theory of recovery against a manufacturer failing to develop curative devices in a timely fashion. Attention is also given to the possible legal use of post-sale warnings or recall notices both by the consumer plaintiff and by the defendant manufacturer. J.P.B.

**A80-33302** Commuter airlines and the Airline Deregulation Act of 1978. M. Styles. *Journal of Air Law and Commerce*, vol. 45, Spring 1980, p. 685-709. 209 refs.

The impact of the Airline Deregulation Act of 1978 upon the domestic passenger segment of the commuter airline industry is examined. The development of the commuter airline (CA) industry is outlined, from irregular air carriers of less than 10,000 lb to their present 55-passenger restriction and the importance of CA service to small communities as well as for isolated areas is noted. Attention is also given to the federal loan guarantee program for CAs, federal preemption of state aviation regulation, joint fares, and the fuel efficiency of CAs. J.P.B.

**A80-34051** Advanced transit and urban revitalization - An international dialogue; Proceedings of the International Conference, Indianapolis, Ind., April 25-28, 1978. Volumes 1 & 2. Conference sponsored by the Advanced Transit Association. Washington, D.C., Advanced Transit Association, 1978. Vol. 1, 456 p.; vol. 2, 730 p.

Advanced transit systems are considered including design, operation, control, and guideways. Safety, simulating, forecasting social and economic impacts of advanced transit operations, and energy use in advanced transit design are discussed. V.T.

**A80-34057 #** A method of deciding the optimal specifications of transit systems. T. Ishii (Tokyo University, Tokyo, Japan) and Y. Tsukio (Nagoya University, Nagoya, Japan). In: *Advanced transit and urban revitalization - An international dialogue; Proceedings of the International Conference, Indianapolis, Ind., April 25-28, 1978. Volume 1.* Washington, D.C., Advanced Transit Association, 1978. 21 p.

Transportation plans usually have two features: they study the feasibility of specific systems, and the selected system may not approach optimality closely enough. The paper discusses a planning method to decide the optimal specifications of transit systems which fulfill the requirements of service levels within several boundary conditions, when the particular urban settings are given. After theoretical explanations of the model, a local urban center is selected (Maebashi City) and this method applied to prove its usefulness under the existing urban conditions. (Author)

**A80-34063 #** A new instrument for the planning of advanced transit systems. U. Haferstroh (SNV Studiengesellschaft Nahverkehr mbH, Hamburg, West Germany). In: *Advanced transit and urban revitalization - An international dialogue; Proceedings of the International Conference, Indianapolis, Ind., April 25-28, 1978. Volume 1.* Washington, D.C., Advanced Transit Association, 1978. 19 p. Research supported by the Bundesministerium für Verkehr.

The paper describes a new type of planning instrument for evaluation of advanced transit systems. The paper emphasizes that

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the system is fully integrated from the prognosis to the cost-effectiveness programs and it includes public participation. The transportation planning under the present environmental conditions and the models that have been developed for these requirements are described, along with the program system that resulted from the integration of these models. Finally, the paper considers the introduction of the new urban transportation systems to the public.

A.T.

**A80-34077 # Automated group transit design and procurement trends.** M. W. LaNier (ABAM Engineers, Inc., Tacoma, Wash.). In: *Advanced transit and urban revitalization - An international dialogue; Proceedings of the International Conference, Indianapolis, Ind., April 25-28, 1978. Volume 2.* Washington, D.C., Advanced Transit Association, 1978. 24 p. 6 refs.

The interrelationship between the Automated Guideway Transit (AGT) vehicle and the system guideway tends toward a significant revision in the methods usually employed to design and procure urban transit systems. Three urban transit design-procurement methods are examined and reasons for the trend toward procurement of AGT through integrated supplier/designer consortiums are given. Such a change in transit system procurement methods may allow a reduction in deployed system cost so that solutions may be developed for transportation problems that now seem economically unsolvable. (Author)

**A80-34082 # Aspects of the government research and development funding programme for urban transportation systems.** R. E. Götz (Bundesministerium für Forschung und Technologie, Bonn, West Germany). In: *Advanced transit and urban revitalization - An international dialogue; Proceedings of the International Conference, Indianapolis, Ind., April 25-28, 1978. Volume 2.*

Washington, D.C., Advanced Transit Association, 1978. 20 p. 7 refs.

The paper describes government research and development in urban transportation in the Federal Republic of Germany. It considers the objectives, program structures, and budgets for urban transportation, noting that the current systems require replacement of streetcars, removal of streetcar lines, and transition to one-man bus operation. Government objectives are aimed at an increase in the reliability, safety, rational energy utilization, and low pollution, along with the reduction of transportation costs; future urban railway systems including underground railways, bus systems, and group rapid transit systems such as the H-Bahn and C-Bahn are discussed. It is concluded that the demand-responsive urban systems will offer the features of private transport and public mass transportation systems. A.T.

**A80-34083 # Personal Rapid Transit - The paradigm challenge.** C. G. Burke (Southern California, University, San Gabriel, Calif.). In: *Advanced transit and urban revitalization - An international dialogue; Proceedings of the International Conference, Indianapolis, Ind., April 25-28, 1978. Volume 2.*

Washington, D.C., Advanced Transit Association, 1978. 22 p. 24 refs.

The paper examines Personal Rapid Transit (PRT) which is a new concept of public transportation radically different from existing ideas on public transit. PRT is a paradigm challenge which may result in a radical change for the existing subset of organizations which are currently planning and financing the construction of public transit systems. The existing and contemplated rapid transit systems imply little or no change for the transportation system, while imposing change on the society; the PRT, however, implies less change for the society, but requires revolutionary changes in the roles of organization sets which make up the public transportation subsystem. The transit paradigm is illustrated by an example of an existing paradigm and a typical PRT network for the Los Angeles area. A.T.

**A80-34299 Management of the Western Union Communications Network.** J. W. VanCleve (Western Union Telegraph Co., Upper Saddle River, N.J.). *American Institute of Aeronautics and*

*Astronautics, Communications Satellite Systems Conference, 8th, Orlando, Fla., Apr. 20-24, 1980, Paper 80-0550.* 5 p.

The paper describes the integrated transmission network and operational control of Western Union's combined satellite and terrestrial network. The WESTAR and microwave coast-to-coast radio beam installation is outlined. V.T.

**A80-34657 Management of an R&D planning process utilizing an advisory group.** F. I. Denny (Edison Electric Institute, Washington, D.C.). *IEEE Transactions on Engineering Management*, vol. EM-27, May 1980, p. 34-36.

This paper emphasizes the practical aspects of selecting projects or programs for funding utilizing an experience-based resource group or team of 'experts.' A process is proposed for identifying research and development (R&D) needs in a systematic manner which attempts to minimize impulsiveness, while maximizing careful review and decision making. The methodology discussed here has proven to be effective at clarifying problem areas and producing group consensus. Common pitfalls and means to circumvent counter-productive efforts and inefficiencies are cited. (Author)

**A80-34658 Engineering information release prior to final design freeze.** R. M. Eastman (Missouri-Columbia, University, Columbia, Mo.). *IEEE Transactions on Engineering Management*, vol. EM-27, May 1980, p. 37-42.

The purpose of the research was to develop methods for shortening the procurement time for complex components by releasing some engineering information prior to the final design freeze. The investigation covered review and analysis of records of engineering and procurement at a major defense contractor, interviews with key contractor personnel, and a literature search. The study concluded that early release of engineering information should be used only if necessary to meet schedule requirements and if carefully controlled. (Author)

**A80-34659 A time-level model of technology transfer.** M. Nawazsharif and A. K. M. A. Haq (Asian Institute of Technology, Bangkok, Thailand). *IEEE Transactions on Engineering Management*, vol. EM-27, May 1980, p. 49-59. 20 refs.

In this paper a dynamic and spatial model of technology transfer has been presented, in relatively simple mathematical form, which incorporates time and potential technological distance as a level parameter. The existing models of technological change at a particular location (that is, the technological substitution models) are shown to be special cases of the developed time-level model. Transfer of computer technology has been used as an illustrative example. Analysis of the model results indicate that the developed time-level model of technology transfer can be used as a guide in determining the optimal partners for most effective technology transfer. (Author)

**A80-35827 A look at a unique application of satellite communications - The interconnection of libraries.** D. R. Wright. *Satellite Communications*, vol. 4, May 1980, p. 24, 25, 28, 29.

The paper discusses library networking, which may currently help libraries to provide additional materials to its patrons, although regional limitations imposed on most library networks do not adequately insure equal access. A communications tool, such as a satellite, could allow even the most geographically remote libraries access to information at a reasonable rate of return. V.T.

**A80-37025 Air transportation /7th edition/.** R. M. Kane and A. D. Vose. Dubuque, Iowa, Kendall/Hunt Publishing Co., 1979. 533 p. \$10.95.

The work describes the development, regulation, and administration of air transportation. A historical review is presented, and the roles of the DOT, the FAA, and the CAB are examined. Attention is given to the procedures by which safety is maintained, and air carrier economic regulations, domestic air carriers, and international and foreign air transportation are considered. Also covered are air carrier

management and organization, the economics of air carrier routes, air carrier accounting and financial analysis, and legal aspects of air transportation. In addition, the effects of the Airline Deregulation Act of 1978 are discussed. M.E.P.

**A80-37202** **Symposium on Nondestructive Evaluation, 12th, San Antonio, Tex., April 24-26, 1979, Proceedings.** Symposium sponsored by the American Society for Nondestructive Testing, Southwest Research Institute, and Nondestructive Testing Information Analysis Center. Edited by W. W. Bradshaw. San Antonio, Tex., Southwest Research Institute, 1979. 319 p. \$65.

A collection of papers is presented regarding the research, development, and application achievements in the area of non-destructive testing. Topics of interest include computer signal processing for ultrasonic attenuation and velocity measurements, nondestructive measurement of plate glass temper, a proposed time-domain quantitative ultrasonic NDE system, and nondestructive evaluation techniques for composite materials. Also discussed are computer-controlled ultrasonic inspection of magnetic pulse welded fuel pins, acoustic emission for flaw detection in electrosag welds, and acoustical holography matrix array imaging system for the underwater inspection of offshore oil platform weldments. S.D.

**A80-37204 #** **Nondestructive evaluation awareness through GIDEP.** E. T. Richards (Government-Industry Data Exchange Program Operations Center, Corona, Calif.). In: Symposium on Non-destructive Evaluation, 12th, San Antonio, Tex., April 24-26, 1979, Proceedings. San Antonio, Tex., Southwest Research Institute, 1979, p. 17-21.

The Government-Industry Data Exchange Program (GIDEP) is discussed which provides a means to exchange certain types of technical data essential for the design, development, and production of systems and equipments. These data include failure analysis and inspection techniques, manufacturing processes, failure experience information, and part/component and material laboratory test data. The GIDEP information exchange and technology transfer is achieved by developing centralized data banks for use by engineering, quality, reliability, maintainability, metrology and safety organizational functions. Operation methods and data-utilization examples are described. Case histories of product reliability improvement and cost reduction benefits are included. S.D.

**A80-37330** **Hydrogen in air transportation; Proceedings of the International Symposium, Stuttgart, West Germany, September 11-14, 1979, and Supplement.** Symposium sponsored by the Deutsche Gesellschaft für Luft- und Raumfahrt and Deutsche Forschungs- und Versuchsanstalt für Luft- und Raumfahrt. Cologne, Deutsche Gesellschaft für Luft- und Raumfahrt, 1979. Proceedings, 443 p.; Supplement, 171 p. \$39.14.

The Symposium emphasizes future oil prospects, experience with gaseous hydrogen pipeline systems, hydrogen fueled turbofan engines, liquid hydrogen airport requirements, and a liquid hydrogen experimental airline project. Papers were given on the impacts of fossil fuel on the environment, alternate fuels for aircraft, production of hydrogen by coal gasification, production of hydrogen from solar energy and water, handling of hydrogen, liquid hydrogen fueled aircraft, turbofan engine and fuel system for liquid hydrogen use, liquid hydrogen engines, and design concept for LH2 airport facilities. A.T.

**A80-37337 #** **Safe handling of hydrogen in large quantities.** M. Müller (Messerschmitt-Bölkow-Blohm GmbH, Ottobrunn, West Germany). In: Hydrogen in air transportation; Proceedings of the International Symposium, Stuttgart, West Germany, September 11-14, 1979. Cologne, Deutsche Gesellschaft für Luft- und Raumfahrt, 1979, p. 13.1-13.29.

Safe handling of hydrogen which is used as a propellant in

rocket engines is examined. The supply system consisting of vehicles of 1000 to 6000 l capacities for transport of liquid hydrogen is described; the hydrogen is released to a storage tank of 10,000 l capacity. The test facility has a high pressure capability of the propellant feed system, and it enables the development and optimization of the combustion system without the use of the rocket's pumping and turbine unit. Safety measures require that the materials in contact with hydrogen must have a sufficient low temperature ductility or must be resistant to embrittlement which occurs when in contact with pressurized gas at ambient temperatures. For normal stress, a conventional stainless steel 1.4541 (German standard) was used, while for a higher stress, as in tubes and tanks, a nitrogen alloyed austenitic steel 1.4429 is utilized. Finally, several accidents involving a hydrogen leak, explosions, and failures of electronic equipment leading to accidents were described. A.T.

**A80-37341 #** **Safety of liquid hydrogen in air transportation.** F. J. Edeskuty (California, University, Los Alamos, N. Mex.). In: Hydrogen in air transportation; Proceedings of the International Symposium, Stuttgart, West Germany, September 11-14, 1979. Cologne, Deutsche Gesellschaft für Luft- und Raumfahrt, 1979, p. 18.1-18.17. 29 refs. Research sponsored by the U.S. Department of Energy.

Safety in the use of liquid hydrogen in air transportation is discussed. The use of cryogenic hydrogen involves the hazards from low temperatures and from combustibles. The hydrogen properties and their effect on airline operation are considered, showing that several safety problems require additional experimentation. The storage and refueling system should be automated, and buildings in the vicinity of aircraft and fueling systems should be kept at a positive pressure. Hydrogen spills and dispersion are discussed in terms of models which include the rate and size of spill, and which can predict the dispersion and distribution of hydrogen as a function of time and distance from the spill point. It is concluded that the safety record of producing and handling LH2 has been good and it will require a continued effort in safety engineering. A.T.

**A80-37549** **Airport construction in the Third World - A look at the problems.** M. Grangier. *Interavia*, vol. 35, June 1980, p. 507-514.

The problems in the construction of airports in the Third World are surveyed. Attention is given to the need for planning to fit short-term requirements into an overall long-term design. The relationship between an airport and surrounding region involves possible conflicts between social, transport and economic interests which must be minimized. Consideration is also given to the development and expansion of airports which is complicated by the difficulty of projecting future air traffic. Topics discussed include economic research and planning, feasibility studies and the choice of a site, surface links, project management, construction and related problems, electronic and electrical equipment, and financing the program. M.E.P.

**A80-37677 #** **Defining new directions for corrosion research and development.** H. M. Burte and C. T. Lynch (USAF, Materials Laboratory, Wright-Patterson AFB, Ohio). (*American Chemical Society, State of the Art Symposium on Wear and Corrosion, 15th, Washington, D.C., June 4-6, 1979.*) *I & EC - Industrial and Engineering Chemistry, Product Research and Development*, vol. 19, June 1980, p. 166-172. 25 refs.

Corrosion problems in aerospace systems are discussed. Through a series of AFOSR/AFML corrosion workshops, new directions for corrosion research were identified. A four column tabular format listing General Problems/Needs, Windows, Reduction to Practice/Development Possibilities, and Focused Research needs was particularly useful. 'Windows' are specific applications where the research and development (R & D) can be immediately applied; the keying on windows to indicate research directions and focus discussion has been successfully utilized at several meetings. Examples of current R & D needs and possibilities are given. A.T.

**A80-37690** Air Traffic Control Association, Annual Fall Conference, 24th, Atlantic City, N.J., October 15-19, 1979, Proceedings. Washington, D.C., Air Traffic Control Association, Inc., 1979. 218 p.

The papers deal essentially with current problems of the ATC system and with the introduction of new technology into the system. The topics covered include the fuel problem, the application of the TIPS system to flight data management, the use of automated graphics in the automated flight service station, the basic geometry of an efficient terminal-space configuration, and the development of a new weather contouring device. V.P.

**A80-37701** System control of FAA communications. J. C. Fowlkes (Mitre Corp., McLean, Va.) and F. Coble (FAA, Washington, D.C.). In: Air Traffic Control Association, Annual Fall Conference, 24th, Atlantic City, N.J., October 15-19, 1979, Proceedings. Washington, D.C., Air Traffic Control Association, Inc., 1979, p. 134-141. 8 refs. U.S. Department of Transportation, Contract No. FA79WA-4184.

The concept of system control which embodies control of the entire system, including local equipment, far-end equipment, and transmission facilities, is examined with reference to basic design principles, technology applications, and system functions. Important developments and products which are now utilized in system control projects are: microprocessors, minicomputers, solid-state RAM, bubble memory, CCD, and solid-state disks. Other developments include 'smart' terminals which can perform some functions without access to a processor, color displays, and built-in test equipment. Several system control projects are discussed, including the automated technical control system of the Air Force, the TRI-TAC system for the Army, Navy, and Air Force, and system control for FAA communications. V.L.

**A80-39281** Economics and technology of airships; International Symposium, Paris, France, March 28-30, 1979, Proceedings. Volumes 1 & 2 (Economie et technologie des aéronefs allégés; Colloque International, Paris, France, March 28-30, 1979, Recueil des Conférences. Volumes 1 & 2). Symposium sponsored by the Association d'Etude et de Recherche sur les Aéronefs Allégés. Paris, Association d'Etude et de Recherche sur les Aéronefs Allégés, 1979. Vol. 1, 296 p.; vol. 2, 324 p. In French and English. Price of two volumes, \$128.53.

Major airship projects (in France and other countries) are examined. Airships are considered from the viewpoints of envelopes and structures, piloting and propulsion infrastructure, captive and free balloons, application prospects, and economic prospects. B.J.

**A80-39317** The development of a model to describe an airship operating company. V. J. Drago, T. M. Connor, and R. G. Oilila (Battelle Columbus Laboratories, Columbus, Ohio). In: Economics and technology of airships; International Symposium, Paris, France, March 28-30, 1979, Proceedings. Volume 2.

Paris, Association d'Etude et de Recherche sur les Aéronefs Allégés, 1979, p. 551-559. Research supported by the Goodyear Aerospace Co.

An airship operating company model is presented. The model is made up of three components or submodels: a company structure model, company operation model, and investment model. The investment model was used to analyze the economic performance of a company operating one airship. V.T.

**A80-39554** Paving the way for energy-saving innovations. D. G. Jansson and G. C. Newton, Jr. (MIT, Cambridge, Mass.). *Technology Review*, vol. 83, June-July 1980, p. 42-53.

The paper examines the Energy Related Inventions Program of DOE which aims at stimulating the innovative process to assure that energy saving products reach the marketplace and are assimilated into economy. Specifically, the program will enable the inventors to compete effectively for public or private contract support, and to

form new enterprises for production of their inventions; it will also help to negotiate the commercialization of their inventions. Five inventions, including equipment for waste heat utilization for commercial cooking equipment and a wastewater aeration power control device were evaluated for viability and energy impact; the evaluation consisted of estimates of the possible energy impact, assessments of invention's business potential, barriers to commercialization, and the role of DOE support in stimulating technology. A.T.

**A80-39576** How to regulate (Savoir réglementer). P. Lapasset (Direction Générale de l'Aviation Civile, Bureau Réglementation des Aéronefs, Paris, France). *Voies-Aviation Civile*, no. 7, Supplement, Spring 1980, p. 5-8. In French.

The theory of regulation is discussed with emphasis on when and how to regulate. As an illustration, consideration is given to the regulation of aircraft safety. It is emphasized that good regulation is based on clear and coherent objectives. B.J.

**A80-39582** A method for monitoring maintenance - The audit (Une méthode de surveillance de l'entretien - L'audit). R. Munnich (Bureau Veritas, Service Aéronautique, Paris, France). *Voies-Aviation Civile*, no. 7, Supplement, Spring 1980, p. 28-30. In French.

The audit is considered as a technique for the monitoring of aircraft maintenance; in particular the history of maintenance auditing at the Bureau Veritas is briefly described. Also considered are the definition, the methodology, and the limits of the maintenance audit. B.J.

**A80-39588** Air transport of dangerous materials - Safety and administrative simplification can go hand in hand (Le transport par air des matières dangereuses - Sécurité et simplification administrative peuvent aller de pair). J. Harcouet (Direction Générale de l'Aviation Civile, Paris, France). *Voies-Aviation Civile*, no. 7, Supplement, Spring 1980, p. 42. In French.

**A80-40301** Annual Reliability and Maintainability Symposium, San Francisco, Calif., January 22-24, 1980, Proceedings. Symposium sponsored by IEEE, ASQC, IES, AIAA, ASME, AIIE, SOLE, SSS, and SRE. New York, Institute of Electrical and Electronics Engineers, Inc., 1980. 496 p. S24.

The Symposium focused on regulatory impact on reliability, the new DOD RAM policy, maintainability, product liability, assurance technologies and costs, software reliability, energy systems, human reliability, and electrical systems. Papers presented included management benefits and burdens in regulatory legalisms, analysis of fault isolation techniques, accelerated vs real time aging tests, technology transport for fuel-critical economy, distribution of equivalent initial flaw size, software standards, liquid metal breeder reactor cooling systems, aircraft operations and logistics simulation, and reliability in electrical transmission and distribution. A.T.

**A80-40302** Management benefits and burdens in regulatory legalisms. H. D. Rue (Hughes Aircraft Co., Culver City, Calif.). In: Annual Reliability and Maintainability Symposium, San Francisco, Calif., January 22-24, 1980, Proceedings. New York, Institute of Electrical and Electronics Engineers, Inc., 1980, p. 11-18. 12 refs.

This paper relates essential aspects of the engineering-law interface to realistic assessment of product design, reliability, safety and quality. Fundamental principles of regulatory legalisms and judicial opinions affecting industry are reviewed. A more equitable balance between assumed benefits and the often untenable burdens to industrial managements is advocated. To avoid company financial risk exposure, managers and engineers must acquire the basic knowledge regarding current regulations and judicial decisions: the assessment of the engineering-law interface cannot be wholly delegated to corporate attorneys. The acquisition of the requisite

knowledge is shown to be readily obtainable, requiring only personal motivation for the company's economic 'well being.' (Author)

**A80-40303 # Draft DoD directive 5000.xx, Reliability and Maintainability.** B. H. Swett (U.S. Department of Defense, Office of the Under Secretary of Defense for Research and Engineering, Washington, D.C.). In: Annual Reliability and Maintainability Symposium, San Francisco, Calif., January 22-24, 1980, Proceedings. New York, Institute of Electrical and Electronics Engineers, Inc., 1980, p. 19-23.

Following the introduction of some major questions involved in the development of DoD policy on reliability and maintenance (R&M), the text of the 17 May 1979 draft directive is presented in its entirety. The directive establishes policies and responsibilities for the R&M of systems, subsystems and equipment for each phase of their life cycle, and for related operating and support concepts. Milestone decisions with regard to program initiation, demonstration and validation, full scale development, and production and deployment are also discussed. (Author)

**A80-40310 Estimating the cost of R and M changes.** M. R. Seldon (General Dynamics Corp., Pomona, Calif.). In: Annual Reliability and Maintainability Symposium, San Francisco, Calif., January 22-24, 1980, Proceedings. New York, Institute of Electrical and Electronics Engineers, Inc., 1980, p. 79-84. 6 refs.

The paper considers various methods of reliability (R) and maintainability (M) changes which provide improvements at varying costs. The amount of R and M improvement can be estimated as well as the cost of effecting that change. The ratio of the R or M improvement to its cost can be used to rank these methods. The most desirable method has the highest ratio of improvement to cost and should be selected for implementation first, followed by the next highest method. Such a procedure will (1) enhance program planning (2) provide quantitative performance commitments by the reliability organization to management, and (3) facilitate the understanding of the potential cost of Reliability Improvement Warranty requirements. A.T.

**A80-40311 Cost analyses for avionics acquisition.** E. F. Toohey and A. B. Calvo (Analytic Sciences Corp., Reading, Mass.). In: Annual Reliability and Maintainability Symposium, San Francisco, Calif., January 22-24, 1980, Proceedings. New York, Institute of Electrical and Electronics Engineers, Inc., 1980, p. 85-90. 6 refs.

The paper reports on the types of cost, reliability, and maintenance tradeoff studies of cost analyses required for formulating an effective acquisition strategy. Sample study results are provided, and a description of how study results are used to focus on critical issues in the acquisition program is provided. The reliability is found to be a central factor, but its ultimate effect on support costs is determined by other influences such as the structure and efficiency of the logistic support system; attention must be directed early in the development cycle to identifying support cost drivers within a framework which accommodates the actual equipment use and support conditions. Once the drivers are identified, cost control procedures in the form of warranties and verification testing which focus on the principal areas of concern can be integrated into the acquisition plan. A.T.

**A80-40323 Triple tracking growth.** D. J. Simkins (IBM Corp., Federal Systems Div., Owego, N.Y.). In: Annual Reliability and Maintainability Symposium, San Francisco, Calif., January 22-24, 1980, Proceedings. New York, Institute of Electrical and Electronics Engineers, Inc., 1980, p. 158-163.

This paper describes the practical ramifications of Reliability Growth Management approaches with emphasis on a triple tracking approach management/technical approach as opposed to primarily a mathematical approach. The paper also discusses 'real world' construction of the instantaneous (current) MTBF target curve and

cumulative MTBF target curves depending on how the fixes are to be incorporated. Also examined are case histories involving out-of-tolerance conditions that were identified through the triple tracking system. Finally, software tracking and Bayesian techniques are discussed. The paper focuses on the development phase and the equipment level analysis except for software tracking. (Author)

**A80-40329 An engineering framework for software standards.** R. G. Babb, II and L. L. Tripp (Boeing Computer Services, Co., Seattle, Wash.). In: Annual Reliability and Maintainability Symposium, San Francisco, Calif., January 22-24, 1980, Proceedings. New York, Institute of Electrical and Electronics Engineers, Inc., 1980, p. 214-219. 61 refs.

An engineering framework has been derived and applied to software engineering to classify current and potential software standards. The evolution of an engineering discipline was broken down into three phases: crafts, fledgling engineering, and disciplined engineering; 'software engineering' is currently in the crafts phase, with some 'fledgling' activity. A relationship of practices, methods, and standards has been suggested; a framework for engineering standards was described and used to classify various kinds of software standardization. Finally, a framework for software management standards is discussed, and used to classify some activities in the industry; current and potential work in software technical and management standards has been surveyed. A.T.

**A80-40340 \* # Analysis of eighty-four commercial aviation incidents - Implications for a resource management approach to crew training.** M. R. Murphy (NASA, Ames Research Center, Moffett Field, Calif.). In: Annual Reliability and Maintainability Symposium, San Francisco, Calif., January 22-24, 1980, Proceedings. New York, Institute of Electrical and Electronics Engineers, Inc., 1980, p. 298-306. 9 refs.

A resource management approach to aircrew performance is defined and utilized in structuring an analysis of 84 exemplary incidents from the NASA Aviation Safety Reporting System. The distribution of enabling and associated (evolutionary) and recovery factors between and within five analytic categories suggests that resource management training be concentrated on: (1) interpersonal communications, with air traffic control information of major concern; (2) task management, mainly setting priorities and appropriately allocating tasks under varying workload levels; and (3) planning, coordination, and decisionmaking concerned with preventing and recovering from potentially unsafe situations in certain aircraft maneuvers. (Author)

**A80-40341 # R, M, and logistics simulations using Q-GERT.** R. E. Mortenson, Jr. (USAF, Test and Evaluation Center, Kirtland AFB, N. Mex.). In: Annual Reliability and Maintainability Symposium, San Francisco, Calif., January 22-24, 1980, Proceedings. New York, Institute of Electrical and Electronics Engineers, Inc., 1980, p. 314-319. 7 refs.

The paper presents a framework and language for weapon system logistics processes and functions. Since most logistics problems can be formulated in terms of waiting for something, the queuing theory (the study of waiting lines) provides a good perspective. The paper begins with an explanation of Q-GERT, Integrated Logistics Support Elements, and a simplified Air Force logistics process. A Q-GERT model is developed to describe the simplified process; next, a series of changes to the model are introduced to illustrate logistic and equipment design questions that might be addressed using Q-GERT. The paper ends with a discussion of the inputs and outputs of the Q-GERT Analysis Program. A.T.

**A80-40369 Various families of /E/PROMs (Familienordnung bei /E/PROMs).** M. Sbalzarini (Georg Fischer AG, Schaffhausen, Switzerland). *Elektronik*, vol. 29, June 26, 1980, p. 70-74. 7 refs. In German.

The market situation (including design trends and important

parameters) involving PROMs and EPROMs is reviewed. Attention is given to pin assignment, and an extensive list of PROMs and EPROMs now available and announced is presented. Finally, a circuit is presented which can be easily adapted to changing requirements.

B.J.

**A80-40700 \* #** Matrix management for aerospace 2000. J. F. McCarthy, Jr. (NASA, Lewis Research Center, Cleveland, Ohio). *American Institute of Aeronautics and Astronautics, International Meeting and Technical Display on Global Technology 2000, Baltimore, Md., May 6-8, 1980, Paper 80-0946*. 14 p. 8 refs.

The matrix management approach to program management is described, showing that it is an organized approach to attaining program objectives by defining and structuring all elements so as to form a single system whose parts are united by interaction. The objective of the systems approach is to attain an uncompromised complete coverage of the program management effort. It is demonstrated that beginning with an analysis of the functions necessary to carry out a given program, a model must be defined; a matrix of responsibility assignment must be prepared; and each operational process is examined to establish how it is to be implemented and how it relates to all other processes.

M.E.P.

**A80-40898 \*** Dynamic decisions and work load in multitask supervisory control. M. K. Tulga (Commercial Information Corp., Woburn, Mass.) and T. B. Sheridan (MIT, Cambridge, Mass.). *IEEE Transactions on Systems, Man, and Cybernetics*, vol. SMC-10, May 1980, p. 217-232. 38 refs. Grant No. NsG-2118.

A paradigm is developed for the problem of allocating in time a single resource to multiple simultaneous task demands which appear randomly, last for various periods, and offer varying rewards for service. Based upon a dynamic optimizing algorithm plus an estimator, and including response time and future discounting constraints, a model of the human decisionmaker is compared to experimental results for human subjects performing such a task at a computer-graphics terminal. Results indicate a reasonable fit, under various model parameters and task conditions, and suggest interesting hypotheses about the nature of human 'planning ahead' and mental work load.

(Author)

**A80-41166** Packaging, recovery and reuse: Governmental and industrial viewpoints; Proceedings of the Congress, Utrecht, Netherlands, October 23, 24, 1979. Congress sponsored by the European Commission and Koninklijke Nederlandse Jaarbeurs. *Resource Recovery and Conservation*, vol. 5, June 1980. 120 p.

Papers are presented concerning government and industrial viewpoints on the contribution of packaging materials to the solid waste stream and the relative merits of mechanical and source separation of reusable materials from municipal solid waste. Specific topics include the history of recycling in the European Economic Community, Dutch experience with sorting at the source, the basic elements in waste treatment operations, the technical and economic risks associated with resource recovery, possible industrial methods for the recovery of packaging materials, mechanical processes for the processing of municipal solid waste for materials recovery and waste incineration and pyrolysis.

A.L.W.

**A80-41167** Sorting at the source. J. M. Joosten (Stichting Verwijdering Afvalstoffen, Amersfoort, Netherlands). (*European Commission and Koninklijke Nederlandse Jaarbeurs, Congress on Packaging, Recovery and Reuse: Governmental and Industrial Viewpoints, Utrecht, Netherlands, Oct. 23, 24, 1979.*) *Resource Recovery and Conservation*, vol. 5, June 1980, p. 15-19.

Recent experience in the Netherlands with the sorting of municipal solid waste at the source is presented. Comparison of the prices and per cent recovery of waste paper from 1965 to 1978 reveals a rise in recovery rate despite concurrent wide fluctuations in the price of the paper, indicating a fairly stable raw material supply for recycling operations. Results are also presented which show that

for 69 municipalities participating in projects for the source separation and collection of glass, 49 achieved better than the 30% cooperation rates expected and one third achieved a breakeven rate of 39% or greater. Results of a survey of motivations for recycling cooperation indicate that people recycle for economic and social reasons as well as ecological, and that newspapers have the greatest impact in publicizing the project. The results thus contradict some of the arguments used in discussions of sorting at the source.

A.L.W.

**A80-41176 #** Planning technology development to achieve consistent component technology and flexibility of application. A. E. Fanning (USAF, Frank J. Seiler Research Laboratory, Colorado Springs, Colo.). *AIAA, SAE, and ASME, Joint Propulsion Conference, 16th, Hartford, Conn., June 30-July 2, 1980, AIAA Paper 80-1081*. 8 p.

Planning the development of technology applicable to military airbreathing propulsion systems is dominated by unknowns. Most significant among these unknowns is the uncertainty regarding desired characteristics of future systems. Effective planning must recognize these uncertainties and efficient use of development resources demands that technical goals established for the development of component technologies be consistent with maximum exploitation of advancing technology, while maintaining flexibility. A systematic method of identifying sets of consistent component technology goals, which maximize exploitation of advancing technology and maintain flexibility of application is discussed.

(Author)

**A80-41760 \* #** Mission management - Lessons learned from early Spacelab missions. H. G. Craft, Jr. (NASA, Marshall Space Flight Center, Huntsville, Ala.). *Deutsche Gesellschaft für Luft- und Raumfahrt and American Astronautical Society, Symposium on Shuttle/Spacelab - The New Transportation System and its Utilization, 3rd, Hanover, West Germany, Apr. 28-30, 1980, DGLR Paper 80-080*. 17 p.

The concept and the responsibilities of a mission manager approach are reviewed, and some of the associated problems in implementing Spacelab mission are discussed. Consideration is given to program control, science management, integrated payload mission planning, and integration requirements. Payload specialist training, payload and launch site integration, payload flight/mission operations, and postmission activities are outlined.

V.T.

**A80-41791** The story of the life and death of the CAB show cause order. J.-L. Magdalénat (McGill University, Montreal, Canada). *Air Law*, vol. 5, no. 2, 1980, p. 83-98. 96 refs.

The paper presents the history of the CAB show cause order. The background of the order was reviewed, noting that IATA Traffic Conferences received periodic approval from the Board until 1955, when antitrust immunity was granted for an indefinite period. The CAB announced a tentative withdrawal of antitrust immunity in 1978 and directed IATA to show cause why this finding should not be made. Subsequently, the investigation of antitrust immunity was limited to air travel in the U.S. The CAB legal justification for the order was based on antitrust laws; arguments against the order made by various countries are discussed, with the most utilized contention that no real alternative system existed by which the IATA conferences could be replaced. The CAB arguments rested on recent bilateral air transport agreements entered into by the U.S.; however, the international aviation community was opposed to the CAB findings, and the show cause proceedings were terminated in December 1979.

A.T.

**A80-41925 \* #** National meeting to review IPAD status and goals. R. E. Fulton (NASA, Langley Research Center, Hampton, Va.). *Astronautics and Aeronautics*, vol. 18, July-Aug. 1980, p. 49-52. 6 refs.

A joint NASA/industry project called Integrated Programs for Aerospace-vehicle Design (IPAD) is described, which has the goal of raising aerospace-industry productivity through the application of computers to integrate company-wide management of engineering

data. Basically a general-purpose interactive computing system developed to support engineering design processes, the IPAD design is composed of three major software components: the executive, data management, and geometry and graphics software. Results of IPAD activities include a comprehensive description of a future representative aerospace vehicle design process and its interface to manufacturing, and requirements and preliminary design of a future IPAD software system to integrate engineering activities of an aerospace company having several products under simultaneous development. J.P.B.

**A80-42011**      **Toward the development of a new aptitude selection test battery for air traffic control specialists.** J. O. Boone (FAA, Civil Aeromedical Institute, Oklahoma City, Okla.). *Aviation, Space, and Environmental Medicine*, vol. 51, July 1980, p. 694-699. 14 refs.

In an effort to update and refine the selection battery for air traffic controllers, five experimental tests measuring aptitudes and skills considered important in air traffic work were administered to 1,828 newly selected air traffic control specialist (ATCS) trainees on their first day of training at the FAA Academy in Oklahoma City. The five experimental tests and the five tests presently used by the Office of Personnel Management (OPM) for selecting ATCS trainees were employed in an iterative stepwise regression (stepdown procedure). The tests that made a significant contribution in predicting Academy scores were then used to form a composite and the old test battery and the new battery were compared. The new composite demonstrated a statistically significant increase in the multiple correlation over the old test battery. Use of the new test battery could result in a savings to the FAA in terms of Academy attrition due to failures. It could also aid in upgrading the quality of ATCS selectees and aid in minimizing human error in air traffic control work. (Author)

**A80-42856**      **Space - New opportunities for international ventures; Proceedings of the Seventeenth Goddard Memorial Symposium, Washington, D.C., March 28-30, 1979.** Symposium sponsored by AAS, ESA, DGLR, et al. Edited by W. C. Hayes, Jr. (NASA, Washington, D.C.). San Diego, Calif., American Astronautical Society (Science and Technology Series. Volume 49); Univelt, Inc., 1980. 300 p. \$35.

Consideration is given to such topics as new opportunities for international ventures in space, the Tracking and Data Relay Satellite System, the commercial potential for the Space Shuttle, and approaches to the financing of space ventures. Also considered are Japanese space activities and the European role in the Space Transportation System. B.J.

**A80-42861**      **The European approach to the financing of space ventures.** H. Dummler (Salomon Brothers, New York, N.Y.). In: *Space - New opportunities for international ventures; Proceedings of the Seventeenth Goddard Memorial Symposium*, Washington, D.C., March 28-30, 1979. San Diego, Calif., American Astronautical Society; Univelt, Inc., 1980, p. 203-214. (AAS 79-066)

Two topics are discussed: (1) the changes that are taking place in telecommunications, and (2) the attitude of the investor toward investing in space projects. It is suggested that satellite and telecommunications projects in the 1980's which are revenue-supported will find ready access to the necessary funding. B.J.

**A80-43291 #**      **The conceptual design procession in the A-109 environment - A case study.** A. J. Schuetz (Lockheed-California Co., Burbank, Calif.). *American Institute of Aeronautics and Astronautics, Aircraft Systems Meeting, Anaheim, Calif., Aug. 4-6, 1980, Paper 80-1817*. 8 p. 8 refs.

The paper deals with the recommended conceptual design process for military aircraft concept formulation in the environment of the Circular A109, Major Systems Acquisitions, introduced by the

Office of Management and Budget. The individual elements of the new approach are described and illustrated by examples. V.P.

**A80-43323 #**      **Design engineering.** I. J. Kubasak (Lockheed-California Co., Burbank, Calif.). *American Institute of Aeronautics and Astronautics, Aircraft Systems Meeting, Anaheim, Calif., Aug. 4-6, 1980, Paper 80-1888*. 15 p. 9 refs.

The subject of design engineering and the role of the design engineer as practiced in the aircraft industry is addressed. Attention is given to the applied technology and methodology in order to illustrate how the design engineer functions in the main stream of the engineering effort. It is shown that this effort begins early in the life cycle of the aircraft, by helping marketing to sell. The effort is then followed by the preliminary design phase, and continues through the project design phase. It is continued further by helping to test and to build; and finally, by helping to maintain the aircraft in service. The role of the design engineer as a composite of many designers in the project design activity who must put together the science and the aircraft structure and technology is discussed. M.E.P.

**A80-44411 #**      **Multiattribute utility theory and environmental decisions.** J. P. Collins (U.S. Navy, Environmental Support Office, Port Hueneme, Calif.) and E. A. Glysson (Michigan, University, Ann Arbor, Mich.). *American Society of Civil Engineers, Environmental Engineering Division, Journal*, vol. 106, Aug. 1980, p. 815-830. 23 refs.

A decision-theoretic procedure (the multiattribute utility approach) for evaluating the complex environmental interactions of engineering projects is described. The evaluative procedure consists of six phases: (1) the definition of evaluative framework, (2) the description of decision attributes, (3) the development of environmental utility functions, (4) the incorporation of uncertainty of outcomes, (5) the scaling of utility functions, and (6) the formulation of results. The procedure was applied to the evaluation of two proposed solid waste disposal alternatives in southeastern Michigan. B.J.

**A80-44521 #**      **The library of the DFVLR - Present status, planned alteration, usage possibilities (Das Bibliothekswesen der DFVLR - Derzeitiger Status, geplante Neuordnung, Nutzungsmöglichkeiten).** P. Sternemann (Deutsche Forschungs- und Versuchsanstalt für Luft- und Raumfahrt, Cologne, West Germany). *Deutsche Gesellschaft für Luft- und Raumfahrt, Symposium über Information und Dokumentation auf dem Gebiete der Luft- und Raumfahrt, Neubiberg, West Germany, Nov. 14, 1979, Paper 79-084*. 18 p. In German.

The paper gives an overview of the present status, planned alterations, and the scope of users of the DFVLR library, as well as a survey of library related activities outside of the library department. Attention is given to the tasks of the DFVLR which include research, assistance in planning and carrying out projects, and the construction and operation of large test installations, showing how they relate to demands on the library. M.E.P.

**A80-44525**      **Project management - Tasks, costs, usefulness (Projekt-Management - Aufgaben, Kosten, Nutzen).** J. Scheel (Projektgruppe Systemtechnik GmbH, Bremen, West Germany). *VDI-Z*, vol. 122, no. 14, July 1980, p. 567-575. In German.

The article proposes that organizational methods be studied for their economic rationale, making it possible to compare costs and usefulness. Emphasis is placed not on a procedure for such analyses, but on a description of the necessity of project management and the areas where it is able to exert an influence. M.E.P.

**A80-44569**      **Whatever happened to the Space Shuttle.** R. Lewis. *New Scientist*, vol. 87, July 31, 1980, p. 356-359.

The development of the Space Shuttle program is described. Consideration is given to the concept of the system, as well as to its

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components, such as engines and thermal protection. Delays in the development are analyzed and financial problems are outlined, along with other nontechnical issues. V.T.

**A80-44648** Focus - Fiber optics (Im Blickpunkt - Lichtleitertechnik). H. Lemme. *Elektronik*, vol. 29, July 24, 1980, p. 35-46. 34 refs. In German.

A summary of the current state of the art of fiber optics, as well as of what is available on the market, is presented. The discussion covers fibers and cables including their optical characteristics and production, as well as transmitters including LEDs, and laser diodes. Also examined are receivers, including PIN-photodiodes, and avalanche diodes, as well as passive elements such as optical connectors, and branches. Further aspects covered include experiences in actual use and the outlook for the future. M.E.P.

**A80-44650** Technical documentation in electronics (Technische Dokumentation in der Elektronik). H. Bonerz (Elektronik-System-Gesellschaft mbH; Flug-Elektronik-Gesellschaft für Logistik GmbH, Munich, West Germany). *Elektronik*, vol. 29, July 24, 1980, p. 67-70. In German.

It is noted that along with the increasing technicalization and high performance capability of modern electronic devices and systems, the growing significance of logistics - the optimal readying of hard and software with regard to time, location and quantity - for the user has been recognized. Technical documentation is shown to play an important role in the processing of logistical problems. It is concluded that each product is only as suitable for use as its immediately available and up to date documentation. M.E.P.

**A80-45025** Pilots who drink - FAA regulations and policy, and the Air Line Pilots Association treatment program. E. D. Weed, III. *Journal of Air Law and Commerce*, vol. 45, Summer 1980, p. 1089-1114. 102 refs.

Pilot alcoholism is discussed along with the methods of coping with the problem adopted by the CAB and the FAA: sanctions such as pecuniary penalties and revocation of certification are considered. Emphasis is placed on an alternative early identification and treatment plan, approved and supported by the FAA, which is currently being developed by the Air Line Pilots Association and involves the peer group approach and human intervention. J.P.B.

**A80-45738 #** Product performance enhancement in the United States Air Force. J. A. Stempson (USAF, Systems Command, Washington, D.C.). *American Institute of Aeronautics and Astronautics, Aircraft Systems Meeting, Anaheim, Calif., Aug. 4-6, 1980, Paper 80-1816*. 5 p.

Maintenance and support of Air Force systems and equipment has been traditionally reserved to the military. Consequently, manufacturers and suppliers of military hardware are frequently not deeply involved in or oriented toward continuing field support of their product. Since military systems and equipment tend to embody new technology and state-of-the-art advances, it is often difficult for the military alone to ensure proper product performance, particularly during the early stages of field use. This paper discusses the need for product performance enhancement from the view of current Air Force and contractor experience and responsibilities. Implementation techniques and their associated risks and benefits are discussed and proposed. (Author)

**A80-45741 #** Acquisition logistics management in naval aviation. J. F. Sylvester (U.S. Navy, Naval Air Systems Command, Washington, D.C.). *American Institute of Aeronautics and Astronautics, Aircraft Systems Meeting, Anaheim, Calif., Aug. 4-6, 1980, Paper 80-1827*. 20 p.

Acquisition logistics management in naval aviation is discussed with particular emphasis placed on maintenance capability and material support. Planning for support is separable into two categories: planning that must be done prior to the signing of a full

scale development (FSD) contract and planning that occurs following the development contract award. To achieve the pre-FSD goals, it is necessary to address three key critical elements: design features, contract requirements, and budget requirements. Once source selection is completed, the development contract signed, and the budget in place, an ILS development program begins. V.T.

**A80-45742 #** Affordable automatic testing - A modular concept. R. O. Byrne and M. K. Allen (USAF, Acquisition Logistics Div., Wright-Patterson AFB, Ohio). *American Institute of Aeronautics and Astronautics, Aircraft Systems Meeting, Anaheim, Calif., Aug. 4-6, 1980, Paper 80-1828*. 6 p.

In this paper we will present some of the problems related to the development and acquisition of automatic test equipment (ATE) and provide rationale on how an Air Force modular concept results in affordable weapon system support. We will address the effects that a modular approach will have upon those who will develop, acquire, use, and support Air Force ATE in the future. (Author)

**A80-46772** Photovoltaics commercialization readiness assessment. F. H. Morse (U.S. Department of Energy, Office of Conservation and Solar Applications, Washington, D.C.). In: *Photovoltaic Solar Energy Conference, 2nd, Berlin, West Germany, April 23-26, 1979, Proceedings*. Dordrecht, D. Reidel Publishing Co., 1979, p. 843-850.

The technical, market/economic, environmental, and institutional readiness of photovoltaic systems is discussed. Consideration is given to remote, or off-grid, applications and grid-connected applications. Two strategy options are outlined - to promote the evolutionary development of the photovoltaic industry and to focus on penetration of energy-saving markets with new and improved low-cost photovoltaic technology. V.T.

**A80-47585** Energy utilization; World Energy Engineering Congress, 2nd, Atlanta, Ga., October 29-31, 1979, Compiled Papers. Congress sponsored by the Association of Energy Engineers and U.S. Department of Energy. Atlanta, Ga., Fairmont Press, Inc., 1980. 399 p. \$45.

The conference focused on energy utilization techniques and current technologies applicable within the commercial, industrial, and institutional sectors. Major subjects include energy from refuse, industrial energy utilization, cogeneration and community district heating, energy from wood, new developments in solar power technology, and new approaches to energy management. In addition, recent energy utilization developments in Finland and the United Kingdom are presented. V.L.

**A80-47586** A synergistic solid waste to energy project - Phase 1 project concept. J. E. Schaeffer (Delaware County, Solid Waste Management, Pa.), S. E. Price (Scott Paper Co., Chester, Pa.), and A. W. Hogeland. In: *Energy utilization; World Energy Engineering Congress, 2nd, Atlanta, Ga., October 29-31, 1979, Compiled Papers*. Atlanta, Ga., Fairmont Press, Inc., 1980, p. 5-8.

A project has been proposed to use the 1500 tons per day of municipal solid waste available in Delaware County in Pennsylvania for the production of steam and electric power for Scott Paper Company's plant. The project will consist of a facility for combustion of solid waste, including recovery of residual materials, disposal of the remaining ash, and provisions for continuity of operation in the event of interruption in the waste stream or interruption in the use of steam from the project. Major tasks of the project, its economic viability, and synergistic features are briefly reviewed. V.L.

**A80-47588** Energy from MSW - The industrial market. E. B. Cohen (New Jersey, Dept. of Environmental Protection, N.J.), R. W. Simkins (Burlington County, Health Dept., N.J.), and J. C. Anderson. In: *Energy utilization; World Energy Engineering Con-*

gress, 2nd, Atlanta, Ga., October 29-31, 1979, Compiled Papers. Atlanta, Ga., Fairmont Press, Inc., 1980, p. 15-18. 6 refs.

Prospects for energy recovery from solid waste in Burlington County, New Jersey, are discussed with respect to potential customers, final forms of energy, and energy costs. Major requirements to economically competitive energy recovery from municipal solid waste are formulated, and the present status of local refuse derived energy projects is reviewed. V.L.

**A80-47874**      **Electronics reliability - A state-of-the-art survey.** H. S. Blanks (New South Wales, University, Kensington, Australia). *Microelectronics and Reliability*, vol. 20, no. 3, 1980, p. 219-245. 100 refs.

The reliability physics of electronic components, screening and testing methods, reliability predictions, and reliability growth are discussed. Consideration is given to screening of modules and higher assemblies. Emphasis is placed on reliability growth management and analysis. V.T.

**A80-48165**      **Energy to the 21st century; Proceedings of the Fifteenth Intersociety Energy Conversion Engineering Conference, Seattle, Wash., August 18-22, 1980. Volumes 1, 2 & 3.** Conference sponsored by AIAA, ACS, ANS, ASME, AIChE, SAE, and IEEE. New York, American Institute of Aeronautics and Astronautics, Inc., 1980. Vol. 1, 896 p.; vol. 2, 864 p.; vol. 3, 935 p. Price of three volumes, members, \$145.; nonmembers, \$165.

The conference focused on advanced power cycles for fusion; aircraft electrical power systems; aircraft, missile, and launch facility batteries; aerospace high voltage technology; NiCd space batteries; aerospace power system simulation; space photovoltaics, and solar arrays; fossil fuels, and fuel cells. Papers were presented on photocell heat engine solar power systems, power technology for fusion reactors, Comsat/Intelsat Ni-H battery technology, GaAs solar cells for space applications, Pioneer Venus multiprobe and orbiter solar array performance, lead-acid batteries for energy storage, the near-term hybrid vehicle, coal liquefaction and gasification, and syngas from fusion. A.T.

**A80-48285 #**      **Municipal solid waste and district heating - A case study.** P. F. Donnelly (Argonne National Laboratory, Argonne, Ill.). In: *Energy to the 21st century; Proceedings of the Fifteenth Intersociety Energy Conversion Engineering Conference, Seattle, Wash., August 18-22, 1980. Volume 2.* New York, American Institute of Aeronautics and Astronautics, Inc., 1980, p. 900-903.

The feasibility of energy recovery from municipal solid waste is examined with reference to the Recycle Energy System project now being implemented in Akron, Ohio. The system designed to burn 1000 tons of solid waste a day, consists of (1) a solid waste shredding facility, (2) three industrial spreader-stokers and boilers capable of using shredded commercial and residential solid waste as fuel, and (3) the existing and new steam distribution lines. The project financing, major problems, and current status are discussed. V.L.

**A80-48317 #**      **The challenge of financing geothermal development.** P. Rodzianko (Geothermal Energy Corp., New York, N.Y.). In: *Energy to the 21st century; Proceedings of the Fifteenth Intersociety Energy Conversion Engineering Conference, Seattle, Wash., August 18-22, 1980. Volume 2.* New York, American Institute of Aeronautics and Astronautics, Inc., 1980, p. 1134-1137.

**A80-48801**      **Synthesis and analysis methods for safety and reliability studies; Proceedings of the Advanced Study Institute, Urbino, Italy, July 3-14, 1978.** Institute sponsored by NATO. Edited by G. Apostolakis (California, University, Los Angeles, Calif.), S. Garribba (Milano, Politecnico, Milan, Italy), and G. Volta (Commis-

sion of the European Communities, Joint Research Centre, Ispra, Italy). New York, Plenum Press, 1980. 471 p. \$49.50.

Theoretical and applied aspects of reliability and risk analysis methodologies are discussed with emphasis on binary and multistate systems and man-system interactions. Papers are presented on tree analysis by list-processing techniques, a computer code for fault-tree calculation, uncertainty propagation in fault-tree, and multivalued logic in the representation of engineering systems. Other papers include the use of Markov processes for reliability problems, optimization problems in system supervision, and notes on human error analysis and prediction. V.L.

**A80-48809**      **Improving system reliability by the elimination of a glass of design errors.** G. Rzevski (Kingston, Polytechnic, Kingston-upon-Thames, Surrey, England). In: *Synthesis and analysis methods for safety and reliability studies; Proceedings of the Advanced Study Institute, Urbino, Italy, July 3-14, 1978.* New York, Plenum Press, 1980, p. 391-399. 15 refs.

The relationship between system design methods and system reliability is examined with emphasis on a class of human errors which affect system reliability and are committed, or indirectly caused, by system designers. The concept of 'perceivable' systems is formulated and a methodology of perceivable system design is developed. The method is based on a set of principles including the principles of trial-and-error, decomposition, minimizing connectivity, top-down approach, optimal life-cycle, continuity, and universality. The same principles can be applied to the design of hardware, software, and management systems; different guidelines are required for different types of systems. Results of the experimental testing of the proposed design method are briefly discussed. V.L.

**A80-49393**      **Capital requirements for energy in the industrialised countries.** P. Tempest. *Revue de l'Energie*, vol. 31, Aug.-Sept. 1980, p. 43-52. 14 refs. In English and French.

Various key factors which will determine the capital requirements for energy of the industrialized countries over the next two decades are reviewed. Attention is given to capital market sources, the implications of differing energy requirements, the economic constraints of growth, the danger of persistent low growth, attempts to counteract discontinuity, energy pricing discrepancies, conservation as a part of energy investment, and technological constraints in new energy. B.J.

**A80-49397**      **Assessment of risks in the financing of major energy projects.** J. Gabriel and A. Galibert (Société de Promotion des Grands Projets Internationaux, France). *Revue de l'Energie*, vol. 31, Aug.-Sept. 1980, p. 113-126. In English and French.

The various types of risks associated with the financing of a major energy project are reviewed, including: (1) the construction period risks, (2) the risks at the time of delivery of the facilities, and (3) the operating period risks (particularly those during the debt repayment period). Consideration is then given to the limitation and spreading of risks, and to direct and indirect securities. It is concluded that, in comparison with the traditional financing of industrial projects, large energy projects will increasingly necessitate a thoroughgoing change in the evaluation of risks and the customary methods of covering the risks. B.J.

**A80-49398**      **Trends in financing LNG projects.** W. Dorson (Chase Manhattan Bank, New York, N.Y.). *Revue de l'Energie*, vol. 31, Aug.-Sept. 1980, p. 145-150. In English and French.

The capital costs required for a base load LNG (liquefied natural gas) project have increased dramatically over the past decade. Compared to the scope and cost of earlier projects capital requirements have increased beyond the investment appetites of most private investors and financing responsibility tended to become segmented in a manner reflecting specific responsibilities. It is suggested that through the use of a project financing approach it may

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be possible to disaggregate certain project responsibilities based on the changing motivations and expertise of interested parties. This approach may provide some of the answers required to ensure the financial viability of many proposed LNG projects. B.J.

**A80-49400** Financing for energy resources development projects - Japanese experience. H. Ishihara (Industrial Bank of Japan, Ltd., Tokyo, Japan). *Revue de l'Energie*, vol. 31, Aug.-Sept. 1980, p. 203-222. In English and French.

The past energy demand situation and the future outlook in Japan are reviewed. Consideration is then given to the overall financing aspects of past energy resources development projects. Finally, the institutional aspects of the financing and of the problems involved are discussed. B.J.

**A80-49538** Development of separation methods and system design of recycling of solid wastes. M. Hiraoka, N. Takeda, and K. Fujita (Kyoto University, Kyoto, Japan). (*Recycling World Congress, 2nd, Manila, Philippines, Mar. 19-22, 1979.*) *Conservation and Recycling*, vol. 3, no. 3-4, 1979, p. 211-232.

The method of characteristic functions and characteristic matrices is applied to the analysis of experimental data on different types of size-reducing equipment, separators, and classifiers involved in a municipal waste recycling project. Based on the results of the analysis, two alternative recycling systems have been proposed. These systems are discussed with reference to material balance, calorific value of reclaimed materials, prices of end products, as well as construction and operation costs. V.L.

**A80-49541** Source separation for resource recovery - State-of-the-art. S. Gotoh (National Institute for Environmental Studies, Tsukuba, Japan), E. Tanaka (Dynax, Inc., Tokyo, Japan), and Y. Yonemura (Nomura Research Institute, Kamakura, Japan). (*Recycling World Congress, 22nd, Manila, Philippines, Mar. 19-22, 1979.*) *Conservation and Recycling*, vol. 3, no. 3-4, 1979, p. 305-317. 5 refs.

In Japanese cities with populations of less than 300,000 recycling or materials recovery from the refuse is widely practiced through source separation, assuming some form of citizen's participation. Very few cities use a sophisticated mechanized system for resource recovery. Application of handpicking, sorting by screens, or magnetic separation of ferrous fraction to a source-separated waste stream is common practice for recycling in many cities. The state-of-the-art in two cities, one with a considerable involvement of citizens in source separation and another with little, is described in this paper. (Author)

**A80-49689** Helicopters - A solution to urban commercial transportation needs. S. R. Spector (Hughes Helicopters, Culver City, Calif.). *Society of Automotive Engineers, International Air Transportation Meeting, Cincinnati, Ohio, May 20-22, 1980, Paper 800739*. 11 p.

The need for fast, safe, convenient, low cost urban transportation can be satisfied by a Helicopter Transportation System. A series of public-use heliports would be established around a metropolitan area to support frequent bus-type intracity operations of light turbine helicopters. Some of the heliports would also support intercity operations to relieve conventional airport surface and air traffic congestion. The Helicopter Transportation System is more cost-effective in providing quasi-rapid transit than competitive transportation alternatives. The helicopter has also become more compatible with urban requirements for safety and low noise to be regarded as an attractive alternate transportation mode for the city. Federal, state, regional and local government programs are required to establish the efficacy of urban helicopter transportation. (Author)

**A80-49701** Operational consideration for safety during airport construction and maintenance. L. L. Smith (Hillsborough County Aviation Authority, Tampa, Fla.). *Society of Automotive*

*Engineers, International Air Transportation Meeting, Cincinnati, Ohio, May 20-22, 1980, Paper 800753*. 7 p.

The paper considers safety problems during airport construction and maintenance. Airports must have a comprehensive risk management policy and an inspection procedure to assure consistent safety; this policy should detail requirements for construction and maintenance area protection, procedures for temporary shutdown of airport facilities, and insurance and bonding contracts for airport builders, legal authorities, and insurance companies. FAA and airport management are responsible for safety regulations, and should consider that safety is a critical requirement for economic success. A.T.

**A80-49716** An analysis of airport authority operating costs. G. D. Gosling (California, University, Berkeley, Calif.). *Society of Automotive Engineers, International Air Transportation Meeting, Cincinnati, Ohio, May 20-22, 1980, Paper 800774*. 15 p. 14 refs.

The paper presents an analysis of the operating costs of large and medium hub airports in the U.S. The effects of airport configuration, climate, and airfield improvements are discussed, noting the number and length of runways and fuel consumption. Financial surveys cover aircraft movement areas, terminal facilities, and air traffic control services; the relation between operating costs and traffic is analyzed to determine possible airport scale economies. A.T.

**A80-49926** Recycling Berlin '79; Proceedings of the International Congress, Berlin, West Germany, October 1-3, 1979. Volumes 1 & 2. Congress sponsored by the World Health Organization, International Energy Agency, National Science Development Board of the Philippines, et al. Edited by K. J. Thome-Kozmiensky (Berlin, Technische Universität, Berlin, West Germany). Berlin, E. Freitag-Verlag für Umwelttechnik; Springer-Verlag, 1979. Vol. 1, 767 p.; vol. 2, 719 p. In English, German, and French. \$81.40.

Trends of energy and material recycling are reviewed with attention given to such topics as refuse recovery systems, the regional planning of solid waste disposal plants, waste management in Germany, and solid waste management in Japan. Consideration is also given to the thermal processing of solid waste, the environmental impact of refuse-to-energy conversion, the incineration of municipal waste, biomass gasification processes, and the use of pyrolysis in waste disposal. B.J.

**A80-49939** Anatomy of regional solid waste resource recovery projects. L. O. Ward and R. J. Schoenenberger (UOP, Inc., Des Plaines, Ill.). In: *Recycling Berlin '79; Proceedings of the International Congress, Berlin, West Germany, October 1-3, 1979*. Volume 1. Berlin, E. Freitag-Verlag für Umwelttechnik; Springer-Verlag, 1979, p. 89-95.

The paper analyzes legal, financing, political, economic, technical, and environmental aspects of planning regional 3000-ton solid waste recovery projects. Facility capacities, number of combustion trains, and turbine-generator capacity, and costs of different designs were evaluated, noting that the principal problems in implementation of a project have been financing, legal, and risk considerations that may be experienced during the next 30 years. A successful solid waste recovery project requires an assured solid waste supply, a publicly acceptable site, reliable energy customers, and technological-management capability. Qualified engineering-consulting firms, financial and legal advisors, and cooperation of government agencies are necessary to construct a solid waste plant. A.T.

**A80-49952** Goals and 'goals' for systems planning - How to elaborate and realise goals. W. Dreger (Siegen, Gesamthochschule, Siegen, West Germany). In: *Recycling Berlin '79; Proceedings of the International Congress, Berlin, West Germany, October 1-3, 1979*. Volume 1. Berlin, E. Freitag-Verlag für Umwelttechnik; Springer-Verlag, 1979, p. 251-257.

Various aspects of the development of goals in systems planning

are reviewed. Attention is given to the necessity of systematizing goals, goals in a system's life cycle, the elaboration of goals, and the role of minor goals. B.J.

**A80-50192 # Let's return to the fundamentals of the acquisition process.** F. H. Dietrich (Executive Office of the President, Office of Federal Procurement Policy, Washington, D.C.). *American Institute of Aeronautics and Astronautics, Aircraft Systems Meeting, Anaheim, Calif., Aug. 4-6, 1980, Paper 80-1815*. 8 p. 10 refs.

The paper provides the necessary background concerning the genesis of the Major System Acquisition Circular A-109 and shows how it melds fundamental management and business principles with classical problem-solving logic. It is concluded that A-109 provides the flexibility by allowing tailoring an acquisition process, as long as the fundamentals of A-109 are accommodated. V.T.

**A80-50268 Effective Sampling Plans based on a prior distribution.** R. D. Guild (Pennsylvania State University, University Park, Pa.) and I. I. D. G. Raka. *Journal of Quality Technology*, vol. 12, Apr. 1980, p. 88-93. 5 refs.

An Effective Sampling Plan (ESP) which assumes a gamma prior distribution on the lot percent defective is developed. The sample size and acceptance number are selected using estimates of the parameters of the gamma prior distribution. A set of ESP's is generated from an initial plan selected from MIL-STD-105D. Process control procedures are given with decision rules for moving from plan to plan within the set. All plans of the ESP set have the same Bayesian OC curve as the initial plan and provide for reduced sampling with improvement in the process. (Author)

**A80-50639 On the quantification of economic consequences of organizational measures (Zur Quantifizierung der wirtschaftlichen Auswirkungen organisatorischer Massnahmen).** R. Hackstein and W. Thomas (Aachen, Rheinisch-Westfälische Technische Hochschule, Aachen, West Germany). *VDI-Z*, vol. 122, no. 15-16, Aug. 1980, p. 631-638. 11 refs. In German.

Results of an examination of process control in 13 German machine-building industries are presented in order to determine the effects of various organizational measures. A model for classifying quantitative and reproducible analyses of differing organizational structures is developed to quantify organizational influences such as transit times and the meeting of deadlines. Attention is given to a comparison between organizational measures for performance measurement and cost-effectiveness as well as to parameters that indicate the quality of work cycles in process control. An analysis of the economy of operation for organizational measures is presented together with a schematic diagram of procedures for mathematical and statistical economic analysis. Graphs depicting cost analysis of various organizational degrees for capital gains are presented. C.F.W.

**A80-50640 Rational investment planning through systematic data availability (Rationelle Investitionsplanung durch systematische Datenbereitstellung).** W. Wiewelshove (Gebr. Kaiser, Arnsberg, West Germany). *VDI-Z*, vol. 122, no. 15-16, Aug. 1980, p. 647-654. In German.

Methods for the rationalization of data acquisition through simple measures are discussed in order to enable more detailed investment planning processes. Time sequences, personnel requirements, and cost-effective structures are analyzed for mechanical yield of machine factories with single and small production capacities. Attention is given to an analysis of occupation time of mechanical processing per year as well as to the dependence of occupation time/year on general processing and machine types. Block diagrams showing the concentration of investment planning evaluation goals together with preparation for investment planning of capacity supply and demand for relevant production parts are examined. Attention is also given to interactive communication (i.e. dialogue) between computers and operators and the data flow between them. C.F.W.

**A80-50812 Component verification system.** D. D. Schroeder (Digital Equipment Corp., Colorado Springs, Colo.) and R. E. Hines (Bendix Corp., Kansas City, Mo.). *IEEE Transactions on Components, Hybrids, and Manufacturing Technology*, vol. CHMT-3, Sept. 1980, p. 367-369. Contract No. DE-AC04-76DP-00613.

Typical hybrid microcircuits (HMC's) manufactured at the Bendix Corporation contain 100 beam lead devices and gold ribbon crossovers. Verification for the presence of these applique components historically has been done manually by comparing a visual aid to the HMC. All HMC's were verified visually, a process requiring 4-5 min/HMC. Approximately 12 percent of the defects were missed. A system has been developed for automatically verifying the presence of beam lead devices and ribbon crossovers. The component verification system (CVS) includes a minicomputer-controlled X-Y stage which indexes the HMC below a vidicon camera. The camera is interfaced to the computer through a video digitizer. Bendix-developed software used the equipment capabilities to magnify and project a 5.1 sq mm area onto a 177.8 sq mm screen with the image data points addressable in a 512 by 480 line matrix. The image analysis software determines component presence based on data point brightness. The CVS can verify beam lead device and crossover presences on a typical HMC in fewer than 30 s. The part identification of any missing part is printed as an aid to rework. The CVS has reduced the time needed for component verification and has improved verification accuracy. (Author)

**A80-50873 Software management - A survey of the practice in 1980.** J. R. Distaso (TRW Defense and Space Systems Group, Redondo Beach, Calif.). *IEEE, Proceedings*, vol. 68, Sept. 1980, p. 1103-1119. 36 refs.

The primary thrust of this paper is to explore many of the problems currently plaguing software development activities and to propose how some of the recently developed management practices may be employed in dealing with them. The practices described range from people organization (e.g., chief programmer teams) to fully automated engineering tools (e.g., software requirements engineering methodology). A number of techniques are presented. These include methods for coping with communications problems in the requirements definition activity, for evolving a facility which will help increase the productivity of software designers and programmers, and for maintaining a high degree of visibility during the elusive unit design code and test phase of a project. A very practical view of the management problems and suggested approaches is presented. Key principles, potential 'pitfalls', and unresolved concerns are addressed from a viewpoint of where the state of the art is today and where the industry appears to be heading in the mid-1980s. (Author)

**A80-50874 The measurement and management of software reliability.** J. D. Musa (Bell Telephone Laboratories, Inc., Whippany, N.J.). *IEEE, Proceedings*, vol. 68, Sept. 1980, p. 1131-1143. 68 refs.

The paper examines software reliability measurement and its applications. Needs for and potential uses of software reliability measurement are discussed. Software reliability and hardware reliability are compared, and some basic software reliability concepts are outlined. A brief summary of the major steps in the history and evolution of the field is presented. Two of the leading software reliability models are described in some detail. The topics of combinations of software (and hardware) components and availability are discussed briefly. The paper concludes with an analysis of the current state of the art and a description of further research needs. (Author)

**A80-51375 United Technologies' master plan.** A. F. Ehrbar. *Fortune*, vol. 102, Sept. 22, 1980, p. 96-98, 100, 105 (3 ff.).

The paper reviews the recent acquisition of a semiconductor company by United Technologies and some major changes that were made in United Aircraft's original operations. The supposition that microelectronics will eventually transform all United products is

advanced and as a result, a microelectronics research center which will design and produce circuits for United's other companies is being developed. The financial status of United which includes a large expense on R&D is obtained. Activities of companies such as Pratt and Whitney are studied, noting problems with the F-100 engine and the development of the JT-10D engine for the new Boeing 757.

A.C.W.

## STAR ENTRIES

**N80-10148\***# Northwestern Univ., Evanston, Ill. Transportation Center.

**FACTORS AFFECTING THE RETIREMENT OF COMMERCIAL TRANSPORT JET AIRCRAFT**

Frank A. Spencer Aug. 1979 296 p refs

(Grant NsG-2149)

(NASA-CR-152308) Avail: NTIS HC A13/MF A01 CSDL 01C

The historical background of the technology and economics of aircraft replacement and retirement in the prejet era is reviewed in order to determine whether useful insights can be obtained applicable to the jet era. Significant differences between the two periods are noted. New factors are identified and examined. Topics discussed include concern over current policies regarding deregulation, regulatory reform, and retroactive noise regulations; financing and compliance legislation; aging; economic environment and inflation; technological progress; fuel efficiency and cost; and a financial perspective of replacement decisions. A.R.H.

**N80-10149\***# Douglas Aircraft Co., Inc., Long Beach, Calif. **CARGO LOGISTICS AIRLIFT SYSTEMS STUDY (CLASS). VOLUME 4: FUTURE REQUIREMENTS OF DEDICATED FREIGHTER AIRCRAFT TO YEAR 2008**

R. J. Burby Oct. 1979 259 p refs

(Contract NAS1-14948)

(NASA-CR-158950-Vol-4) Avail: NTIS HC A12/MF A01 CSDL 01C

The 1978 fleet operations are extended to the year 1992, thus providing an evaluation of current aircraft types in meeting the ensuing increased market demand. Possible changes in the fleet mix and the resulting economic situation are defined in terms of the number of units of each type aircraft and the resulting growth in operational frequency. Among the economic parameters considered are the associated investment required by the airline, the return on investment to the airline, and the accompanying levels of cash flow and operating income. Against this background the potential for a derivative aircraft to enter fleet operations in 1985 is defined as a function of payload size and as affected by 1980 technology. In a similar manner, the size and potential for a new dedicated 1990 technology, freighter aircraft to become operational in 1995 is established. The resulting aircraft and fleet operational and economic characteristics are evaluated over the period 1994 to 2008. The impacts of restricted growth in operational frequency, reduced market demand, variations in aircraft configurations, and military participation, are assessed. A.R.H.

**N80-10399\***# Tracor Jitco, Inc., Rockville, Md. **A SAFETY PRACTICES MANUAL FOR THE MANUFACTURING, TRANSPORTATION, STORAGE, AND USE OF PYROTECHNICS**

Joanna M. Fringer, James B. Willis, Sally W. Snyder, and Pamela H. Errico 1979 194 p refs

(Contract DHEW-210-77-0145)

(PB-297807/0) Avail: NTIS HC A09/MF A01 CSDL 19A

A compilation of existing regulations, consensus standards, and professional recommendations for the protection of persons involved in the manufacture, transport, storage, use, and field mixing of pyrotechnics is presented. GRA

**N80-10504\***# Atomics International, Golden, Colo. Rockwell Hanford Operations.

**QUALITY ASSURANCE IN ALTERNATIVE ENERGY SOURCES**

R. D. Hammond 2 Feb. 1979 14 p Presented at the First Annual Western Energy Quality Assurance Seminar, San Francisco, 7 Apr. 1979

(Contract EY-77-C-06-1036; Contract EY-77-C-1030)

(RHO-SA-107) Avail: NTIS HC A02/MF A01

The Hanford history, description of the radwaste efforts taking place, future plans, and highlights of the increasing role of quality assurance are outlined. DOE

**N80-10678\***# General Accounting Office, Washington, D. C. Energy and Minerals Div.

**ENERGY SAVING STRATEGIES FOR FEDERAL PROCUREMENT**

19 Jun. 1979 14 p

(PB-296969/9; EMD-79-68) Avail: NTIS HC A02/MF A01 CSDL 10A

Federal energy conservation measures are evaluated, and what Federal agencies have done to develop and implement procurement techniques which result in reduced energy consumption is reviewed. GRA

**N80-10692\***# Decision Focus, Inc., Palo Alto, Calif. **PROPOSED RESEARCH PLANNING FORMAT FOR THE ENVIRONMENTAL ASSESSMENT DEPARTMENT Final Report**

D. Cohan and D. W. North Mar. 1979 127 p refs Sponsored by Electric Power Research Inst.

(EPRI-EA-1018; TPS-78-798) Avail: NTIS HC A07/MF A01

Issues of concern to Environmental Assessment Department (EAD) clients are reviewed, and alternative roles for EAD research are defined. The proposed planning format describes explicitly the steps in the planning and research process: identifying broad needs of industry and society; defining specific forcing issues; detailing research needs and objectives; developing research programs and projects; and producing the research results and integrated products that form the EPRI response to the original needs. An illustrative application of the planning format to the current EAD research program is included. DOE

**N80-10697\***# Illinois Univ. at Urbana-Champaign. **MODELING THE IMPACTS OF TRANSPORTATION SYSTEMS MANAGEMENT ON VEHICLE EMISSIONS, PHASE 1**

David E. Boyce, George Provenzano, Frank Southworth, Kristi Cromwell-Cain, and Kyung S. Chon Apr. 1979 127 p refs Sponsored by the Illinois Inst. of Natural Resources.

(PB-296908/7; IINR-79/09) Avail: NTIS HC A07/MF A01 CSDL 13B

Literature on the impact of transportation systems management on travel in cities in the United States and other countries was surveyed in order to qualitatively analyze their potential effectiveness in reducing motor vehicle emissions. GRA

**N80-10785\***# Oak Ridge National Lab., Tenn. **NATIONAL LIBRARY OF MEDICINE TOXICOLOGY DATA BASE MANAGEMENT SYSTEM**

J. S. Stanton and J. L. McNeany Apr. 1979 44 p

(Contract W-7405-eng-26)

(ORNL/CSD/TM-80) Avail: NTIS HC A03/MF A01

A data management system developed for the National Library of Medicine toxicology data base (TDB) is described. The TDB data management system includes features to handle initial data entry, data editing, generation of proof listings, and conversion of data to and from the MARK IV file management system's input format. DOE

**N80-10788\***# Civil Aeromedical Inst., Oklahoma City, Okla. **THE DEVELOPMENT OF THE ATC SELECTION BATTERY: A NEW PROCEDURE TO MAKE MAXIMUM USE OF AVAILABLE INFORMATION WHEN CORRECTING COR-**

**RELATIONS FOR RESTRICTION IN RANGE DUE TO SELECTION**

James O. Boone and Mary A. Lewis Sep. 1978 46 p refs  
(AD-A066132: FAA-AM-78-36) Avail: NTIS  
HC A03/MF A01 CSCL 05/9

A five test selection battery is currently given to select the air traffic controllers. Data was collected on two new tests being considered for incorporation into the battery. To determine the utility of the old and new tests, it is necessary to correlate the tests with a criterion of job success. However, since criterion information is available only on persons already selected for air traffic control work, the correlation is restricted to this upper range of persons, and is, thereby, spuriously low for prediction purposes. To properly evaluate the utility of the tests, the correlation must be corrected for this restriction in range. A new procedure that was developed to more accurately correct correlations for restriction in range is described. The new procedure was compared with Gulliksen and Thorndike's procedures by the Monte Carlo method and was shown to be more accurate.

R.E.S.

**N80-10832#** Department of Justice, Washington, D.C.  
**COMPUTER SYSTEMS CONVERSION: A MANAGEMENT PERSPECTIVE Final Report**

Daniel B. Schneider Oct. 1978 86 p refs  
(PB-297604/1) Avail: NTIS HC A05/MF A01 CSCL 09B

Computer systems conversion, and its interplay with the procurement of computer equipment is considered. Large-scale computer systems such as are found in the U.S. Department of Justice are emphasized. Data base management systems, and on-line transaction processing are included. The Federal procurement situation is also discussed.

G.R.A.

**N80-10852\*#** ECON, Inc., Princeton, N. J.  
**THE REQUIREMENTS AND FEASIBILITY OF BUSINESS PLANNING IN THE OFFICE OF SPACE AND TERRESTRIAL APPLICATIONS**

Joel S. Greenberg and B. P. Miller 22 Mar. 1979 265 p refs  
(Contract NASw-3047)

(NASA-CR-162388: Rept-79-278-2) Avail: NTIS  
HC A12/MF A01 CSCL 12B

The feasibility of applying strategic business planning techniques which are developed and used in the private sector to the planning of certain projects within the NASA Office of Space and Terrestrial Applications was assessed. The methods of strategic business planning that are currently in use in the private sector are examined. The typical contents of a private sector strategic business plan and the techniques commonly used to develop the contents of the plan are described, along with modifications needed to apply these concepts to public sector projects. The current long-range planning process in the Office of Space and Terrestrial Applications is reviewed and program initiatives that might be candidates for the use of strategic business planning techniques are identified. In order to more fully illustrate the information requirements of a strategic business plan for a NASA program, a sample business plan is prepared for a hypothetical Operational Earth Resources Satellite program.

A.R.H.

**N80-10964#** Committee on Commerce, Science, and Transportation (U. S. Senate).

**NASA AUTHORIZATION FOR FISCAL YEAR 1980. PART 4: INDEX**

Washington GPO 1979 122 p Hearings on S. 357 before the Comm. on Commerce, Sci., and Transportation, 96th Congr., 1st Sess., 1979  
(GPO-51-336) Avail: Comm. on Commerce, Sci., and Transportation

Indexes to appropriations for space research and development, construction of facilities, and research and program management.

A.W.H.

**N80-10965#** Unified Industries, Inc., Alexandria, Va.  
**MANAGERIAL PLAN: EXECUTIVE ORDER 12003 AND THE**

**NATIONAL ENERGY ACT**

Dec. 1978 96 p

(Contract EM-77-C-01-8962)

(DOE/TIC-10067) Avail: NTIS HC A05/MF A01

A management tool is provided to assist in planning and developing the Federal Energy-Conservation Program which requires that, by 1985, Executive Branch agencies that own or will own buildings reduce building energy-consumption substantially below 1975 levels. The order also requires that all agencies of the Branch conduct programs designed to reduce energy consumption in general operations of the agency. The program master plan defines goals, objectives strategies, and milestones within a structure that describes the framework, elements, phases, and roles of the agencies. Data requirements for the planning, implementing, evaluating, and reporting functional requirements of the executive order are included with an analysis of the DOE organizational management and resource requirements. DOE

**N80-10966** Pennsylvania State Univ., University Park.  
**THE APPLICATION OF AN ADDITIVE-ULTIMATE MODEL TO THE EVALUATION OF TRANSPORTATION SYSTEM MANAGEMENT STRATEGIES Ph.D. Thesis**

Peter Morley Lima 1979 202 p

Avail: Univ. Microfilms Order No. 7922308

Transportation efficiency was investigated in terms of implementing transportation system management (TSM) strategies. Various TSM strategies were compared by testing the hypothesis that an additive-utilities model can be applied to evaluate alternative TSM strategies. The current transportation resource allocation process, cost effectiveness, and the feasibility of assessing an additive-utilities model by a random sampling of the metropolitan population were among the topics studied. It is concluded that the systems analytic method is an effective approach for constructing a TSM evaluation framework and that the expected utility theory is a valuable tool for specifying single attribute utility functions, and general equations based on this theory can be used to trace an individual's utility function. The additive-utilities model successfully distinguishes between different TSM packages and indicates like packages. Dissert. Abstr.

**N80-10973#** Clean Water Fund, Washington, D. C.  
**CRITICAL RESEARCH NEEDS IN COMMUNITY WATER MANAGEMENT**

25 Jul. 1978 57 p refs

(PB-295984/9: NSF/RA-780563)

Avail: NTIS

HC A04/MF A01 CSCL 13B

Research needs were identified as critical when they could, if filled, make for significant near-term improvements in efforts to solve some of the most important water problems. Needs which appeared as obstacles to solutions of more than one significant water problem were regarded as especially critical. The water problems examined include: (1) problems resulting from widespread use of conventional sewage treatment technologies and resistance to alternative methods; (2) water storages and the price of water; and (3) drinking water contamination. The sewage treatment program is considered the weakest link in the national effort to control concentrated pollution from point sources.

G.R.A.

**N80-11112\*#** Battelle Columbus Labs., Ohio.  
**EVALUATION CRITERIA FOR COMMERCIALY ORIENTED MATERIALS PROCESSING IN SPACE PROPOSALS Final Report**

W. F. Moore and J. R. McDowell Jan. 1979 58 p

(Contract NASw-2800)

(NASA-CR-162437: BCL-OA-TFR-78-5)

Avail: NTIS

HC A04/MF A01 CSCL 22A

An approach and criteria for evaluating NASA funded experiments and demonstrations which have commercial potential were developed. Methods for insuring quick initial screening of commercial proposals are presented. Recommendations are given for modifying the current evaluation approach. New criteria for evaluating commercially orientated materials processing in space (MPS) proposals are introduced. The process for selection of

qualified individuals to evaluate the phases of this approach and criteria is considered and guidelines are set for its implementation. R.C.T.

**N80-11250#** Electric Power Research Inst., Palo Alto, Calif.  
**BIOFUELS: A SURVEY**  
John R. Benemann Jun. 1978 96 p refs Sponsored by EPRI  
(EPRI-ER-746-SR) Avail: NTIS HC A05/MF A01

Photosynthesis, plant productivity, waste and residue resources, 'energy farming,' processes for using biomass directly or converting it to fuels, and overall economics are discussed. Applications by U.S. industries and utilities are emphasized and current U.S. research and development programs presented. With foreseeable technologies and economics, approximately 5% of the fossil fuels now consumed in the United States could presently be replaced by available forestry, agricultural, and municipal wastes and residues. DOE

**N80-11256#** Forecasting International Ltd., Arlington, Va.  
**U. S. ARMY METRICATION ANALYSIS AND RECOMMENDATIONS FOR DA IMPLEMENTATION PLAN, VOLUME 1**

M. J. Oetron, L. A. Roepcke, C. F. McFadden, S. E. Sugarek and E. B. Peters 9 Jun. 1978 345 p refs  
(Contract DAAG39-77-C-0108)  
(AD-A069746) Avail: NTIS HC A15/MF A01 CSCL 05/1

Much has been learned about the metrication experiences and practices of foreign nations and U.S. companies. The most crucial lessons learned from the experience of others which have relevance to the U.S. Army are briefly summarized below. (1) Metrication is inevitable. (2) Key to the Army's approach to metrication should be an evolutionary, least cost philosophy - including the concepts of keeping pace with industry, letting costs lie where they fall and employing flexible timetables and plans. (3) A strong, high level commitment to metrication is essential. (4) Planning and coordination are the keys to successful, least cost metrication, and the 'doers' (line management) should be the planners. (5) Only a small, dedicated metrication organization is needed. It can be supported by ad hoc working groups with membership drawn from the line organization. GRA

**N80-11257#** Army Aviation Research and Development Command, St. Louis, Mo.  
**SCHEDULE. MANAGERIAL TOOL FOR PROJECT/PRODUCT MANAGERS Final Report**  
Vernon Allen, Lonnie Antwiler, and Michael Garsik May 1979 195 p refs  
(AD-A072140; USA AVRADCOM-TR-79-17) Avail: NTIS HC A09/MF A01 CSCL 09/2

Schedule is an interactive computer program designed to organize and present schedule information. It enables the user to maintain a master file of schedule type information for each of many projects, from which current status, change impact analysis or 'what if' studies can be obtained. The program, which was developed on an IBM 360/65, provides graphic output on a Tektronix 4014 or tabular output on most printers/typewriters. It was written in PL/1 language except for the graphics routines, which are combinations of Fortran IV and Tektronix Advanced Graphics. Release 3. GRA

**N80-11500#** Ecole Nationale Supérieure des Télécommunications, Paris (France). Dept. Electronique et Physique.  
**DEVELOPMENT OF THE STATISTICAL PATTERN RECOGNITION METHODOLOGY AND ITS APPLICATION TO QUALITY CONTROL**  
Josef Kittler Sep. 1978 145 p refs Sponsored by Roy. Soc. (ENST-D-78023) Avail: NTIS HC A07/MF A01

Various aspects of statistical pattern recognition are reviewed. In the area of feature selection, feature set search algorithms for selecting a subset of pattern descriptors from a set of measurements are comparatively studied. Decision making systems are then considered, particularly as regards measurement

errors and the subsequent increase in the error probability of the system. In the realm of pattern classification, the problem of designing a pattern recognition system for processing incomplete pattern vectors is discussed. Next, it is shown that the probability distribution of empirical error count estimate is not binomial and a recursive formula for determining this distribution is given. Finally, pattern recognition techniques are applied to the problem of automatic inspection of products by lots. Alternative approaches to acceptance sampling plan design are proposed. Author (ESA)

**N80-11501#** Ecole Nationale Supérieure des Télécommunications, Paris (France). Dept. Electronique et Physique.  
**SOFTWARE AND PROCEDURES FOR STATISTICAL QUALITY CONTROL [LOGICIELS ET PROCEDURES DE CONTROLE STATISTIQUE DE RECEPTION]**  
L. F. Pau, M. Deglaire, J. Kittler, M. Thongsa, and C. Toghraie Apr. 1979 171 p refs Partly in FRENCH and ENGLISH (Contracts ENST-292261; LCIE-292958) (ENST-D-79006) Avail: NTIS HC A08/MF A01

A number of acceptance sampling procedures for statistical quality control, most of which involve measurements, together with the software packages developed for the corresponding sampling plan computations are introduced. The procedures include finite lot acceptance sampling by attributes, without or with individual classification errors; acceptance sampling by measurements with two-sided control of the mean; nonparametric sequential control by measurements; Bayesian acceptance sampling of the mean; and statistical control of the percentage defective determined from multivariate measurements on each item in the sample. A complete theoretical description and an example of computer implementation are given for each procedure presented. Author (ESA)

**N80-11696#** California Univ., Livermore. Lawrence Livermore Lab.  
**SEISMIC SAFETY MARGINS RESEARCH PROGRAM OVERVIEW**

Frank J. Tokarz and Paul D. Smith 30 Nov. 1978 31 p refs Presented at third ASCE Specialty Conf. on the Structural Design of Nuclear Plant Facilities, Boston, 2 Apr. 1979 Sponsored in part by NUREG (Contract W-7405-eng-48; DOE-40-550-75) (UCRL-81884; Conf-790408-4) Avail: NTIS HC A03/MF A01

An overview of the seismic safety margins research program is presented. The program objective, the approach to meet the program goal and objectives, end products, the probabilistic systems methodology, and planned activities for phase 1 are discussed. DOE

**N80-11790#** SRI International Corp., Menlo Park, Calif.  
**STUDY OF AUTOMATED COMMAND SUPPORT SYSTEMS Final Report, 1 Apr. 1978 - 30 Mar. 1979**  
Marshall C. Pease and Daniel Sagalowicz 9 Jul. 1979 56 p refs  
(Contract N00014-77-C-0308) (AD-A072298) Avail: NTIS HC A04/MF A01 CSCL 09/2

This study addresses techniques for the design of automated support systems for naval management. It seeks to apply advanced computer techniques developed by the artificial intelligence community to real-world command environments. The managerial environment exhibits two major differences from most other application environments. First, the problems encountered by the manager are not routine or predictable. It is important that it be possible to tune the system to the actual needs as the problem develops. Second, the manager is the expert; he must be able to understand the system's behavior and the reasons for the actions it takes. In combination, these requirements indicate that the commander, or his delegate, should be able to modify or extend the system even though they may have little knowledge of programming or system design. The crucial design issue is to provide means by which the human user can exercise deep control without requiring a correspondingly deep knowledge of the system's implementation. The primary device we have

## N80-11835

exploited to provide the user with effective control is to base the design on the explicit encoding of the system's knowledge as a set of models each of which contains the constraints and goals that describe necessary relations in the information that describes the situation in a specified component of the application environment. These models remain available to the user for his study and modification. The implementation principles used to develop this design have been demonstrated in an experimental system called ACS.1 for automated command support. GRA

**N80-11835#** National Research Inst. for Mathematical Sciences, Pretoria (South Africa).

### ASPECTS OF A MULTI-CRITERION SECRETARY PROBLEM

T. J. Stewart Sep. 1978 29 p refs  
(CSIR-TWISK-42) Avail: NTIS HC A03/MF A01

The selection of the most satisfactory from a random sequence of objects when these are evaluated according to a number of different criteria is presented. Various proposed methods of multi-criterion decision making are applied, and when evaluation is based on ranking only, procedures are very robust, and fairly simple. For the multi-criterion problem, however, ranking has the disadvantage that no allowance is made for differences in the range of options available for different attributes. On the other hand, rules based on measured values are difficult to implement. Such values can be used to determine criterion weights which can be incorporated into the rank-based procedures.

M.M.M.

**N80-11941#** Ohio Public Utilities Commission, Columbus.  
**DEMAND MANAGEMENT DEMONSTRATION PROJECT. STAGE 1: DEVELOPMENT OF RESIDENTIAL LOAD CHARACTERISTICS. STAGE 4: DEMONSTRATION OF RESIDENTIAL INCREMENTAL COST PRICING IMPLEMENTED BY TIME-OF-DAY METERING Final Report, Jan. 1979**

Apr. 1979 144 p  
(Contract EC-75-F-01-8072)  
(HCP/B8072-01) Avail: NTIS HC A07/MF A01

Several load-management technologies were used in order to gather data necessary for further implementation, gain insight into customer reactions to the various techniques studied, and develop the computer codes necessary to process such data. The results are consistent with economic theory and will contribute to the further development of effective pricing structures for electricity. The customers on the time-of-day rate responded by reducing their peak-period consumption significantly below that of comparable control-group customers. Total energy use by customers in the pricing group declined about 3.5%. Customers in the time-of-use and radio-controlled groups reacted favorably to the techniques. DOE

**N80-11942#** Mathematics and Computation Lab., Washington, D. C. Information Science Div.  
**ZERO BASE BUDGET SOFTWARE Final Report**  
Nathan J. Ray Jun. 1979 118 p  
(PB-298732/9; GSA/FPA/MCL-TM-283) Avail: NTIS HC A06/MF A01 CSCL 05A

This manual contains descriptions of software modules which may be used to facilitate the physical preparation of budgets using the Zero Base Budget concept. The software includes facilities for entering and manipulating decision packages, rank tables, staffing tables, and object class tables. The manipulation facilities include the capability to obtain resource summaries by organizational elements or by program area. The Zero Base Budget Software executes on the PDP 11/45 computer under control of the STAMOS operating system. GRA

**N80-11947#** Hanford Engineering Development Lab., Richland, Wash.

### AUTOMATED DOCUMENT RETRIEVAL WORKSHOP

Linda Sue Boehmer, Gerald A. Marzyck, Weeona G. Harves, Theresa Humason, June E. Isaacs, Jan R. Jackson, and Gerald W. Main Sep. 1978 128 p  
(Contract EY-76-C-14-2170)  
(HEDL-SA-1628) Avail: NTIS HC A07/MF A01

Records management establishing microfilm system, aperture card production, keywording, and computerizing the document retrieval system were considered. DOE

**N80-11949#** Capital Systems Group, Rockville, Md.  
**DEVELOPMENT OF A PLANNING GUIDE TO INNOVATION IN THE DISSEMINATION OF SCIENTIFIC INFORMATION**  
John M. Strawhorn Feb. 1979 44 p  
(Contract NSF C-950)  
(PB-296537/4; NSF/IST-24410/15) Avail: NTIS HC A03/MF A01 CSCL 05B

A concise summary of a project designed to simulate the adoption of useful innovations by scientific and technical (S&T) publishers is given. Publication of a book, development of a specialized document collection and bibliographic data base, creation of a computerized human-resources file, conduct of several working meetings on communications technologies, and a major survey of the policies and practices of U. S. S&T journal publishers are among the topics discussed. GRA

**N80-11951#** Committee on Commerce, Science, and Transportation (U. S. Senate).

### NASA AUTHORIZATION FOR FISCAL YEAR 1980

Washington GPO 1979 54 p Rept. on H.R. 1786 for the Comm. on Commerce, Sci., and Transportation, 96th Congr., 1st Sess., 11 Jun. 1979  
(S-Rept-96-207; GPO-39-010) Avail: US Capitol, Senate Document Room

Budget requests for the fiscal year 1980 by National Aeronautics and Space Administration are presented. Appropriations for research and development, construction of facilities, and research and program management are discussed. A.W.H.

**N80-11952#** General Accounting Office, Washington, D. C. General Government Div.

### PERSPECTIVES ON INTERGOVERNMENTAL POLICY AND RELATIONS

28 Jun. 1979 52 p  
(PB-297280/0; GGD-79-62) Avail: NTIS HC A04/MF A01 CSCL 05A

Intergovernmental policy and fiscal relations are examined. Relationships among Federal, state, and local governments are studied. Perspectives on intergovernmental issues and a forecast of future developments concerning ways to improve the intergovernmental management system are discussed. A.W.H.

**N80-11959#** Urban Inst., Washington, D.C.  
**DIRECTIONS TO IMPROVE URBAN TRAVEL DEMAND FORECASTING: CONFERENCE SUMMARY AND WHITE PAPERS Final Report**

Louise E. Skinner, ed. 1978 411 p refs Conf. held in Washington, D. C., May 1978 Prepared in cooperation with DTM, Inc., Transport and Road Research Lab., Cambridge Systematics, Inc., Oklahoma Univ., S. G. Associates, Inc., sponsored by UMTA and FHWA  
(Contracts DOT-FH-11-9386; DOT-FH-11-9387; DOT-FH-11-9389; DOT-8-3-0032)  
(PB-297409/5; FHWA/PL-79/007) Avail: NTIS HC A18/MF A01 CSCL 13B

Approaches and procedures for improving urban travel demand forecasting are studied. Areas of research examined are the application of time and money budgets to planning, increased understanding of location theory (land use, spatial perception, accessibility measures), development of multinomial supply models, and determination of the temporal and geographic stability of demand and supply models used in transportation planning. Data collection procedures in diary data and household interactions are discussed. A.W.H.

**N80-11960#** Massachusetts Inst. of Tech., Cambridge.  
**HYBRID OPTIMIZATION IN URBAN TRAFFIC NETWORKS Final Report, 13 Mar. 1978 - 14 Mar. 1979**

Han-Ngee Tan, Stanley B. Gershwin, and Michael Athans Apr. 1979 123 p refs  
(Contract DOT-TSC-1456)  
(PB-297146/3; DOT-TSC-RSPA-79-7) Avail: NTIS  
HC A06/MF A01 CSCL 13B

The hybrid optimization problem, a general theoretical framework for the analysis of a class of traffic control problems, is discussed. The role of individual drivers as independent decision makers is examined in relation to the problem. Different behavioral models for flow distribution are investigated. Necessary conditions for this problem are derived, and a physical interpretation of these conditions is provided. Possible directions for the development of algorithms applicable for solving large scale hybrid optimization problems are proposed. A procedure for computing the upper and lower bounds of the optimal cost of the hybrid optimization problem is outlined. A.W.H.

**N80-11962#** Envirex, Inc., Milwaukee, Wis. Environmental Sciences Div.

**DEVELOPMENT OF AN EMERGENCY RESPONSE PROGRAM FOR TRANSPORTATION OF HAZARDOUS WASTE Final Report**

1979 343 p  
(Contract EPA-68-01-3973)  
(PB-297438/4; EPA-530/SW-171C) Avail: NTIS  
HC A15/MF A01 CSCL 13B

The problems associated with hazardous materials spills due to the anticipated increase in transportation of hazardous wastes are discussed. The capabilities of existing systems and an evaluation of their applicability to hazardous waste spills are presented. Federal and State regulations regarding spill notification, reporting requirements, and clean up procedures are reviewed. GRA

**N80-11965#** Georgia Inst. of Tech., Atlanta. Engineering Experiment Station.

**SOUTHEASTERN FORUM ON APPROPRIATE TECHNOLOGY Final Report**

Jeffrey S. Tiller, David S. Clifton, Jr., and Robert A. Cassanova Apr. 1979 98 p Conf. held at Atlanta, Ga., 17-18 Sep. 1978 (Grant NSF ISP-78-22994)  
(PB-298796/4; GIT-B-519-F; NSF/RA-790007) Avail: NTIS  
HC A05/MF A01 CSCL 05A

The background and purpose of the forum are described as well as its structure and agenda. Results of the forum are presented and a strategy is proposed for NSF to follow in an appropriate technology program. The specific appropriate technologies that participants believed had the greatest potential for widespread implementation were passive solar energy, cooperative community projects, waterless toilets, an AT extension service, active solar equipment, utilization of local material and human resources in energy, resource recovery plants, conversion of biomass to fuel, recycling centers, techniques for passive and active space cooling, photovoltaics and marketing cooperatives for small farms. GRA

**N80-11989#** National Academy of Sciences - National Research Council, Washington, D. C. Solid State Sciences Committee.

**SUPPORT OF SMALL RESEARCH PROJECTS IN MATERIALS SCIENCE AT UNIVERSITIES Final Report, 1 Aug. 1977 - 20 Jun. 1979**  
B. N. Gregory 1979 58 p  
(Contract F49620-77-C-0135; AF Proj. 2306)  
(AD-A071940; AFOSR-79-0838TR) Avail: NTIS  
HC A04/MF A01 CSCL 20/11

A major question facing the nation's scientific community and makers of science policy, is how to maintain the quality of our scientific programs in the face of shrinking resources, either from budgetary cuts or increasingly sophisticated and costly research needs. To explore this situation the NRC's Solid State Sciences Committee initiated a series of meetings to inquire into the manner in which research is supported in the solid state and materials sciences. The general objectives of the study are to review and enlarge understanding of the role of small research projects in the U.S. solid-state sciences effort, to determine factors that lead to meaningful research projects, and

to establish guidelines to aid those who must make decisions concerning the allocation of resources. The intended audience includes both universities and funding agencies. In pursuing this study, the panel was asked to undertake the following general tasks: (1) To assess the role of small research projects in relation to regional and national needs; (2) to determine the factors affecting the production of high-quality research in small projects; and (3) To recommend constructive modes of research organization and required support. GRA

**N80-12078#** Coast Guard Research and Development Center, Groton, Conn.

**ANALYST LEVEL DOCUMENTATION FOR THE SEARCH AND RESCUE SIMULATION (SARSIM) Final Report**

G. L. Underwood, J. A. Smith, and G. B. Walters Mar. 1979 85 p refs  
(AD-A073155; CGR/DC-14/79; GC-D-49-79) Avail: NTIS  
HC A05/MF A01 CSCL 09/2

The Search and Rescue Simulation (SARSIM) is a management tool that has been developed to aid Coast Guard decision-makers in developing long-range strategic plans to carry out the SAR mission. SARSIM is a discrete event digital computer simulation program programmed in SIMSCRIPT II.5. It is a highly flexible user-oriented model that simulates Coast Guard response to futuristic caseloads. SARSIM is comprised of three major modules. The first major module is the PREPROCESSOR. The PREPROCESSOR is used to generate expected caseloads based on the historical SAR Data Base. In other words, it supplies a scenario, or futuristic caseload which may, if desired, be used for many different simulation runs. The heart of SARSIM, the SIMULATOR, is essentially a bookkeeping system which logs in cases, registers their needs, investigates the availability of service facilities, assigns resources for servicing, and generally keeps track of simulated time spent in the several possible activities represented within the model and maintains statistics for output. The POSTPROCESSOR is a data retrieval package, which operates on data files from the SIMULATOR to permit a more detailed analysis of simulation runs as a supplement to the printed report from the SIMULATOR. GRA

**N80-12079#** Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).

**PROPULSION AND ENERGETICS PANEL WORKING GROUP 2 ON AIRCRAFT FIRE SAFETY. VOLUME 1: EXECUTIVE SUMMARY**

B. P. Botteri (AFSC) Sep. 1979 17 p  
(AGARD-AR-132-Vol-1; ISBN-92-835-0246-9) Avail: NTIS  
HC A02/MF A01

The fire experience, areas in which fire protection enhancement is needed, technological advances in the areas of safety and personnel survivability for a civilian turbine engine transport aircraft are presented. M.M.M.

**N80-12094#** Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Systems and Logistics.

**VALIDATION OF THE DETROIT DIESEL ALLISON LOGISTIC SUPPORT COST MODEL (PROGRAM OS 590) M.S. Thesis**

Howard E. Creek and Christopher Harlambakis Jun. 1979 83 p refs  
(AD-A072670; AFIT-LSSR-20-79A) Avail: NTIS  
HC A05/MF A01 CSCL 21/5

The Department of Defense (DoD) is genuinely concerned about Operation and Support Costs (O/S) during the early stages of the acquisition process. An area of particular interest to the Air Force Aero Propulsion laboratory (AFAPL) was the validation of Detroit Diesel Allison's O/S cost model, OS590. This study was designed to assist the AFAPL in determining O/S costs for future advanced high technology turbine engines. The results of this research include the following findings: (a) input data for OS590 within the scope of this effort was available from Air Force sources; (b) OS590 produced valid O/S costs; (c) OS590 was sensitive to selected input parameters; and (d) the Directorate of Propulsion YZLR reviewed and agreed that OS590 was complete. GRA

**N80-12581**

**N80-12581#** Ernst and Ernst, Washington, D. C.  
**DEVELOPMENT OF A JOINT-COST-ALLOCATION MANUAL FOR INTEGRATED COMMUNITY ENERGY SYSTEMS (ICES)**

Sep. 1978 117 p refs  
(Contract W-31-109-eng-38)  
(ANL/ICES-TM-20) Avail: NTIS HC A06/MF A01

The problem of an appropriate-cost-allocation system for an integrated community energy system was studied. Technical factors were examined and the relevant economic theory was synthesized. Three generic approaches to cost allocation (public projects, cost accounting, mathematical programming) were assessed and current utility and regulatory allocation procedures were surveyed. Based on these steps, conclusions to date are: (1) economic theory suggests that cost allocation is unnecessary for optimal feasibility, pricing, and output decisions; (2) reasonable and practicable allocations are required for regulatory purposes and cost-sharing arrangements; (3) no single approach to cost allocation in practice is wholly satisfactory; (4) the mathematical programming approach seems most promising at this juncture; and (5) implementation of any method is dependent on data availability. DOE

**N80-12856#** Analytic Sciences Corp., Reading, Mass.  
**ANALYSIS OF SOME NUCLEAR WASTE MANAGEMENT OPTIONS. VOLUME 1: ANALYSIS AND INTERPRETATION**

L. E. Berman, D. A. Ensminger, M. S. Giuffre, C. M. Koplik, S. G. Oston, G. D. Pollak, and B. I. Ross 10 Oct. 1978 141 p refs  
(Contract W-7405-eng-48)  
(UCRL-13917-Vol-1) Avail: NTIS HC A07/MF A01

Risk analyses were performed on that portion of a nuclear fuel cycle which begins following solidification of high-level waste. Risks associated with handling, interim storage and transportation of the waste are assessed, as well as the long term implications of disposal in deep mined cavities. The risk is expressed in terms of expected dose to the general population and peak dose to individuals in the population. DOE

**N80-12949#** Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Systems and Logistics.

**RELIABILITY AND MAINTAINABILITY ANALYSIS: A CONCEPTUAL DESIGN MODEL**

Anthony F. Czajkowski Mar. 1972 237 p refs  
(AD-A073120; AFIT-SLTR-3-72) Avail: NTIS HC A11/MF A01 CSCL 05/1

This study combines aspects of utility theory, probability theory, and mathematical programming to develop an efficient method for performing reliability/maintainability analysis during the early conceptual stages of system development. The general concepts of operational capability and system life cycle cost are used to construct an operational model for determining subsystem reliability and maintainability 'design point' characteristics. Consideration of both technological and cost uncertainty is incorporated within the model. Specifically, the method developed provides a systematic and operationally efficient technique for selecting subsystem reliability/maintainability alternatives when (1) attainable subsystem reliability/maintainability levels are not known with certainty, (2) all life cycle element cost flows are not known with certainty, (3) chance-constraint restrictions exist on some or all of the following factors: system availability, weight, reliability, maintainability, and/or R and D cost, (4) some subsystem reliability/maintainability design alternatives are interdependent (contingent and/or mutually-exclusive), (5) the suitability of selecting any particular system (combination of subsystem reliability/maintainability alternatives) depends upon both cost and risk considerations. GRA

**N80-12957\*#** National Aeronautics and Space Administration, Goddard Space Flight Center, Greenbelt, Md.  
**BALTIMORE APPLICATIONS PROJECT Annual Progress Report, Jun. 1978 - May 1979**

Thomas S. Golden and Philip Yaffee Jun. 1979 16 p refs  
(NASA-TM-80577; APR-5) Avail: NTIS HC A02/MF A01 CSCL 05A

An update is presented for the following projects: (1) asphalt pavement recycling; (2) data collection platform/water quality monitoring; (3) digital emergency traffic routing; (4) fire department communications and dispatch system; (5) health department management information system; (6) hazardous materials; (7) coal gasification; and (8) emergency vehicle proximity sensing. A.R.H.

**N80-12965#** Texas Historical Commission, Austin.  
**HOUSTON CONFERENCE ON THE REVITALIZATION OF THE INNER CITY**

Aug. 1979 25 p Conf. at Houston 5-6 May 1978  
(Grant EDA-08-6-27556)  
(PB-298906/9; EDA-79-0135) Avail: NTIS HC A02/MF A01 CSCL 13B

A conference on the Revitalization of the Inner City fulfilled an important task, and satisfied the major goals of its sponsors. It provided a forum for discussing redevelopment of Houston's inner city. The Foundation and the Commission involvement with revitalization proposed the conference to help educate those involved with revitalization by providing concrete examples of successful projects in Houston and other cities, and consequently, serve as a catalyst for solving the city's problems. The revitalization process required a cooperative effort between government, private enterprise and Houston citizens. GRA

**N80-12969#** Remak-Rosenbloom, Santa Barbara, Calif.  
**IMPLEMENTING PACKAGES OF CONGESTION-REDUCING TECHNIQUES: STRATEGIES FOR DEALING WITH INSTITUTIONAL PROBLEMS OF COOPERATIVE PROGRAMS**

Roberta Remak and Sandra Rosenbloom Jun. 1979 140 p refs Sponsored in part by Am. Assoc. of State Highway and Transportation Officials and Federal Highway Admin.  
(PB-298831/9; TRB/NCHRP/REP-205; ISBN-0-309-02912-0; LC-79-66248) Avail: NTIS MF A01; HC available from Transportation Research Board, 2101 Constitution Ave., NW, Washington, D. C. 20418 \$7.60 CSCL 13B

The institutional barriers to cooperative programs for implementing complex packages of congestion-reducing (C-R) techniques are identified. Experiences of 18 U.S. cities in carrying out simpler joint agency transportation projects were studied. Sources of institutional problems and possible solutions are noted. This information is extrapolated to suggest problems that local agencies might meet in attempting to implement the C-R packages and suggest strategies for overcoming them. Problems and strategies are discussed as they relate to: (1) individual techniques selected for the package; (2) needs to coordinate activities of independent agencies; and (3) organizations and the characteristics of the implementation site. GRA

**N80-12990#** Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).

**AGARD BULLETIN TECHNICAL PROGRAMME, 1980**

Aug. 1979 33 p  
(AGARD-Bull-79/2) Avail: NTIS HC A03/MF A01

A list of scheduled meetings for 1980 is presented along with descriptions of programs. Budget and publications summaries are included. F.O.S.

**N80-13057#** Federal Aviation Administration, Washington, D. C.  
**INSTALLATION CRITERIA FOR THE APPROACH LIGHTING SYSTEM IMPROVEMENT PROGRAM (ALSIP) Final Report**

Steven Zaidman Nov. 1978 44 p  
(AD-A070076; FAA-ASP-78-5) Avail: NTIS HC A03/MF A01 CSCL 01/5

An investment criteria for retrofit of runway approach lighting systems is presented. The retrofit of existing rigid light support structures with frangible mountings and the conversion of high intensity lighting systems to more energy efficient configurations is discussed. The criteria are developed by benefit versus cost analysis. A.W.H.

**N80-13333\*** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

**OPERATIONAL PROCEDURES FOR GROUND STATION OPERATION: ATS-3 HAWAII-AMES SATELLITE LINK EXPERIMENT**

Kenji Nishioka and Emanuel H. Gross Dec. 1979 31 p (NASA-TM-81155; A-8011) Avail: NASA, Ames Research Center, Moffett Field, Calif. 94035 CSCL 17B

Hardware description and operational procedures for the ATS-3 Hawaii-Ames satellite computer link are presented in basic step-by-step instructions. Transmit and receive channels and frequencies are given. Details such as switch settings for activating the station to the sequence of turning switches on are provided. Methods and procedures for troubleshooting common problems encountered with communication stations are also provided.

R.E.S.

**N80-13491#** Rome Air Development Center, Hanscom AFB, Mass.

**RELIABILITY AND MAINTAINABILITY MANAGEMENT MANUAL**

Anthony Coppola and Alan N. Sukert Jul. 1979 158 p refs (AF Proj. 2338)

(AD-A073299; RADC-TR-79-200) Avail: NTIS HC A08/MF A01 CSCL 09/2

This manual provides a guide to Air Force program managers, at all levels, for the planning, organizing, manning, leading and controlling of cost-effective reliability and maintainability programs in all phases of acquisition. It addresses both hardware and software reliability.

GRA

**N80-13634#** Los Alamos Scientific Lab., N. Mex.

**ENERGY POLICY AND DECISION ANALYSIS: NEW CONCEPTS AND MECHANISMS**

E. L. Kaufman and R. W. Vogel Jul. 1979 52 p refs (Contract W-7405-eng-36)

(LA-7909-MS) Avail: NTIS HC A04/MF A01

Relevant portions of the energy-management problem and a technique wherein objective energy policy analysis can be performed in a short time frame are described. A precept for decision criteria is proposed and a set of fundamental concepts are described that allow quantitative assessment of policy and decision consequences for the total energy system. A decision conferencing is described wherein the technical assessment is combined with the political acumen of experienced decision makers to allow the best public-interest choice to be made. A rationale is also presented for the organizational placement of the analysis function, outside of government or industry. This placement provides a much needed level of credibility, higher than that which presently exists, and reduces bias and equitably balance the needs of the public, government, and industry. DOE

**N80-13911#** Los Alamos Scientific Lab., N. Mex.

**GENERAL-PURPOSE HEAT SOURCE PROJECT, SPACE NUCLEAR SAFETY PROGRAM, AND RADIOISOTOPIC TERRESTRIAL SAFETY PROGRAM Progress Report, May 1979**

W. J. Maraman, comp. Jul. 1979 43 p (Contract W-7405-eng-36)

(LA-7952-PR) Avail: NTIS HC A03/MF A01

The studies related to the use of Pu-238O<sub>2</sub> in radioisotopic power systems are reported. Research progress is reported on: (1) general purpose heat source development; (2) space nuclear safety; and (3) radioisotopic terrestrial safety. DOE

**N80-13917#** Du Pont de Nemours (E. I.) and Co., Aiken, S. C. **US PROGRAM FOR THE IMMOBILIZATION OF HIGH-LEVEL NUCLEAR WASTES**

J. L. Crandall 8 Jun. 1979 25 p Presented at the Am. Nucl. Soc. Meeting, Atlanta, 3-8 Jun. 1979

(Contract EY-76-C-09-0001)

(DP-MS-79-2; CONF-790602-69) Avail: NTIS HC A02/MF A01

A program developed for the term management of high level nuclear waste is described. The program is designed to immobilize

the high level waste in forms that act as highly efficient barriers against radionuclide release to the disposal site and to provide technology for similar treatment of commercial high level waste in case reprocessing of commercial nuclear fuels is ever resumed. Descriptions of commercial wastes, program strategy, program expenditures, development of waste forms, evaluation and selection of waste forms, regulatory aspects of waste form selection, project schedules, and cost estimates for immobilization facilities are discussed. DOE

**N80-13981** Clemson Univ., S.C.

**DERIVATION OF A QUANTITATIVE MODEL TO ASSESS THE PERFORMANCE OF RESEARCH AND DEVELOPMENT ORGANIZATIONS Ph.D. Thesis**

Wilhelm Andreas Haberkorn 1979 186 p

Avail: Univ. Microfilms Order No. 7925090

A methodology to derive estimates of research and development income is developed. The key element is a research and development revenue model which allows the user to classify research activities according to predetermined criteria. Portions of the model are used to evaluate the performance of an actual research organization. The results indicate that the proposed methodology is promising for practical application. Dissert. Abstr.

**N80-13982\*** Information Planning Associates, Inc., Gaithersburg, Md.

**THE WORK REQUEST SYSTEM OF A NASA Q1 PACKAGE**

15 Nov. 1979 61 p

(Contract NASw-3176)

(NASA-CR-162511) Avail: NTIS HC A04/MF A01 CSCL 05A

A computer package is described which can be used to track any type of work that is controlled on the basis of work requests and purchase orders/contracts. Run on any NASA Q1, using floppy disks only, the system can handle about 1,200 requests per year, and provides performance and summary reports for management. The milestones tracked at Goddard are described as well as directions for installing the system. Sample reports and operator instructions are included. A.R.H.

**N80-13983#** Royal Aircraft Establishment, Farnborough (England).

**THE GEORGE 3 AND 4 ACCOUNTING SYSTEM**

Irene M. Cummings London HMSO Jul. 1978 74 p refs (RAE-TR-78080; RAE-Math-Comp-233; BR66077) Avail: NTIS HC A04/MF A01

A comprehensive system for accounting for computer usage was developed for running under the George Operating System on the ICL 1904A and 1906S computers. It allows any resource to be accounted for and has been running successfully for the last three years. The mechanism of the accounting system is described in detail and the choice of resources actually accounted for as well as charges made are discussed. Author (ESA)

**N80-14150\*** Jet Propulsion Lab., California Inst. of Tech., Pasadena.

**THE DEEP SPACE NETWORK Progress Report, Sep. - Oct. 1979**

15 Dec. 1979 118 p refs

(Contract NAS7-100)

(NASA-CR-162524; JPL-PR-42-54)

Avail: NTIS

HC A06/MF A01 CSCL 22D

Deep Space Network progress in flight project support tracking and data acquisition research and technology, network engineering, hardware and software implementation, and operations is presented. For individual titles, see N80-14151 through N80-14162.

**N80-14151\*** Jet Propulsion Lab., California Inst. of Tech., Pasadena.

**NETWORK FUNCTIONS AND FACILITIES**

N. A. Renzetti *In its* The Deep Space Network 15 Dec. 1979 p 1-3 (For primary document see N80-14150 05-12)

Avail: NTIS HC A06/MF A01 CSCL 14B

N81-14175

The objectives, functions, and organization of the Deep Space Network are summarized; deep space station, ground communication, and network operations control capabilities are described.

Author

**N80-14175\*#** IBM Federal Systems Div., Houston, Texas.  
**SOFTWARE DESIGN SPECIFICATION. PART 2: ORBITAL FLIGHT TEST (OFT) DETAILED DESIGN SPECIFICATION. VOLUME 3: APPLICATIONS. BOOK 2: SYSTEM MANAGEMENT**

16 Oct. 1979 977 p  
(Contract NAS9-14444)  
(NASA-CR-160389) Avail: NTIS HC A99/MF A01 CSCL 22B

The functions performed by the systems management (SM) application software are described along with the design employed to accomplish these functions. The operational sequences (OPS) control segments and the cyclic processes they control are defined. The SM specialist function control (SPEC) segments and the display controlled 'on-demand' processes that are invoked by either an OPS or SPEC control segment as a direct result of an item entry to a display are included. Each processing element in the SM application is described including an input/output table and a structured control flow diagram. The flow through the module and other information pertinent to that process and its interfaces to other processes are included. J.M.S.

**N80-14177\*#** National Aeronautics and Space Administration. John F Kennedy Space Center, Cocoa Beach, Fla.  
**SPACE TRANSPORTATION SYSTEM SHUTTLE TURN ABOUT ANALYSIS REPORT**

R. E. Reedy 14 Aug. 1979 151 p refs  
(NASA-TM-80840) Avail: NTIS HC A08/MF A01 CSCL 22A

The progress made and the problems encountered by the various program elements of the shuttle program in achieving the 160 hour ground turnaround goal are presented and evaluated. Task assessment time is measured against the program allocation time. R.E.S.

**N80-14276#** Urban Inst., Washington, D.C.  
**FIRE-CODE INSPECTIONS AND FIRE PREVENTION: WHAT METHODS LEAD TO SUCCESS** Final Report

John R. Hall, Jr., Michael J. Karter, Jr., Margo Koss, Alfred H. Schainblatt, and Thomas C. Mc Nerney Dec. 1978 141 p refs  
Sponsored in part by Fire Administration  
(Grant NSF APR-76-19148)  
(PB-298991/1) Avail: NTIS HC A07/MF A01 CSCL 13L

Research is undertaken to determine whether some fire-code inspection practices result in fewer fires, lower fire loss, and fewer civilian casualties in properties covered by fire codes (excluding one and two-family residences) than do other fire-code inspection practices. The research involved (1) identifying the fires and civilian fire casualties that are potentially preventable by inspection and measuring the proportion of fires and casualties which are of that type; (2) relating differences in characteristics of fire-code inspection practices to differences in fire rates for a representative group of cities; and (3) examining the circumstances of major casualty incidents across the country to determine the relative preventability of those incidents. GRA

**N80-14407#** Mason and Hanger-Silas Mason Co., Inc., Amarillo, Tex.

**ULTRAVIOLET SPECTROSCOPIC METHODS FOR QUALITY CONTROL**

G. D. Simpson Apr. 1979 8 p refs  
(Contract DE-AC04-76DP-00487)  
(MHSMP-79-29) Avail: NTIS HC A02/MF A01

A test designed to provide instrumental quality control on the Perkin-Elmer 356 Double Wavelength Spectrophotometer is described. Properly implemented, this test provides a routine check on instrument performance, so that repair or adjustment can be made with a minimum loss of instrument downtime and of precision and accuracy in UV measurements. Results of the test are given. DOE

**N80-14829#** National Research Inst. for Mathematical Sciences, Pretoria (South Africa).

**OPTIMAL SELECTION FROM A RANDOM SEQUENCE WITH OBSERVATION ERRORS**

T. J. Stewart Mar. 1979 26 p refs  
(CSIR-TWISK-69) Avail: NTIS HC A03/MF A01

A form of sequential decision problem is introduced in which options are presented in sequence, with no recall of rejected options (as in the secretary problem), but in which the value of each option may only be inferred from experiments. Decisions have thus to be made concerning both the acceptance and rejection of each option and the degree of experimentation. General properties of the optimal policy are derived, and an algorithm is obtained for the solution in a special case. This special case suggests a heuristic rule for more general situations, the performance of which rule has been investigated by a Monte Carlo study. Author

**N80-14955\*#** Information Planning Associates, Inc., Gaithersburg, Md.

**FUNCTIONAL DESIGN SPECIFICATION: NASA FORM 1510** Final report

15 Nov. 1979 99 p  
(NASA-CR-162513) Avail: NTIS HC A05/MF A01 CSCL 05A

The 1510 worksheet used to calculate approved facility project cost estimates is explained. Topics covered include data base considerations, program structure, relationship of the 1510 form to the 1509 form, and functions which the application must perform: WHATIF, TENENTER, TENTYPE, and data base utilities. A sample NASA form 1510 printout and a 1510 data dictionary are presented in the appendices along with the cost adjustment table, the floppy disk index, and methods for generating the calculated values (TENCALC) and for calculating cost adjustment (CONSTADJ). Storage requirements are given. A.R.H.

**N80-14956\*#** Jet Propulsion Lab., California Inst. of Tech., Pasadena.

**USER REQUIREMENTS FOR A PATIENT SCHEDULING SYSTEM**

W. Zimmerman 1 Dec. 1979 73 p refs  
(Contract NAS7-100)  
(NASA-CR-162539; JPL-Pub-79-119) Avail: NTIS HC A04/MF A01 CSCL 05A

A rehabilitation institute's needs and wants from a scheduling system were established by (1) studying the existing scheduling system and the variables that affect patient scheduling, (2) conducting a human-factors study to establish the human interfaces that affect patients' meeting prescribed therapy schedules, and (3) developing and administering a questionnaire to the staff which pertains to the various interface problems in order to identify staff requirements to minimize scheduling problems and other factors that may limit the effectiveness of any new scheduling system. A.R.H.

**N80-14957#** Army Concepts Analysis Agency, Bethesda, Md.  
**MANAGEMENT ANALYSIS OF KEY RESOURCE OPERATIONS (MAKRO), VOLUME 1** Final Report

Frank A. Distasio, Jr., George E. Armstrong, Samuel K. Wasaff, Jr., and Samuel M. Burney, Jr. 30 Mar. 1979 242 p refs  
3 Vol.  
(AD-A069016; CAA-SR-79-6-Vol-1) Avail: NTIS HC A11/MF A01 CSCL 05/1

The MAKRO study analyzes the planning, programming, and budget formulation phases of Army PPBS and suggests ways to improve the system. The principal PPBS Activities at HQDA were identified, then subjected to rigorous analysis, and documented. The methodology included development and implementation of a computer-based graphics routine to create network diagrams. Network diagrams were constructed for 21 distinct Army PPBS processes that were identified in the analysis. The network diagrams are published separately. Specific prescriptive measures were nominated to improve certain PPBS processes. The paramount MAKRO study insight is that the Army PPBS is responsive to higher authorities at the expense of time for rigorous

analysis. The study presents two alternatives which singly or together could enhance the quality of analysis supporting army PPBS: (1) seek relief from the highly interactive/reactive dialogue with higher echelons that is conducted particularly during programming and budgeting; and (2) expand the scope of planning to provide more detail of resource sensitive issues for use in programming. Author (GRA)

**N80-14958#** Army Concepts Analysis Agency, Bethesda, Md. **MANAGEMENT ANALYSIS OF KEY RESOURCE OPERATIONS (MAKRO). VOLUME 2, APPENDIX E: NETWORKS. ANNEXES 1 AND 2: PLANNING AND PROGRAMMING Final Report**

Frank A. Distasio, Jr., George E. Armstrong, Samuel K. Wasaff, Jr., and Samuel M. Burney, Jr. 30 Mar. 1979 375 p 3 Vol. (AD-A069017; CAA-SR-79-6-Vol-2-App-E-Ann-1) Avail: NTIS HC A16/MF A01 CSCL 05/1

Planning and programming network diagrams constructed for 21 distinct Army Planning, Programming, and Budgeting System processes are presented. J.M.S.

**N80-14959#** Army Concepts Analysis Agency, Bethesda, Md. **MANAGEMENT ANALYSIS OF KEY RESOURCE OPERATIONS (MAKRO). VOLUME 3, APPENDIX E: NETWORKS. ANNEX 3: BUDGET FORMULATION Final Report**

Frank A. Distasio, Jr., George E. Armstrong, Samuel K. Wasaff, Jr., and Samuel M. Burney, Jr. 30 Mar. 1979 329 p 3 Vol. (AD-A069018; CAA-SR-79-6-Vol-3-App-E-Ann-3) Avail: NTIS HC A15/MF A01 CSCL 05/1

Budget formulation diagrams constructed for Army Planning, Programming, and Budgeting processes are presented. J.M.S.

**N80-14960#** Martin Marietta Aerospace, Orlando, Fla. **US ROLAND 2 LOGISTICS MODEL (ROLOG): USER'S GUIDE**

T. E. Wilkerson, J. Neale, S. Dunkin, Edwin Schwemmer, and Bradley B. Dunn Oct. 1978 61 p refs (Contract DAAK40-76-C-0198)

(AD-A074449) Avail: NTIS HC A04/MF A01 CSCL 09/2  
The US ROLAND Logistics Model (ROLOG) is a series of computer programs for processing LSAR data, updating the data base, performing logistic support effectiveness calculations, and reporting data in both graphic and tabular formats. This document is intended to assist the user in executing the programs to achieve realism in the outputs specific to the operational and support scenarios being evaluated. GRA

**N80-14961#** General Accounting Office, Washington, D. C. Program Analysis Div. **ASSESSING THE OUTPUT OF FEDERAL COMMERCIALY DIRECTED R/D**

27 Aug. 1979 49 p (PB-299228/7; PAD-79-69) Avail: NTIS HC A03/MF A01 CSCL 05A

To assess the output of Federal commercially directed R&D spending it is necessary to understand the role played by R&D in embodying a laboratory result in a commercially acceptable product or process. The process is complex and the approach to assessing the output of commercially directed research and development is outlined. The interactions occurring between research and development spending and other types of Federal incentives necessary to achieve program goals are analyzed. The Department of Energy's Solar Photovoltaics program is examined to illustrate the complexities. GRA

**N80-14962#** Arizona Univ., Tucson. Office of Arid Lands Studies. **WEST COAST FORUM ON APPROPRIATE TECHNOLOGY Final Report**

Kenneth E. Foster, Roger L. Caldwell, Terry Triffet, and Lina K. Robinson Feb. 1979 56 p Forum held at Tucson, Ariz., 21 Sep. 1978 (Contract NSF CISP-78-22989)

(PB-298986/1; NSF/RA-790003) Avail: NTIS HC A04/MF A01 CSCL 05A

Scientific research support to promote successful performance of appropriate technology (AT) projects is considered including the provision of a scientific educational base as well as an understanding of the societal and economic impacts related to the adoption of AT. Some of the predominant topic areas identified for research include alternative energy sources, small-scale urban organic agriculture technology, alternative waste disposal systems, and water conservation technology. GRA

**N80-14963#** California Univ., Los Angeles. Graduate School of Management. **ASSESSMENT OF TECHNOLOGY FOR INFORMATION SERVICES PLANNING**

Bennet P. Lientz Aug. 1979 27 p refs (NR Proj. 049-345) (AD-A073315) Avail: NTIS HC A03/MF A01 CSCL 05/2

Computer and communication technology is changing at an increased rate. New technologies are emerging; the price-performance of current technology is improving. There is a need to assess the impact of technology on new information systems projects, particularly those dealing with distributed processing and electronic office systems. Such an assessment provides direction and guidance in long range and intermediate term information services planning. It can potentially prevent costly conversion efforts. An approach is developed for obtaining this assessment. Two case examples of applications are also provided which illustrate the method, results, and benefits. GRA

**N80-14968\*** National Aeronautics and Space Administration, Washington, D. C. **PRESS CONFERENCE: FY 1980 BUDGET**

20 Jan. 1979 36 p (P79-10182) Avail: NASA Scientific and Technical Information Facility, P.O. Box 8757, B.W.I. Airport, Md. 21240 CSCL 05C

Both the President's space policy and OMB's anti-inflation policy are reflected in appropriations for NASA's space science, applications, and advances of technology in aeronautics and space programs. Increases in the budgets for each of these areas are examined in the light of the inflation factor and its impact on program management and mission plans. Possible new starts for the future budgets are indicated. A.R.H.

**N80-14970#** Committee on Science and Technology (U. S. House). **THE SPACE INDUSTRIALIZATION ACT OF 1979**

Washington GPO 1979 291 p refs Hearings on H.R. 2337 before the Subcomm. on Space Sci. and Applications of the Comm. on Sci. and Technol., 96th Congr., 1st Sess., 22-23 May; 26-27 Jun. 1979 (GPO-50-404) Avail: Subcomm. on Space Sci. and Applications

Issues associated with the prospects for commercial ventures in space, the role of the Federal Government, and the appropriate mechanisms for fostering entry of the private sector are examined. Federal legislation to establish a Space Industrial Corporation to provide means for financing the development of new products, processes, and industries using the properties of the space environment is assessed. A.R.H.

**N80-14972#** Department of Energy, Washington, D. C. **COMMERCIALIZATION STRATEGY REPORT FOR ELECTRIC AND HYBRID VEHICLES**

P. Brown, P. Davis, G. Hagey, and M. Katz [1979] 91 p (TID-28858-Draft) Avail: NTIS HC A05/MF A01

Barriers to the commercialization of electric powered vehicle technology are identified, along with possible actions to remove specific barriers. Technical, economic, environmental, and institutional readiness are assessed. Recommended commercialization strategies and goals are presented. K.L.

**N80-15278#** Institute of Gas Technology, Chicago, Ill. **LNG INDUSTRY: AN OVERVIEW OF PROJECTS AND COSTS**

J. Glenn Seay, Philip J. Anderson, and Edward J. Daniels 1978 29 p Presented at ASME Energy Tech. Conf., Houston, Tex.,

## N80-15448

5 Nov. 1978  
(Contract EF-76-C-02-4234)  
(CONF-7811112-2) Avail: NTIS HC A03/MF A01

A summary of the LNG projects that are currently in various stages of development is presented. These projects account for a potential international LNG trade of about 765 million cu m (27 billion CF) per day. The operating experiences of some of the currently operational projects are reviewed with an emphasis on the natural gas liquefaction facilities. DOE

**N80-15448\*#** National Aeronautics and Space Administration, Lyndon B. Johnson Space Center, Houston, Tex.

### PROCEEDINGS OF TECHNICAL SESSIONS, VOLUMES 1 AND 2: THE LACIE SYMPOSIUM

Jul. 1979 1095 p refs Symp. held at Houston, Tex., 23-26 Oct. 1978 Sponsored by NASA, NOAA, and USDA Original contains color imagery. Original photography may be purchased from the EROS Data Center, Sioux Falls, S. D. 57198 ERTS (E80-10030; NASA-TM-80811; JSC-16015-Vol-1; JSC-16015-Vol-2) Avail: NTIS HC A99/MF A01 CSCL 02C

The technical design of the Large Area Crop Inventory Experiment is examined and data acquired over 3 global crop years is analyzed with respect to (1) sampling and aggregation; (2) growth size estimation; (3) classification and mensuration; (4) yield estimation; and (5) accuracy assessment. Seventy-nine papers delivered at conference sessions cover system implementation and operation; data processing systems; experiment results and accuracy; supporting research and technology; and the USDA application test system.

**N80-15471\*#** National Aeronautics and Space Administration, Lyndon B. Johnson Space Center, Houston, Tex.

### LACIE QUALITY ASSURANCE

G. L. Gutschewski, Principal Investigator *In its Proc. of Tech. Sessions, Vol. 1 and 2* Jul. 1979 p 249-255 refs ERTS

Avail: NTIS HC A99/MF A01 CSCL 02C

Topics covered include (1) development of the LACIE quality assurance program; (2) LACIE quality assurance responsibilities of all organizational elements; (3) internal quality assurance support; and (4) accomplishments. A.R.H.

**N80-15639#** Midwest Research Inst., Golden, Colo. Solar Energy Research Inst.

### ROLE OF THE GOVERNMENT IN THE DEVELOPMENT OF SOLAR ENERGY

M. D. Yokell 1979 29 p refs Presented at the Ann. Meeting Assoc. for the Advan. of Sci., Houston, Tex., 4 Jan. 1979 (Contract EG-77-C-01-4042) (SERI/TP-52-138; CONF-790122-3) Avail: NTIS HC A03/MF A01

The economic rationale for a Federal solar energy subsidy program, the type of program required, and methods for determining the proper funding level for each program are discussed. An introduction offers a brief description of solar technologies. A summary of the current Federal solar subsidy program is also provided. DOE

**N80-15647#** Syracuse Research Corp., N. Y. Energy Research Center.

### PROJECT EVALUATION AND QUALITY CONTROL

Arthur Levy Jan. 1979 18 p (Grant CSA-30200-L-76-01) (PB-301048/5; SRC-TR-555.20) Avail: NTIS HC A02/MF A01 CSCL 13A

Quality control and evaluation of weatherization/energy programs are discussed. Among the issues presented are truck and tool maintenance, inventory control, work evaluation, and personnel evaluation and training. K.L.

**N80-15663#** Department of Energy, Washington, D. C. ENVIRONMENTAL DEVELOPMENT PLAN PHOTOVOLTAICS

Sep. 1979 34 p refs (DOE/EDP-0031) Avail: NTIS HC A03/MF A01

Potential environmental, health, safety, and socioeconomic impacts relevant to solar photovoltaic systems are identified. A management plan is then presented for conducting and coordinating environmental research in concert with the technology development effort to ensure that the identified environmental issues are resolved prior to significant public deployment of the technology. DOE

**N80-15821\*#** National Aeronautics and Space Administration, Ames Research Center, Moffett Field, Calif.

### SOME HUMAN FACTORS ISSUES IN THE DEVELOPMENT AND EVALUATION OF COCKPIT ALERTING AND WARNING SYSTEMS

Robert J. Randle, Jr., William E. Larsen, and Douglas H. Williams Washington Jan. 1980 65 p refs (NASA-RP-1055; A-7696) Avail: NTIS HC A04/MF A01 CSCL 05H

A set of general guidelines for evaluating a newly developed cockpit alerting and warning system in terms of human factors issues are provided. Although the discussion centers around a general methodology, it is made specifically to the issues involved in alerting systems. An overall statement of the current operational problem is presented. Human factors problems with reference to existing alerting and warning systems are described. The methodology for proceeding through system development to system test is discussed. The differences between traditional human factors laboratory evaluations and those required for evaluation of complex man-machine systems under development are emphasized. Performance evaluation in the alerting and warning subsystem using a hypothetical sample system is explained. R.C.T.

**N80-15893#** Department of Energy, Washington, D. C. Office of Nuclear Energy Programs.

### FISSION ENERGY PROGRAM OF THE U.S. DEPARTMENT OF ENERGY, FY 1980

Apr. 1979 315 p refs (DOE/ET-0089) Avail: NTIS HC A14/MF A01

The fission energy program and program objectives are discussed. The program management and program strategy are described and the program budget is presented. The topics in the program which are discussed include thermal reactor technology, advanced isotope separation technology, water cooled breeders, gas cooled breeders, and space power applications. A.W.H.

**N80-15973\*#** National Aeronautics and Space Administration, Washington, D. C.

### DECISION MAKING AND PROBLEM SOLVING WITH COMPUTER ASSISTANCE

F. Kraiss Jan. 1980 61 p refs Transl. into ENGLISH of "Entscheiden und Problemlösen mit Rechnerunterstützung". Rept. FB-36 Forschungsinstitut fuer Anthropotechnik, Meckenheim, West Germany, Feb. 1978 p 1-73 Original language document was announced as N79-28048 Transl. by Kanner (Leo) Associates, Redwood City, Calif. (Contract NASW-3199) (NASA-TM-76008; FB-36) Avail: NTIS HC A04/MF A01 CSCL 05A

In modern guidance and control systems, the human as manager, supervisor, decision maker, problem solver and trouble shooter, often has to cope with a marginal mental workload. To improve this situation, computers should be used to reduce the operator from mental stress. This should not solely be done by increased automation, but by a reasonable sharing of tasks in a human-computer team, where the computer supports the human intelligence. Recent developments in this area are summarized. It is shown that interactive support of operator by intelligent computer is feasible during information evaluation, decision making and problem solving. The applied artificial intelligence algorithms comprehend pattern recognition and classification, adaptation and machine learning as well as dynamic and heuristic programming. Elementary examples are presented to explain basic principles. Author

**N80-15974\*#** National Aeronautics and Space Administration, Washington, D. C.

**RESEARCH AND TECHNOLOGY OBJECTIVES AND PLANS SUMMARY (RTOPS). RESEARCH AND TECHNOLOGY PROGRAM, FISCAL YEAR 1980**

1980 201 p  
(NASA-TM-80744) Avail: NTIS HC A10/MF A01 CSCL 05A

A compilation of the summary portions of each of the Research and Technology Objectives and Plans (RTOPS) used for management review and control research currently in progress throughout NASA is presented. Indexes include: subject, technical monitor, responsible NASA organization, and RTOP number. A.R.H.

**N80-15975#** Massachusetts Inst. of Tech., Cambridge. Operations Research Center.

**LINEAR MULTIPLE OBJECTIVE PROBLEMS WITH INTERVAL COEFFICIENTS**

Gabriel R. Bitran Aug. 1979 26 p refs  
(Contract N00014-75-C-0556)

(AD-A073967; TR-167) Avail: NTIS HC A02/MF A01 CSCL 12/2

This paper considers linear multiple objective programs with coefficients of the criteria given by intervals. This class of problems is of practical interest since in many instances it is difficult to determine precisely the coefficients of the objective functions. A subproblem to test if a feasible extreme point is efficient in the problem considered is obtained. A branch and bound algorithm to solve the subproblem as well as computational results are provided. Extensions are discussed. GRA

**N80-15976#** National Technical Information Service, Springfield, Va.

**MANAGEMENT BY OBJECTIVES. A BIBLIOGRAPHY WITH ABSTRACTS Progress Report, 1964 - Aug. 1979**

Mary E. Young Sep. 1979 93 p Supersedes NTIS/PS-78/0976; NTIS/PS-77/0892

(NTIS/PS-79/0958/3; NTIS/PS-78/0976; NTIS/PS-77/0892) Avail: NTIS HC \$28.00/MF \$28.00 CSCL 05A

The bibliography cites studies relating to the philosophy of Management by Objectives (MBO) as well as positive and negative factors where MBO has been implemented. Case studies of implementation include health care planning, urban planning, local governments, housing, military management, R & D organizations, etc. This updated bibliography contains 85 abstracts, 19 of which are new entries to the previous edition. GRA

**N80-15977#** Washington State Univ., Pullman. College of Economics and Business.

**A PROGRAM OF MANAGEMENT AND TECHNICAL ASSISTANCE IN THE STATE OF WASHINGTON Final Report**

Gene Hansen Sep. 1979 132 p  
(Grant EDA-07-06-01792-1)

(PB-299276/6; EDA-79-0139) Avail: NTIS HC A07/MF A01 CSCL 05A

A program to support economic growth of Washington by making the existing resources of Washington State University and other cooperating institutions accessible and by delivering competent management and technical assistance in support of specific economic development is discussed. Several exhibits are included. GRA

**N80-15978#** Little (Arthur D.), Inc., Cambridge, Mass.  
**FACTORS RELATED TO THE IMPLEMENTATION AND DIFFUSION OF NEW TECHNOLOGIES: A PILOT STUDY**

Jun. 1979 126 p  
(Grant NSF ERS-77-03286)

(PB-298998/6; ADL-80978; NSF/PRA-7703286) Avail: NTIS HC A07/MF A01 CSCL 05A

Case studies of 14 technologies were carried out in order to develop an understanding of how government intervention affects the processes of implementation and diffusion of new technologies. The technologies studied were: automobiles, broadcast radio, frozen foods, black and white TV, color TV, polio vaccine, supersonic transport, fluoridation of water supplies,

computer-aided instruction, basic oxygen process for steel, numerical control in manufacturing, digital computers, lasers, and integrated circuit. The key factors, their motivations for implementing/adopting the technology (or not doing so), the interactions among the key factors, and how these affected implementation/adoption are examined. GRA

**N80-15979#** Massachusetts Inst. of Tech., Cambridge. Information and Decision Systems Lab.

**SCHEDULING OF FLEXIBLE FLOWSHOPS (SYSTEMS ASPECTS OF FLEXIBLE MANUFACTURING SYSTEMS)**

K. L. Hitz Mar. 1979 78 p refs

(Grants NSF DAR-78-17826; NSF APR-76-12036)

(PB-301218/4; LIDS-R-879; NSF/RA-790103) Avail: NTIS HC A05/MF A01 CSCL 05A

The scheduling of production in a deterministic Flexible Flow Shop is discussed. This is a serial arrangement of buffered multipurpose machines connected by a conveyor system which allows fully mechanized parts handling. Machines can be bypassed, and simultaneous processing of parts with different machine routes is possible. The problem of producing a range of part types of specified ratios, with known fixed transport and processing times is considered. Optimal schedules are characterized as periodic loading sequences which minimize idle time on bottleneck machines once they have begun operating, while satisfying constraints on buffer capacity. The computation of optimal schedules by an implicit enumeration algorithm is discussed. GRA

**N80-15999#** Transportation Research Board, Washington, D.C.  
**URBAN TRANSPORTATION PLANNING, EVALUATION, AND ANALYSIS**

James M. Witkowski, William C. Taylor, Edward Beimborn, David F. Schulz, and Kenneth R. Yunker 1979 59 p refs  
(PB-300749/9; TRB/TRR-707; ISBN-0-309-02953-8;

LC-79-607099) Avail: NTIS HC A04/MF A01; Paper copy also available from Transportation Research Board, 2101 Constitution Ave., NW, Washington, D.C., 20418. HC \$3.40 CSCL 13B

The topics discussed include: (1) urban transportation planning under energy constraints; (2) long-range transportation planning in southeastern Wisconsin; (3) preliminary screening of transit corridor alternatives; (4) highway location selection; (5) macroanalysis for transit integration; (6) discrete optimization in transportation networks; (7) residential area location preference surfaces; and (8) ethics of politically oriented transportation planning. GRA

**N80-16003#** General Accounting Office, Washington, D. C. Community and Economic Development Div.

**IMPROVING THE SCIENTIFIC AND TECHNICAL INFORMATION AVAILABLE TO THE ENVIRONMENTAL PROTECTION AGENCY IN ITS DECISION MAKING PROCESS Report to the Congress**

21 Sep. 1979 71 p

(PB-300580/8; CED-79-115) Avail: NTIS HC A04/MF A01 CSCL 05A

Formal procedures for the assessment of scientific and technical information in governmental decision making are suggested: formal participation of science organizations, the establishment of issue oriented commissions, and a 'science court' for ventilating scientific disputes during the decision making process are discussed and contrasted. M.G.

**N80-16005#** American Association for the Advancement of Science, Washington, D.C. Office of Opportunities in Science.  
**A RESEARCH AGENDA ON SCIENCE AND TECHNOLOGY FOR THE HANDICAPPED**

Janet Welsh Brown and Martha Ross Redden Jan. 1979 58 p refs

(Contract NSF OPA-78-25354)

(PB-301220/0; NSF/RA-790053)

Avail: NTIS HC A04/MF A01 CSCL 05K

A research agenda was developed in science and technology for the handicapped designed to provide support for planning a new research program. High and low technology, adults and

children, basic and applied research, and hardware developments and social science research are discussed. Recommendations are categorized first by major disability groups and then listed by those recommendations that cut across disabilities, especially those with policy, educational and training implications. Included are: mobility impairment; neuromuscular/skeletal disabilities; visual disability; hearing impairment; vocal impairment; psychological and social issues for research; economic issues for research; and principles for operating a program of search and development for the physically handicapped. GRA

**N80-16088#** Committee on Science and Technology (U. S. House).

**SPACE SHUTTLE OPERATIONAL PLANNING, POLICY AND LEGAL ISSUES**

Washington GPO 1979 272 p refs Hearings before the Subcomm. on Space Sci. and Applications of the Comm. on Sci. and Technol., 96th Congr., 1st Sess., 25-26 Sep. 1979 (GPO-53-649) Avail: Subcomm. on Space Sci. and Applications

Government policies and agencies; regulations; user charges; provisions for launch assurance and priorities; user liabilities insurance and indemnity provisions; protection of individual and private property, as well as patents and proprietary rights involve questions of legal and business importance which can have a significant effect on the extent to which the space transportation system will promote private venture. Approaches to the organization and management of an operational space transportation system in the 1980's are examined. A.R.H.

**N80-16195#** National Technical Information Service, Springfield, Va.

**ALCOHOL FUELS. CITATIONS FROM THE AMERICAN PETROLEUM INSTITUTE DATA BASE Progress Report, 1973 - Jul. 1979**

Diane M. Cavagnaro Sep. 1979 194 p (NTIS/PS-79/0911/2) Avail: NTIS HC \$28.00/MF \$28.00 CSCL 21D

Research on alcohol fuels are cited. The citations cover synthesis, chemical analysis, performance testing, processing, pollution, economics, environmental effects, and feasibility. (Contains 178 abstracts). GRA

**N80-16237#** Argonne National Lab., Ill.

**ENERGY AND MATERIALS FLOWS IN THE FABRICATION OF ALUMINUM PRODUCTS**

R. M. Arons and A. M. Wolsky Aug. 1978 69 p refs (Contract W-31-109-eng-38) (ANL/CNSV-3) Avail: NTIS HC A04/MF A01

The aluminum fabrication process is described and energy use and efficiency for each process step is cited. It is concluded that the most effective approaches to energy conservation is the use of methods for waste heat reduction and recovery, reduction of scrap generation during processing, use of induction heating for both melting and heat treating, and use of alternative processing techniques that eliminate energy intensive intermediate steps. DOE

**N80-16361#** Allied Chemical Corp., Idaho Falls, Idaho.

**COMPUTERIZED QUALITY CONTROL TECHNIQUES**

G. D. Halverson, A. R. Camarata, R. L. Hand, F. W. Spraktes, and J. M. Baldwin 1979 49 p refs Presented at the 20th Ann. Meeting of the Inst. of Nucl. Mater. Management, Albuquerque, N. Mex., 16 Jul. 1979 (Contract EY-76-C-14-2170) (CONF-790707-11) Avail: NTIS HC A03/MF A01

An examination of historical semicontrolled data for providing a quality control tool by yielding information for such items as: (1) mathematical correction of unidentified systematic deviations; (2) estimation of confidence in lab results; and (3) detection of correctable trends is presented. A computerized quality control system is described and related topics including: (1) data flow and control; (2) use of statistics and graphics in data examination; (3) aspects of human interaction with a computerized system; and (4) the advantages and possible disadvantages of using the described system are discussed. DOE

**N80-16751#** National Bureau of Standards, Washington, D.C. Inst. for Computer Sciences and Technology.

**TECHNOLOGY ASSESSMENT: ADP INSTALLATION PERFORMANCE MEASUREMENT AND REPORTING Final Report**

Carol B. Wilson Sep. 1979 43 p refs (PB80-101322; NBS-SP-500-53; LC-79-600154) Avail: NTIS HC A03/MF A01 CSCL 09B

The status of ADP installation performance measurement and reporting in the Federal ADP community is compared with the best practices as found in the Federal and private sectors and described in the literature. The comparison reveals that more effort could be expended by Federal sites in the area of computer performance management. The principal obstacles to more and better performance programs are perceived to be the lack of needed measures on many systems and the magnitude of the effort involved in accessing and analyzing the measures which are available. Recommendations which could partially relieve the situation include: (1) development of standard performance measures; (2) development of a Government-wide data base for normative performance ranges; and (3) development of statistical computer performance evaluation techniques. GRA

**N80-16933#** Pittsburgh Univ., Pa. Dept. of Industrial Engineering.

**SCIENTIFIC MANAGEMENT OF THE REPAIRABLE ITEM INVENTORY SYSTEM Final Report**

Steven Nahmias 28 Aug. 1979 5 p (Grant AF-AFOSR-3494-78; AF Proj. 2304) (AD-A074259; AFOSR-79-0982TR) Avail: NTIS HC A02/MF A01 CSCL 12/1

The purpose of this research was to examine a number of existing mathematical models of repairable inventory systems in order to discover possible improvements and/or generalization of existing work in this area of research. The research resulted in two research reports. One deals with a deterministic model for a repairable item inventory system with a finite repair rate. The second report deals with managing repairable item inventory systems. The second paper presents a relatively comprehensive review of the mathematical models which have appeared in the literature for managing inventory systems where items were subject to repair. It deals with both the continuous review models - METRIC and its extensions and periodic review models which are based on dynamic programming formulations. GRA

**N80-16934#** New York State Assembly Scientific Staff, Albany. **LINKING SCIENCE AND TECHNOLOGY TO PUBLIC POLICY: THE ROLE OF UNIVERSITIES**

Abdo I. Baakini, ed. 1979 156 p Prepared in cooperation with State Univ. New York, Albany (Grant NSF ISP-75-18374) (PB80-108202; ISBN-0-915194-03-1; LC-78-22608) Avail: NTIS HC A08/MF A01 CSCL 05A

The nature of the relationship between universities and state governments is addressed from both historical and contemporary perspectives. Benefits to be derived by universities and state governments through mutual cooperation and sources of problems that can arise from close relationships between the two are discussed in edited conference papers. The consensus is that increased cooperation between universities and state governments, particularly in the areas of S & T, will prove highly beneficial to both, provided that the arrangements through which this cooperation is achieved are sufficiently flexible to recognize autonomy of the universities. GRA

**N80-16935#** British Library, London (England).

**REVIEW OF MANAGEMENT INFORMATION FROM COMPUTER-BASED CIRCULATION SYSTEMS IN ACADEMIC LIBRARIES**

C. Mary Overton Jun. 1979 36 p (BLL-BLRDR-5471; ISBN-0-905984-32-3; ISSN-0308-2385) Copyright. Avail: British Library Lending Div., Boston Spa, Engl.: £3.50

The production and use of management information from computer-based circulation libraries in the United Kingdom are reviewed. Statistical, operational, and analytical information categories are described and the potential usefulness of each

type is illustrated. Particular attention is paid to archive files. The management information used in fund allocation loan regulation, book buying, and stock management is briefly described. Factors which detract from the value of management information from automated circulation systems are discussed.

K.L.

**N80-16945#** British Library, London (England).  
**AN EXPERIMENT IN SYNOPSIS PUBLISHING IN THE FIELD OF MECHANICAL ENGINEERING**

R. J. Millson Sep. 1979 127 p refs  
(BLL-BLRDR-5498; ISBN-0-905984-41-2; ISSN-0308-2385)  
Copyright. Avail: British Library Lending Div., Boston Spa, Engl.: £ 10.00

In order to evaluate the concept of synopsis publishing, a subscription journal, Engineering Synopses, was published containing synopses derived from papers accepted for publication in the Proceedings of the IMechE. A regular subscription distribution of some 160 copies of the journal was achieved, augmented by about a further 150 copies distributed to questionnaire recipients, IMechE Committee members, etc. Correspondence with and visits to organizations in academia, industry and elsewhere were undertaken to augment the views of respondents to the questions and to increase the scope of the research by extending it beyond the confines of the disciplines covered by mechanical engineering. Notes are included on the cost effectiveness of the synopsis journal package compared with the traditional journal it might supplant, carrying the same number of titles; copyright implications and the launching of a synopsis journal. Reference is made to the possible future role of synopsis publishing in developing information macro-policies. Particular emphasis is placed on the needs of professional engineers in industry and a role for synopsis publishing in attempting to meet these needs. The prospects of integrating the synopsis journal with centralized on-demand services for full text provision are discussed.

M.M.M.

**N80-16947#** British Library, London (England). Research and Development Dept.

**PERSONAL CURRENT AWARENESS SERVICE: A HANDBOOK OF TECHNIQUES FOR MANUAL SDI**

T. Whitehall Sep. 1979 124 p refs  
(BLRDR-5502; ISBN-0-905984-43-9; ISSN-0306-2385) Avail: British Library Lending Div., Boston Spa, Engl.: £ 7.00; 16 BLL overseas, 15 European or 40 UK BLL photocopy coupons

Current awareness service to individuals based on scanning material collected by libraries is reported. Methods were taken from the literature and from interviews carried out in academic, special and public libraries. A wide variety of approaches to manual SDI was discovered, with librarians, subject specialists and project workers acting as scanners. Its place alongside other current awareness techniques, including computerised SDI, is discussed. There is a detailed treatment of profiling, scanning and notification techniques. A quality control system is described which is based on criteria identified by clients as being relevant to the value of an SDI service. Organization, promotion and management of SDI are also covered, and an analysis of production techniques produces four basic approaches.

M.M.M.

**N80-16949#** Committee on Appropriations (U. S. Senate).  
**DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT, AND CERTAIN INDEPENDENT AGENCIES APPROPRIATIONS FOR FISCAL YEAR 1980, PART 1**

Washington GPO 1979 1179 p refs Hearings on H.R. 4394 before a subcomm. of the Comm. on Appropriations, 96th Congr., 1st Sess., 21 Feb. 1979  
(GPO-41-318) Avail: Comm. on Appropriations

Highlights of NASA's 1979 accomplishments are reviewed as a backdrop to testimony covering a space shuttle supplementary request of \$185 million dollars, and a proposed 1980 budget totaling \$47 billion dollars. Special emphasis is given to cost growth for space shuttle and operating plans for SEASAT, the space telescope, and the Galileo and Voyager projects. Other areas discussed include the space transportation system, space sciences, space and terrestrial applications, aeronautics and

space technology, space tracking and data systems, construction of facilities, and program management.

A.R.H.

**N80-16969#** Seattle Office of Management and Budget, Wash.  
**OVERALL CITY TECHNOLOGY PROCESS Final Report**

Arun G. Jhaveri and Casey Jones Apr. 1979 31 p  
(Grant NSF ISP-78-11664)  
(PB-301109/5; NSF/RA-790079) Avail: NTIS  
HC A03/MF A01 CSCL 13B

State-of-the-art science and technology are applied to city problems and to integrate the technology transfer process into the city's regular decision-making process. The integration of the technology assessment and application process into the city's annual budget process and the involvement of significant city staff in technology assessment, priority setting, and application activities is described. Municipal energy conservation and program performance measurement are emphasized.

GRA

**N80-16970#** Transportation Research Board, Washington, D.C.  
**LOCAL AND REGIONAL DEVELOPMENT AND TRANSPORTATION NEEDS**

Edward C. Muse, Robert E. Taggart, Jr., Jon E. Burkhardt, Annette M. Gaegler, and William C. Hartwig 1979 50 p refs  
(PB-301207/7; TRB/TRR-716) Avail: NTIS HC A03/MF A01; HC also available from Transportation Research Board, Washington, D. C. 20418 HC \$3.00 CSCL 13B

Contents: Environmental planning and design for rapid transit facilities; Estimating socioeconomic impacts of transportation systems; Residential dislocation costs and consequences; Dynamic social and economic effects of the Connecticut Turnpike; Rural road-closure planning program to preserve agricultural land; New location patterns and U.S. transportation policy; Development of truck trip-generation rates by generalized land-use categories.

GRA

**N80-16971#** Hensley-Schmidt, Inc., Jackson, Miss.  
**TRANSPORTATION NEEDS FOR THE ELDERLY, HANDICAPPED AND LOW INCOME OF MISSISSIPPI**

Kay Van Sickle and Kenneth W. Heathcote 1979 33 p  
Sponsored in part by Mississippi State Highway Dept., Jackson, and Mississippi Council on Aging  
(PB-301273/9) Avail: NTIS HC A03/MF A01 CSCL 13B

The present role of public transportation in Mississippi and future alternative directions are outlined. An inventory of special transportation services and analysis of transportation demands and vehicle needs along with alternatives for coordination of these services are included. A manual of Federal programs that provide funds for transportation services, both rural and urban, was compiled to aid transportation agencies and communities in Mississippi in developing comprehensive, balanced transportation programs.

GRA

**N80-17015#** Joint Publications Research Service, Arlington, Va.

**EAST EUROPE REPORT: SCIENTIFIC AFFAIRS, NO. 659**  
11 Jan. 1980 146 p Transl. into ENGLISH from various East European journals  
(JPRS-74911) Avail: NTIS HC A07/MF A01

Developments in the various theoretical and applied scientific disciplines and technical fields are presented. The administration, structure, personnel, and research plans of leading East European scientific organizations and institutions are described. Applications of microelectronics to optical instrumentation and computers are emphasized.

**N80-17065#** Army Command and General Staff Coll., Fort Leavenworth, Kansas.

**THE A-10 AND DESIGN-TO-COST: HOW WELL DID IT WORK?**

Roger E. Carleton May 1979 52 p refs  
(AD-A075437) Avail: NTIS HC A04/MF A01 CSCL 05/1

This document covers systems procurement in a design-to-cost atmosphere. Deficiencies in this program are identified and recommendations are offered to improve this lack of responsiveness.

GRA

**N80-17133\***# National Aeronautics and Space Administration, Marshall Space Flight Center, Huntsville, Ala.  
**SPACE SHUTTLE SOLID ROCKET BOOSTER COST-PER-FLIGHT ANALYSIS TECHNIQUE**  
 J. Alan Forney Dec. 1979 172 p  
 (NASA-TM-78259) Avail: NTIS HC A08/MF A01 CSDL 20H

A cost per flight computer model is described which considers: traffic model, component attrition, hardware useful life, turnaround time for refurbishment, manufacturing rates, learning curves on the time to perform tasks, cost improvement curves on quantity hardware buys, inflation, spares philosophy, long lead, hardware funding requirements, and other logistics and scheduling constraints. Additional uses of the model include assessing the cost per flight impact of changing major space shuttle program parameters and searching for opportunities to make cost effective management decisions. R.C.T.

**N80-17309**# American Association for the Advancement of Science, Washington, D.C. Office of Public Sector Programs.  
**FIRE SAFETY AND DISASTER PREPAREDNESS**  
 Mar. 1979 284 p refs Presented at the Workshop Considering Problems Identified by the Intergovernmental Sci. and Tech. Panel, Washington, D.C., 14-16 Mar. 1979  
 (Grant NSF OPA-78-24464)  
 (PB-300467/8; AAAS/Pub-79/R/3; NSF/RA-790096) Avail: NTIS HC A13/MF A01 CSDL 13L

Problems areas and their relationship to science and technology were discussed and analyzed. The problem areas considered were: (1) evaluation of fire prevention and suppression management; (2) causes and prevention of injury and disability among firefighters; (3) public awareness of fire hazards; and (4) disaster preparation planning. GRA

**N80-17473**# Centre Technique des Industries Mecaniques, Senlis (France).

**A REVIEW OF FINISHING PROCEDURES INVOLVING TURNING AND MILLING** Final Report [ETUDE BIBLIOGRAPHIQUE. OPERATION DE FINITION EN TOURNAGE ET FRAISAGE]

M. Girard 1 Sep. 1977 70 p refs In FRENCH (CETIM-1-21-60-0) Avail: NTIS HC A04/MF A01

The machining and finishing of parts, specifically when turning and/or milling operations are involved, are discussed. The literature is reviewed and a state-of-the-art assessment is made. It is concluded that improvement is possible for the cost effectiveness of these operations as well as in reducing lost material and scraps. In support of these findings work parameters affecting the quality of finished surfaces are examined and their influence on the efficiency of machining is verified experimentally. Practical suggestions as to the choice of tool specifications and operating mode to improve finished surface quality are made.

Author (ESA)

**N80-17574**# Battelle Pacific Northwest Labs., Richland, Wash.  
**ENERGY MATERIAL TRANSPORT, NOW THROUGH 2000, SYSTEM CHARACTERISTICS AND POTENTIAL PROBLEMS. TASK 3: PETROLEUM TRANSPORTATION** Final Report  
 J. G. DeSteele Mar. 1979 291 p  
 (Contract EY-76-C-06-1830)  
 (PNL-2421) Avail: NTIS HCA13/MF A01

A summary characterization of the petroleum transportation system and an assessment of some potential problems that may impact petroleum transportation in the United States during the balance of the century are presented. The system characterization includes a review of petroleum product movements, modal operations and comparisons, and transportation regulations and safety. A median scenario based on published projections shows that the US will probably rely on foreign oil to supply between 40 and 50 percent of domestic petroleum needs throughout the balance of the century. DOE

**N80-17893** Stanford Univ., Calif.  
**COMPUTATIONAL ISSUES IN LINEAR LEAST SQUARES ESTIMATION AND CONTROL** Ph.D. Thesis  
 John Anthony Newkirk 1979 250 p  
 Avail: Univ. Microfilms Order No. 8001980

Various approaches to solving the matrix Riccati equation are examined. Scattering theory is used to provide a pure derivation of several square root algorithms. A set of criteria for choosing among these algorithms is presented and examined with empirical evaluations. Differentiating criteria include sensitivity to repeated closed-loop eigenvalues, the impact of singular model parameters, computational accuracy, and the rate of convergence. Sensitivity to parameter uncertainty in discrete-time systems is considered using a quadratic minimization of a generalized cost function. This same algorithm is used to design arbitrary-order compensation using complete system information. For discrete-time systems, the square root doubling algorithms are found to be comparable to the eigenvector decomposition algorithms in terms of memory requirements, elapsed computation time, and performance. The doubling algorithms are also found to solve a wider class of problems. Dissert. Abstr.

**N80-17894** Stanford Univ., Calif.  
**CRISIS DECISION ANALYSIS** Ph.D. Thesis  
 Burke Edward Robinson 1979 118 p  
 Avail: Univ. Microfilms Order No. 8001999

A modeling procedure, adapted from standard decision analysis methods, that guides the structuring, assessment, and analysis of crisis decisions. Features of the crisis modeling procedure include: (1) identify and structure all those, and only those, variables that may change the decision; (2) assess probable outcomes quickly and efficiently; and (3) indicate, at any moment, the best decision and the value of further modeling. Concepts and associated techniques for constructing a skeleton model are suggested and described including template, sequence, influence, tree, preference, and inquiry. Outcome assessments are made only after the procedure indicates that a new alternative or event should be added to the model and are assessed as estimates ranging from the worst probable to the best probable outcomes. The procedure is used to model the Mayaguez crisis of 1975 and a proposed corporate crisis concerning the purchase of ore. Dissert. Abstr.

**N80-17895** Stanford Univ., Calif.  
**THE CONCEPT OF INFLUENCE AND ITS USE IN STRUCTURING COMPLEX DECISION PROBLEMS** Ph.D. Thesis  
 Daniel Lee Owen 1979 140 p  
 Avail: Univ. Microfilms Order No. 8001983

A general mathematical characterization of the influence between random variables in a decision problem is described. The definition of influence can serve the decision analyst by helping him to conceptualize and communicate the relationship of the probability distributions on different variables in a probabilistic decision model. The definition of influence supports a calculus of influences that allows one to compute the total influence of one variable on another even when there are several intermediate variables. Using this influence calculus, the importance of a particular variable to the decision model can be determined. An immediate consequence is a recommendation for which variables to include in the model and whether the uncertainty about a variable is important. The theoretical bases of the influence method and conventional discretization are compared. Dissert. Abstr.

**N80-17896** California Univ., Berkeley.  
**INTERVAL ELIMINATION METHODS FOR INTERACTIVE OPTIMIZATION OF MULTIPLE OBJECTIVES** Ph.D. Thesis  
 Anthony Neal Payne 1979 151 p  
 Avail: Univ. Microfilms Order No. 8000476

The tradeoff problem arising when multiple, conflicting objectives must be optimized is considered and a man machine interaction methodology by which the decision-maker can efficiently and accurately estimate his preferred objective value from the tradeoff set is developed. A model of a special class of decision-makers for which an interval representation defines an interval of uncertainty containing the preferred objective value

is proposed. A measure of worst-case uncertainty is formulated as a criterion for optimal strategies and the bi-objective tradeoff problem is studied in detail. The worst-case uncertainty is minimized to derive optimal strategies. These strategies are then used to develop a general algorithm. Finally, the general multi-objective tradeoff problem is considered. An efficient strategy for placing experiments is proposed and used to devise a general interval elimination method in algorithmic form. Dissert. Abstr.

**N80-17897#** RAND Corp., Santa Monica, Calif.  
**BUNCHED LAUNCH, BUNCHED ACQUISITION, AND WORK-AROUNDS-ELEMENTS OF ALTERNATIVE SPACECRAFT ACQUISITION POLICIES** Interim Report  
 B. W. Augenstein, David Dreyfuss, and Anson G. Parish Oct. 1979 74 p  
 (Contract F49620-77-C-0023)  
 (AD-A076490; RAND/R-2166-AF) Avail: NTIS  
 HC A04/MF A01 CSCL 22/2

A review of spacecraft acquisition policy to determine whether, and to what degree, variations in acquisition methods can lower total space system costs without loss of operational capability. The authors conclude that there is an alternative to the conventional acquisition strategy: it would involve changes both in the conventional procurement process and in the conventional launch process. This alternative decreases system costs while increasing operational capability, and is equally useful with either an expendable booster or a Space Transportation System recoverable booster used for launch. The concept would call for bunched launch (launching the total mission-required spacecraft in as short a time as possible) and bunched procurement (buying the total number of satellites needed at one time) necessitating accommodations to institutional constraints and the present legal and regulatory framework. GRA

**N80-17898#** Decision Research Corp., Eugene, Oreg.  
**BEHAVIORAL ASPECTS OF COST-BENEFIT ANALYSIS**  
 Baruch Fischhoff Jan. 1979 38 p refs  
 (Contract N00014-79-C-0029; ARPA Order 3668)  
 (AD-A075099; PTR-1077-79-1) Avail: NTIS  
 HC A03/MF A01 CSCL 05/10

Characteristic limits of cost benefit analysis techniques are surveyed. These include: (1) the unavailability of necessary inputs to the analysis; (2) the absence of procedures for assessing the validity of an analysis; and (3) the necessary incompleteness of any formal model of a decision situation. The usefulness of cost benefit analysis as a management tool is emphasized. J.M.S.

**N80-17899#** Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. Dept. of Systems Management.  
**INTERACTIVE PROGRAMMING FOR MANAGEMENT AIDS TO DECISION MAKING: QUEUEING THEORY APPLIED**  
**M.S. Thesis**  
 Paul Hamilton Sep. 1979 131 p  
 (AD-A076982; AFIT/GSM/SM/79S-6) Avail: NTIS  
 HC A07/MF A01 CSCL 05/10

Quantitative models for decision-making are useful only if they are available to those who must make the decisions. QUEUE1, an interactive computer program which incorporates six basic queueing theory models, was developed. QUEUE1 and instructions were designed for use by mid-level managers who do not have an extensive knowledge of computer operations or modeling theory. QUEUE1 was tested on five individuals. Test results lead to the conclusion that interactive programming techniques can present quantitative models to non-technical managers in a useable format. GRA

**N80-17900#** General Technology Systems Ltd., London (England).  
**STUDY AND IMPLEMENTATION OF AN ESA COMPUTERIZED PLANNING SYSTEM. VOLUME 1: PLANNING SYSTEM FUNCTIONS AND STRUCTURE** Progress Report  
 R. Brunt, G. E. Hall, and L. W. Steings Jan. 1978 154 p 3 Vol.  
 (Contract ESA-3172/77-F-WMT)

(GTS-760972-Vol-1; ESA-CR(P)-1222-Vol-1) Avail: NTIS  
 HC A08/MF A01

The program structure, system functions, user and data requirements are presented for a computerized system used for planning, decision making, and information retrieval within the European Space Agency. The programs, written in FORTRAN 4, permit analysis of cost data, manipulation of price levels, currencies, cost elements, prediction of national space expenditure capabilities, and the margin available for new projects, as well as the selection of projects relative to the margin, and a comparison of manpower requirements with forecast industrial capacity. Author (ESA)

**N80-17901#** General Technology Systems Ltd., London (England).  
**STUDY AND IMPLEMENTATION OF AN ESA COMPUTERIZED PLANNING SYSTEM. VOLUME 3: PROGRAM DOCUMENTATION** Progress Report  
 G. E. Hall, N. R. Craddock, W. Spiess, and P. Thermann Oct. 1978 213 p 3 Vol.  
 (Contract ESA-3172/77-F-WMT)  
 (GTS-760972-Vol-3; ESA-CR(P)-1222-Vol-3) Avail: NTIS  
 HC A10/MF A01

The computer implementation aspects of a computerized planning system for ESA are described. Both the configurations of the programs and of the 15 data files, deduced using some basic roles, are described. The derivation of the program structure is discussed along with the data file derivation. Tables of intrinsic data are presented. Author (ESA)

**N80-17910#** Committee on Commerce, Science, and Transportation (U. S. Senate).  
**NASA AUTHORIZATION FOR FISCAL YEAR 1981, PART 1**  
 Washington GPO 1980 798 p refs Hearings on S. 2240 before the Comm. on Commerce, Sci., and Transportation, 96th Congr., 2d Sess., 1980  
 (GPO-57-406) Avail: Comm. on Commerce, Sci., and Transportation

Highlights of NASA programs are presented along with justifications for a proposed budget of \$5,736.7 million for research and development, research and program management, and construction of facilities. A supplemental budget for the space shuttle program is included. A.R.H.

**N80-17912#** Committee on Commerce, Science, and Transportation (U. S. Senate).  
**PATENT POLICY, PART 1**  
 Washington GPO 1979 461 p refs Hearings on S. 1215 before the Subcomm. on Sci., Technol., and Space of the Comm. on Commerce, Sci., and Transportation, 96th Congr., 1st Sess., 23 and 27 Jul.; 25 Oct. 1979  
 (GPO-52-476) Avail: Subcomm. on Sci., Technol., and Space

Federal patent policies which were originally designed to protect the public interest by preventing the so-called give away, have operated to discharge contractor bidding thus eliminating incentives to innovate or disclose new ideas, and to delay the commercialization of inventions developed under Federal contract. A bill is presented and discussed, which will establish and maintain a Federal policy for the management and use of the results of government funded science and technology research and development. A.R.H.

**N80-17914** Stanford Univ., Calif.  
**THE USE OF THE MACROANALYTIC MODELS FOR TRANSIT PLANNING IN SUBURBAN AREAS**  
**Ph.D. Thesis**  
 Wei-Yue Lim 1979 241 p  
 Avail: Univ. Microfilms Order No. 8001960

The use of macroanalytic models to form the basis for transit planning in suburban areas is discussed. The framework developed for using these models for planning consists basically of three steps: (1) the development of performance charts for fixed route and dial-a-ride service using transit supply relationships; (2) the

## N80-17915

incorporation of demand models with supply models to form a supply-demand equilibrium model; and (3) the use of macroanalytic models for the partial optimization of transit designs in the presence of multiple conflicting performance criteria.

Dissert. Abstr.

**N80-17915#** Committee on Commerce, Science, and Transportation (U. S. Senate).

### **NATIONAL TECHNOLOGY INNOVATION ACT**

Washington GPO 1979 432 p refs Hearings on S. 1250 before the Subcomm. on Sci., Technol., and Space of the Comm. on Commerce, Sci., and Transportation, 96th Congr., 1st Sess., 21, 27 Jun. and 21 Nov. 1979

(GPO-50-438) Avail: Subcomm. on Sci., Technol., and Space

The status of industrial innovation in the United States is reviewed, and the provisions of a bill to establish centers for industrial technology where universities and industries can collaborate in the generation of new ideas for technology are discussed. The proposed Office for Industrial Technology within the Department of Commerce, will (1) oversee the relation between technology and the economic and social well being of the country; (2) provide data, analysis, and judgement necessary to enhance the development of technology and innovation; and (3) support the technology broadly applicable to industrial development.

A.R.H.

**N80-17924#** Stanford Univ., Calif. Dept. of Civil Engineering. **DEVELOPMENT OF RESEARCH IN THE CONSTRUCTION OF TRANSPORTATION FACILITIES: A STUDY OF NEEDS, OBJECTIVES, RESOURCES, AND MECHANISMS FOR IMPLEMENTATION** Final Report

John W. Fondahl and Boyd C. Paulson Aug. 1979 145 p refs

(Contract DOT-OS-60150)

(PB-301389/3; DOT/RSPA/DPB/50-79/12) Avail: NTIS HC A07/MF A01 CSCL 13B

The implementation of research results is discussed along with problems created by planning, design, and organizational decisions. Incentives and obstacles to research implementation are identified and proposals for more rapid and effective application of research results are made. Increased utilization of demonstration projects, bid alternates, turnkey contracts, and follow-up measures are discussed. A special study of measures by the Japanese construction industry to achieve cost reduction through innovation is included. Experience originating in projects such as BART, WMATA, and MARTA is examined to identify problems that have serious impact both on costs and the environment desirable for innovative efforts.

GRA

**N80-17925#** M and I, Inc., Fort Collins, Colo. **EVALUATION OF OPERATION AND MAINTENANCE FACTORS LIMITING MUNICIPAL WASTEWATER TREATMENT PLANT PERFORMANCE** Final Report

Bob A. Hegg, Kerwin L. Rakness, and James R. Schultz Jun. 1979 174 p refs

(Contract EPA-68-03-2224)

(PB-300331/6; EPA-600/2-79-034) Avail: NTIS HC A08/MF A01 CSCL 13B

A significant number of wastewater treatment plants constructed with Federal monies have not met design or permit standards. Comprehensive evaluation were conducted at thirty wastewater treatment facilities to identify, quantify and rank the causes of this poor performance. The two highest ranking factors identified were inadequate operator application of concepts and testing to process control and sewage treatment understanding. Many operators were not trained as evidenced by a lack of sewage treatment understanding, but even trained operators did not apply concepts of operation to process control. The third highest ranking factor identified was improper technical guidance from authoritative sources. Six of the ten highest ranking factors were related to improper plant design.

GRA

**N80-18058\*#** Jet Propulsion Lab., California Inst. of Tech., Pasadena.

**THE DEEP SPACE NETWORK** Progress Report, Nov. - Dec. 1979

15 Feb. 1980 131 p refs

(Contract NAS7-100)

(NASA-CR-162795; JPL-PR-42-55)

HC A07/MF A01 CSCL 14B

Avail: NTIS

The functions and facilities of the Deep Space Network are considered. Progress in flight project support, tracking and data acquisition research and technology, network engineering, hardware and software implementation, and operations is reported. For individual titles, see N80-18059 through N80-18073.

**N80-18069\*#** Jet Propulsion Lab., California Inst. of Tech., Pasadena.

**AN EVALUATION CRITERIA MODEL FOR THE NAVIGATION NETWORK SYSTEM DESIGN**

In its The Deep Space Network 15 Feb. 1980 p 68-78

Avail: NTIS HC A07/MF A01

The approaches used in developing the basis for a system design evaluation model are described. Two evaluation cases are modeled, leading to a general model that is then detailed for application specifically to the Navigation Network conceptual designs. The identification of the system attributes and their associated perspectives are discussed along with the method of scoring and ranking a candidate design.

K.L.

**N80-18419#** Arinc Research Corp., Annapolis, Md. **THE APPLICATION OF RELIABILITY IMPROVEMENT WARRANTY TO DYNAMIC SYSTEMS** Final Report, 26 Sep. 1978 - 4 Sep. 1979

A. A. Bilodeau, F. B. Crum, W. A. Dunphy, and R. A. Kowalski 4 Sep. 1979 162 p

(Contract DAAK70-78-C-0200)

(AD-A075520; Rept-1736-01-1-2025; MERADCOM-TQ-1)

Avail: NTIS HC A08/MF A01 CSCL 14/4

The Reliability Improvement Warranty (RIW) is currently used within the Department of Defense to provide an incentive to contractors to design and produce equipment that will have a low failure rate, as well as low costs of repair following failure in field or operational use. Current applications of RIW have generally been restricted to initial production procurements of relatively small, transportable avionics equipment. The RIW concept has potential applications for dynamic systems (e.g., transmissions, gearboxes, engines, etc.) procured by the U.S. Army Mobility Equipment Research and Development Command (MERADCOM). However, dynamic systems may differ from avionics in design and maintenance concepts, transportability features, and deployment and utilization philosophy. Therefore, current criteria for using RIW and current guidelines for developing RIW terms and conditions should be reviewed and adapted for this new class of systems. This effort identified several differences between the characteristics of dynamic systems and those of RIW avionics equipment that are not emphasized in current RIW guidelines. RIW application criteria for dynamic systems were also developed. An existing life-cycle cost (LCC) model was modified to address quantitative features of dynamic systems that should be considered in an economic analysis of RIW versus organic maintenance. Case studies were developed to demonstrate the use of the RIW selection criteria and the LCC model.

**N80-18858#** University of Southern California, Los Angeles. Social Science Research Inst.

**RANK WEIGHTING IN MULTIATTRIBUTE UTILITY DECISION MAKING: AVOIDING THE PITFALLS OF EQUAL WEIGHTS** Technical Report, Dec. 1978 - Dec. 1979

William G. Stillwell and Ward Edwards Sep. 1979 52 p refs

(Contract N00014-79-C-0038)

(AD-A078941; USC-001595-2T; SSRI-RR-79-2) Avail: NTIS

HC A04/MF A01 CSCL 12/1

The notion of 'dominance' in multiattribute utility decision contexts leads to a change in the considered alternative set. The implications of this set change are discussed in relation to the conditions of Wainer's (Wainer, 1976) 'equal weights theorem'

and the resulting sensitivity to weighting of importance dimensions demonstrated. Data from three multiattribute decision making studies are examined using four rank weighting techniques as well as equal weights. Rank weighting of importance dimensions demonstrate marked improvement of approximation as reflected in both Pearson and rank order correlations for measures of overall utility across alternatives within the nondominated subset. Implications for multiattribute utility application are discussed.

GRA

**N80-18979#** National Aeronautics and Space Administration, Washington, D. C.

**NASA'S UNIVERSITY PROGRAM: ACTIVE PROJECTS, FISCAL YEAR 1979**

1979 562 p  
(NASA-TM-81777) Avail: NTIS HC A24/MF A01 CSCL 05A

Current information and related statistics are provided for each grant/contract/ cooperative agreement during the report period. Cross indexes by agreement number, field of science and engineering, and technical officer location are included.

A.R.H.

**N80-18980#** Purdue Univ., Lafayette, Ind. Dept. of Statistics.

**SOME RECENT DEVELOPMENTS IN MULTIPLE DECISION THEORY: A BRIEF OVERVIEW**

Shanti S. Gupta and Deng-Yuan Huang Oct. 1979 15 p refs  
(Contract N00014-75-C-0455)

(AD-A077710; Mimeo-Ser-79-26) Avail: NTIS HC A02/MF A01 CSCL 12/1

This paper surveys some recent developments in multiple decision (selection and ranking) theory. The spirit and philosophy underlying this approach to comparing k populations are discussed briefly. Criteria to construct optimal multiple decision procedures, which are based on some 'modifications' of decision theory, are discussed. The combination of the indifference zone and the subset selection approach into a general framework is described.

GRA

**N80-18995#** National Technical Information Service, Springfield, Va.

**TECHNOLOGY TRANSFER: GENERAL AND THEORETICAL STUDIES, VOLUME 2. A BIBLIOGRAPHY WITH ABSTRACTS Progress Report, 1977 - Dec. 1979**

Mary E. Young Dec. 1979 186 p Supersedes NTIS/PS-78/1274; NTIS/PS-77/1131; NTIS/PS-76/1008; NTIS/PS-75/884; COM-74-1194

(PB80-801509; NTIS/PS-78/1274; NTIS/PS-77/1131; NTIS/PS-76/1008; NTIS/PS-75/884; COM-74-11194) Avail: NTIS HC \$30.00/MF \$30.00 CSCL 05B

The cited reports cover research in technology transfer from 1977 to December, 1978. Topics on Government policies, aid to developing countries, feasibility studies, proposed methodologies, and theory are included. This updated bibliography contains 178 abstracts, 55 of which are new entries to the previous edition.

GRA

**N80-19047#** Advisory Group for Aerospace Research and Development, Paris (France).

**PROPULSION AND ENERGETICS PANEL WORKING GROUP 11 ON AIRCRAFT FIRE SAFETY. VOLUME 2: MAIN REPORT**

B. P. Botteri, ed., M. Gerstein, ed., T. Horeff, ed., and J. Parker, ed. Nov. 1979 167 p 2 Vol.

(AGARD-AR-132-Vol-2; ISBN-92-835-1344-4) Avail: NTIS HC A08/MF A01

Recent aircraft fire experience was analyzed and areas in which fire protection enhancement is needed were delineated. Technological opportunities that offer significant prospect for improvement of safety and personnel survivability were also identified. Because of the complexity of the overall problems, attention was focused upon turbine engine powered transport aircraft in a conventional (non-combat) operational environment. Conclusions and recommendations are summarized.

R.E.S.

**N80-19051#** Perceptronics, Inc., Woodland Hills, Calif.

**AIRCRAFT EMERGENCY DECISIONS: COGNITIVE AND SITUATIONAL VARIABLES Annual Technical Report**

Rosemarie Hopf-Weichel, Luigi Lucaccini, Joseph Saleh, and Amos Freedy Jul. 1979 171 p refs

(Contract F49620-78-C-0067; AF Proj. 2313)

(AD-A077413; PATR-1065-79-7; AFOSR-79-1175TR) Avail: NTIS HC A08/MF A01 CSCL 01/2

Military aircraft accidents are important not only to the individuals directly involved, but also to those responsible for preparing and maintaining combat-ready forces for the nation's defense. This report addresses problems underlying aircraft emergency situations. A literature review provided background information, and an analysis of selected accident reports. A workshop was convened to review the state-of-the-art of aircrew emergency decision training, safety research, and behavioral decision theory. A selected set of emergency situations was the basis of a preliminary classification of aircraft emergency situations in terms of several situational and decision making attributes. The classification is based on data derived from interviews with experienced military flying personnel. A taxonomy of emergency situation types was developed, incorporating both situational and task specific elements as cognitive attributes of the decision tasks performed under emergency conditions. On the basis of the taxonomy, three classes of emergency situations were found to be of interest: Situation 1 (predictable) Situation 2 (partly predictable), and Situation 3 (unpredictable). Initial training guidelines are suggested in light of the cognitive requirements of each class.

GRA

**N80-19087#** Kay and Associates, Inc., Mount Prospect, Ill.

**[AVIONICS LOGISTICS SUPPORT INCLUDING V/STOL LAMPS, AND INSTRUMENT REPAIR] Final Report, 5 Dec. 1977 - 28 Aug. 1979**

2 Nov. 1979 30 p refs

(Contract N60921-78-C-0014)

(AD-A077460) Avail: NTIS HC A03/MF A01 CSCL 01/3

This unclassified report contains information on the contractual effort of Kay and Associates, Inc. in support of the Naval Surface Weapons Center and the Naval Air Systems Command. The efforts encompassed a study concerning VSTOL vs LAMPS, Sea Based Air requirements, composition and configuration of future ship weapons, and screening of Source, Maintenance and Recoverability code changes. Additionally, this effort included the research and analysis of candidate instrument repair facilities with a view toward selecting specific instruments for various weapons systems for increased repair capability at the intermediate level of Maintenance.

GRA

**N80-19122#** Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Systems and Logistics.

**AN ANALYSIS AND SYNTHESIS OF ENGINE CONDITION MONITORING SYSTEMS M.S. Thesis**

Jack W. Chapman, Jr. and Charles L. Page, Jr. Sep. 1979 138 p refs

(AD-A077531; AFIT-LSSR-27-79B) Avail: NTIS HC A07/MF A01 CSCL 21/5

Engine condition monitoring systems have been developed to assist flight line maintenance activities and aid in the transition of aircraft engine maintenance philosophy from that of maximum operating time to reliability centered or on condition maintenance. This study includes a comprehensive review of past, current, and proposed Air Force applications of turbine engine monitoring systems to describe the major features of TEMS. Engine performance data output from TEMS to the various engine management functions are analyzed. The authors conclude that TEMS data and the existing or proposed engine management systems are not directly compatible. Moreover, the analysis indicates that implementation of TEMS and an on condition maintenance policy would require a greatly expanded data base to accomplish the required engine management record keeping, monitoring, and forecasting tasks. Several recommendations are offered for interfacing TEMS with the engine management systems. Areas for further research are suggested.

GRA

**N80-19206\*** Boeing Aerospace Co., Seattle, Wash.  
**QUALITY CONTROL DEVELOPMENTS FOR GRAPHITE/  
 PMR15 POLYIMIDE COMPOSITES MATERIALS**  
 C. H. Sheppard and J. T. Hoggatt Sep. 1979 187 p  
 (Contract NAS1-15009)  
 (NASA-CR-159182; D180-20545-2A) Avail: NTIS  
 HC A09/MF A01 CSCL 11D

The problem of lot-to-lot and within-lot variability of graphite/  
 PMR-15 prepreg was investigated. The PMR-15 chemical  
 characterization data were evaluated along with the processing  
 conditions controlling the manufacture of PMR-15 resin and  
 monomers. Manufacturing procedures were selected to yield a  
 consistently reproducible graphite prepreg that could be processed  
 into acceptable structural elements. K.L.

**N80-19291#** Arkansas Univ., Fayetteville. Dept. of Chemical  
 Engineering.

**EVAPORATION AND DISPERSION OF HAZARDOUS  
 MATERIALS Final Report, 15 May 1978 - 14 May 1979**  
 Charles Springer Jun. 1979 85 p refs  
 (Grant AF-AFOSR-3559-78; AF Proj. 2303)  
 (AD-A077399; AFOSR-79-1062TR) Avail: NTIS  
 HC A05/MF A01 CSCL 21/9

This work was undertaken in order to develop a state-of-the-art  
 predictive model for the evaporation and dispersion of hazardous  
 liquids, especially hydrozine family fuels and propellants, which  
 might be accidentally spilled. All of the several model elements  
 have been assembled and combined in a FORTRAN computer  
 program which will compute evaporation rates and limits of the  
 hazardous region, that is, the maximum distance away from the  
 centerline where a hazard would exist as well as the maximum  
 distance down wind that a hazard would exist. Depending upon  
 the input data supplied, the program will also predict the amount  
 of water that would be required for sufficient dilution to  
 eliminate the hazard, the effects of changing variables (as for  
 example, the effects of changes in wind speed, or in air temperature  
 or in atmospheric stability), and the effect of the passage of  
 time (up to twenty-four hours) if weather conditions are updated  
 hourly. In the latter case, allowances are made for composition  
 changes in the remaining pool because of preferential evapora-  
 tion of components, possible absorption of water from the  
 atmosphere, and absorption of (and reaction with) carbon dioxide  
 from the atmosphere. A number of computations were made in  
 order to determine the effects of changes in the several input  
 parameters. Author (GRA)

**N80-19515\*** National Aeronautics and Space Administration.  
 Lyndon B. Johnson Space Center, Houston, Tex.  
**LIFE SCIENCES FLIGHT EXPERIMENTS PROGRAM, LIFE  
 SCIENCES PROJECT DIVISION, PROCUREMENT QUALITY  
 PROVISIONS**

Gordon House Jan. 1980 18 p  
 (NASA-TM-80962; JSC-16427) Avail: NTIS  
 HC A02/MF A01 CSCL 14D

Methods are defined for implementing quality assurance  
 policy and requirements for life sciences laboratory equipment,  
 experimental hardware, integration and test support equipment,  
 and integrated payloads. K.L.

**N80-19518#** Air Force Inst. of Tech., Wright-Patterson AFB,  
 Ohio. School of Systems and Logistics.

**EVALUATION OF AND RECOMMENDED CHANGE TO THE  
 RELIABILITY IMPROVEMENT WARRANTY (RIW) GUIDE-  
 LINES M.S. Thesis**

Mark C. Jacobson and Reagan L. Skaggs Sep. 1979 101 p  
 refs  
 (AD-A077672; AFIT-LSSR-23-79B) Avail: NTIS  
 HC A06/MF A01 CSCL 14/4

The reliability improvement warranty is a relatively new  
 acquisition technique in government contracting. To encourage  
 effective use of the technique, HQ USAF Directorate of  
 Procurement Policy (LGP) published the pamphlet entitled  
 Interim Guidelines Reliability Improvement Warranty (RIW) in  
 July, 1974. This pamphlet provided guidance in the areas of  
 application criteria, funding, provisions, determination of cost

effectiveness, and general implementation and administrative  
 information. Since the guidelines had not been revised since  
 publication, the researchers' objectives were to determine if the  
 guidelines were adequate and to obtain recommendations for  
 improving those guidelines, if necessary. To meet those objectives,  
 24 individuals knowledgeable in the area of RIW were interviewed.  
 Their perceptions were gathered through ten scaled response  
 questions that addressed main areas within the guidelines. The  
 distribution of responses were tested via the Kolmogorov-Smirnov  
 two sample test to determine the adequacy of the area.  
 Interviewees also recommended changes to correct perceived  
 problem areas via open ended response questions. The researchers  
 concluded the guidelines were inadequate in a number of areas,  
 e.g., evaluation of candidates, example clauses, administrative  
 concerns and cost-benefit analysis among others. Suggestions  
 for increased detail, more examples, deeper rationale and  
 organization into a regulation were made. GRA

**N80-19519#** Advisory Group for Aerospace Research and  
 Development, Neuilly-Sur-Seine (France).

**AVIONICS RELIABILITY, ITS TECHNIQUES AND RELATED  
 DISCIPLINES**

Manfred C. Jacobson (AeG-Telefunken, Ulm, West Germany) Oct.  
 1979 536 p refs In ENGLISH and FRENCH Conf. held in  
 Ankara, 9-13 Apr. 1979  
 (AGARD-CP-261; ISBN-92-835-0254-X) Avail: NTIS  
 HC A23/MF A01

A state of the art review of topics related to reliability and  
 logistics in avionics systems is given. General concepts, reliability/  
 availability requirements and demonstration, reliability and  
 maintainability practices and effects in avionics design, develop-  
 ment and production, software reliability, and logistics support  
 aspects are among the topics discussed.

**N80-19527#** Arinc Research Corp., Annapolis, Md.  
**RELIABILITY IMPROVEMENT WARRANTY: AN OVER-  
 VIEW**

Harold S. Balaban In AGARD Avionics Reliability, Its Tech.  
 and Related Disciplines Oct. 1979 9 p refs

Avail: NTIS HC A23/MF A01

The concept, genesis, and development of reliability improve-  
 ment warranty (RIW) in the United States is reviewed. The  
 application of RIW concepts to military procurements is  
 discussed. The rapidly increasing use of this procurement/logistic  
 concept strongly suggests that RIW is now a viable approach  
 to securing reliable and maintainable equipment at a reasonable  
 cost. R.E.S.

**N80-19528#** Thomson-CSF, Orsay (France).  
**RELIABILITY CLAUSES IN CONTRACTS [LES CLAUSES  
 DE FIABILITE DANS LES CONTRATS]**

J. P. Plantard In AGARD Avionics Reliability, Its Tech. and  
 Related Disciplines Oct. 1979 8 p In FRENCH

Avail: NTIS HC A23/MF A01

The contents of two documents produced by an interministerial  
 Working Group of the Committee for Telecommunication  
 Coordination are examined with respect to the objectives, the  
 most prominent technical points, and the details for their  
 application. The documents cited contain recommendations for  
 the introduction of reliability clauses for equipment and systems.  
 Guidelines for establishing a reliability plan are included.  
 Transl. by A.R.H.

**N80-19529#** Crouzet Aerospace and Systems, Valence (France).  
**THE INCREASE OF THE RELIABILITY OF ELECTRONIC  
 EQUIPMENT SUBJECT TO RELIABILITY CLAUSES [ETUDE  
 DE LA CROISSANCE DE LA FIABILITE D'UN EQUIPEMENT  
 ELECTRONIQUE SOUMIS A DES CLAUSES DE FIABIL-  
 ITE]**

J. C. Chabin In AGARD Avionics Reliability, Its Tech. and  
 Related Disciplines Oct. 1979 9 p refs In FRENCH

Avail: NTIS HC A23/MF A01

The appearance of reliability warranties is one of the preponderant factors in the interest shown by equipment manufacturers in techniques for reliability forecasting. The results established at the beginning of work with material are often very far from the forecast, but the different tasks associated with the reliability programs applied to equipment allow for improvement in performance. Knowledge of the rule of reliability growth as a function of the time of accumulated operation of the equipment that is made the object of permanent efforts of improvement, should help the equipment manufacturer to better support his reliability forecast when negotiating a warranty.

Transl. by A.R.H.

**N80-19531#** Messerschmitt-Boelkow-Blohm G.m.b.H., Munich (West Germany).

**PRODUCTION RELIABILITY ASSURANCE (PRA): TESTING**

Antfried Weihe *In* AGARD Avionics Reliability, Its Tech. and Related Disciplines Oct. 1979 10 p

Avail: NTIS HC A23/MF A01

Production reliability assurance (PRA) tests are all-equipment-reliability tests which are applied for assurance purposes during the production phase of major equipments once the formal qualification status concerning reliability is achieved. A fundamental principle of the tests is the liability of the present and/or if the corrective action required (CAR) line is exceeded by the plot of accumulated failures. Suitable test conditions for both producer and customer are obtained by selection of an appropriate CAR line and by restart of the plot after a specific test experience is gained. A comparison with fixed length tests shows that shorter time to decisions is obtained in the case of PRA testing.

R.E.S.

**N80-19540#** Army Avionics Research and Development Activity, Fort Monmouth, N. J.

**MILITARY ADAPTION OF A COMMERCIAL VOR/ILS AIRBORNE RADIO WITH A RELIABILITY IMPROVEMENT WARRANTY**

Earl I. Feder and Douglas L. Niemoller (Bendix Corp., Fort Lauderdale, Fla.) *In* AGARD Avionics Reliability, Its Tech. and Related Disciplines Oct. 1979 8 p

Avail: NTIS HC A23/MF A01

Low cost, small, lightweight airborne navigation receivers were acquired and reconfigured to meet U.S. Army aircraft specifications. The contract includes a clause requiring the manufacturer to assume responsibility for the field reliability and repair of each receiver for a minimum of four years. If successfully implemented, the reliability improvement warranty should increase reliability, availability, and maintainability and reduce the overall equipment life cycle costs.

K.L.

**N80-19546#** Elliott-Automation Space and Advanced Military Systems Ltd., Camberley (England).

**RELIABILITY MANAGEMENT OF THE AVIONIC SYSTEM OF A MILITARY STRIKE AIRCRAFT**

A. P. White and J. D. Pavier *In* AGARD Avionics Reliability, Its Tech. and Related Disciplines Oct. 1979 13 p refs

Avail: NTIS HC A23/MF A01

The system management techniques to achieve the reliability requirements for the avionic system of the Panavia Tornado aircraft are described. The method of apportionment of these requirements to each of the constituent parts of the system is explained. The aims, cost effectiveness, and experience to date of reliability demonstrations are outlined.

M.G.

**N80-19555#** Westinghouse Electric Corp., Hunt Valley, Md. Defense and Electronic System Center.

**INTEGRATED LOGISTICS SUPPORT ADDS ANOTHER DIMENSION TO MATRIX MANAGEMENT**

Richard M. Drake *In* AGARD Avionics Reliability, Its Tech. and Related Disciplines Oct. 1979 11 p

Avail: NTIS HC A23/MF A01

The application of matrix management to integrated logistics support (ILS) is defined as a management and functional process for unified, coordinated acquisition of logistic resources required to support systems and equipments at all echelons of maintenance throughout their planned period of usefulness. The concept involves the scientific management of all necessary logistic products and services over the system life cycle with particular emphasis upon coherence, timeliness, execution, and reliability. The various elements of logistics services and the integration with matrix management are illustrated. The advantages and disadvantages of the integration are delineated and organizational diagrams are presented. The program management process is discussed with emphasis given to integrated quantitative planning and ILS products such as communicating and direction, and life cycle costs.

A.W.H.

**N80-19556#** Messerschmitt-Boelkow-Blohm G.m.b.H., Munich (West Germany). Product Support Dept.

**MEK: A NEW PROCEDURE FOR DEVELOPMENT OF MAINTENANCES POLICIES**

Klaus Lewandowski *In* AGARD Avionics Reliability, Its Tech. and Related Disciplines Oct. 1979 10 p

Avail: NTIS HC A23/MF A01

A procedure for the development of maintenance policies is presented for the general application in weapon system projects. The procedure is based on a detailed collection and evaluation of the maintenance expenditure expected for the weapon system. The maintenance expenditure is based upon the system technology, the reliability and maintainability attributes including the given lifetime limitations, and the operational requirements and logistic concepts. The procedure is illustrated with an analysis of each step in the data collection process. The data collection process as defined begins with the task frequencies or specified values of the system specifications, proceeds to scheduled maintenance requirements, maintenance levels, personnel requirements, technical publication requirements, and unscheduled maintenance requirements, and ends with a summary of the results.

A.W.H.

**N80-19557#** Westinghouse Electric Corp., Hunt Valley, Md. Integrated Logistics Support Div.

**THE IMPORTANCE OF INTEGRATED LOGISTICS SUPPORT CONSIDERATIONS DURING DESIGN**

Robert C. Rassa *In* AGARD Avionics Reliability, Its Tech. and Related Disciplines Oct. 1979 5 p

Avail: NTIS HC A23/MF A01

The relationship and interdependency of the integrated logistics support elements and their relationship to the design of the prime mission equipment is explored. The roles of the key personnel involved in the initial considerations are examined. Rules for the successful implementation of an integrated logistics support plan are developed and presented.

A.W.H.

**N80-19558#** Ministry of Defence, London (England). Procurement Div.

**THE INTEGRATED MANAGEMENT OF RELIABILITY AND MAINTAINABILITY IN PROCUREMENT**

S. E. Shapcott and K. A. Brown *In* AGARD Avionics Reliability, Its Tech. and Related Disciplines Oct. 1979 4 p

Avail: NTIS HC A23/MF A01

An effective procurement strategy for reliability and maintainability is discussed as documented in the DCAD Technical Publication 1/77: Achievement of Avionic Reliability and Maintainability through Integrated Management. The evolution of the strategy is reviewed, the requirements of the strategy are discussed, and the implementation of the strategy is examined.

A.W.H.

**N80-19559#** Royal Air Force, Dereham (England). RAF Maintenance Data Centre.

**RELIABILITY AND SUPPORT DATA FOR STATISTICAL EVALUATION**

A. Andrews *In* AGARD Avionics Reliability, Its Tech. and Related Disciplines Oct. 1979 14 p

Avail: NTIS HC A23/MF A01

## N80-19561

The organization and procedures for aircraft data collection, using the maintenance data system, are described together with the methods of data storage, retrieval, and analysis. Various applications of the data as part of an integrated reliability management program are outlined. The problems in collecting and interpreting field data are discussed and difficulties in relating the data to the reliability measured in the design and development stages of new equipment are described. A.W.H.

### N80-19561# Arinc Research Corp., Annapolis, Md. **THE RELIABILITY IMPROVEMENT WARRANTY AND ITS APPLICATION TO THE F-16 MULTINATIONAL FIGHTER PROGRAM**

George Harrison *In* AGARD Avionics Reliability, Its Tech. and Related Disciplines Oct. 1979 9 p

Avail: NTIS HC A23/MF A01

The F-16 multinational fighter program is described, with particular emphasis on two aspects: the development of the F-16 reliability improvement warranty (RIW) program, and the coproduction agreements between the U.S. and the governments of Belgium, Denmark, Norway, and the Netherlands. The fundamentals of an RIW procurement, together with some of the variations that were used to suit particular applications, are described. Guidelines for RIW application are presented. A.W.H.

### N80-19809# Advisory Group for Aerospace Research and Development, Paris (France). **MODELING AND SIMULATION OF AVIONICS SYSTEMS AND COMMAND, CONTROL AND COMMUNICATIONS SYSTEMS**

Jan. 1980 553 p refs Presented at the Meeting of the Avionics Panel, Paris, 15-19 Oct. 1979 (AGARD-CP-268; ISBN-92-835-0255-8) Avail: NTIS HC A24/MF A01

Simulation techniques and their applications to avionics and command, control, and communication systems associated with airborne operations are addressed. Modeling methodology, experimentation, validation, and applications are covered. Emphasis is on avionics and airborne command and control, including the range from large-scale force-effectiveness and air defense simulations through flight simulators and real time avionics simulations.

N80-19817# Department of the Air Force, Washington, D.C. Tactical Systems Div.

### **THEATER AIR DEFENSE ENGAGEMENT SIMULATION-COMMAND/CONTROL/COMMUNICATIONS (TADENS-C(3)) AN APPROACH TO THEATER AIR DEFENSE MODEL/METHODOLOGY DEVELOPMENT**

Urban H. D. Lynch *In* AGARD Modeling and Simulation of Avionics Systems and Command, Control and Commun. Jan. 1980 13 p

Avail: NTIS HC A24/MF A01

The theater air defense engagement simulation-command/control/communications (TADENS-C(3)) is a theater air defense model/methodology development whose goal is to timely produce a 'credible, agreeable, and usable' model/methodology to address tactical (strategic) theater air defense and its associated problems/issues. The model development scope is presented. R.E.S.

N80-19924# Hanford Engineering Development Lab., Richland, Wash.

### **PERFORMANCE MEASUREMENT SYSTEM: RECENT SYSTEMS DEVELOPMENT AND APPLICATIONS**

R. A. Rigney 28 Mar. 1979 15 p refs Presented at 6th Internet Intern. Management System Assoc. Meeting, Garmisch-Partenkirchen, West Germany, 24 Sep. 1979 (Contract EY-76-C-14-2170)

(HEDL-SA-1826-FP; CONF-790988-1) Avail: NTIS HC A02/MF A01

The performance measurement system (PMS), a system for managing a given project or program, is described. This system incorporates the value earned for work accomplished approach. Development and application of this system is discussed under the following headings: PMS vs conventional management control systems; PMS implementation on a project/program; PMS data elements (organization, planning and budgeting, accounting, analysis, reports and performance measurement data elements); PMS applications (FFTF, CRBRP, FMEF, and FMIT). DOE

### N80-19979# Desmatics, Inc., State College, Pa. **AN APPROACH FOR PROVIDING MORE ACCURATE PROBABILITY ASSESSMENTS**

Dennis E. Smith and Robert L. Gardner May 1978 104 p refs

(Contract DAHC19-76-C-0045; DA Proj. 2Q7-61102-B-74F) (AD-A077994; ARI-TR-78-B7) Avail: NTIS HC A06/MF A01 CSCL 12/1

This report describes a possible approach for providing more accurate probability assessments in those real-world decision-making situations for which relative frequency information generally does not exist. In this approach an estimated functional relationship is obtained from a comparison, in relative frequency base (RFB) problems, of a person's posterior probability assessments with the true posterior probabilities. Then, the functional relationship is used as a model to provide probability predictions for new problems by adjusting the person's corresponding probability assessments. Experimental evidence indicates that the resulting models can provide satisfactory probability predictions for problems having identical structure to those used in model construction. At this time, some obstacles prevent immediate use of these models for probability prediction in non-relative frequency base (NRFB) problems. However, it would be unwise to discount the feasibility of developing a practical RFB-based model for adjusting real-world probability estimates until the approach were tested with participants and problems in a field of common expertise (such as intelligence analysis or weather forecasting, for example) where more uniformity of background and experience exists. GRA

### N80-19980# Naval Postgraduate School, Monterey, Calif. **GROUP DECISION MAKING WITH FEEDBACK M.S. Thesis**

Amnon Tamir (Israeli Air Force) Sep. 1979 120 p refs (AD-A078159) Avail: NTIS HC A06/MF A01 CSCL 05/10

A computer tool is developed for the purpose of eliciting group utilities for multiple attributes of one complex system relative to a base line. The procedure accommodates multiple users simultaneously providing anonymous feedback to each user to aid in the process of assessing utilities. The procedure provides complete visibility to a manager (umpire) of changes to the data base, so that the process can be monitored in real time. The software is written so that it is completely self-documented and user friendly. GRA

### N80-19981# Naval Postgraduate School, Monterey, Calif. **COMPETITION IN THE ACQUISITION OF MAJOR WEAPONS SYSTEMS M.S. Thesis**

Benjamin Russell Sellers Sep. 1979 128 p refs (AD-A078268) Avail: NTIS HC A07/MF A01 CSCL 05/1

The objectives of this research are: (1) to examine the desirability of competition as expressed by current leaders in the field of major systems acquisition in DOD, in Congress, and in private industry; (2) to evaluate the adequacy of the guidance provided by the current acquisition instructions concerning the need, and the methods available, for generating competition in the acquisition of major weapon systems; and (3) to provide recommendations for improving the guidance contained in the instructions, including the development of a model to aid in making decisions regarding production competition. The results of this research indicate that competition is highly desirable, but that the subject is not adequately addressed in the current instructions. The major contribution of the study is the development of a production competition decision-making model which is presented in Chapter V. This chapter presents the benefits and various methods of obtaining a second production source. Also included is a discussion of the factors which influence

the second sourcing decision and a model for determining which of the second sourcing methods, if any, is best suited for any particular acquisition program. It is written as a stand-alone chapter for use as a desk-guide by program managers and/or contracting officers who are faced with making decisions regarding production competition. GRA

**N80-19990#** Jet Propulsion Lab., California Inst. of Tech., Pasadena.

**LOW-COST BUS-TUNNELS TO THE CENTRAL BUSINESS DISTRICT Final Report**

Bain Jr. Dayman Nov. 1979 61 p refs

(Contract DOT-AS-600019)

(UMTA-CA-06-0116-79-1; JPL-Pub-79-57) Avail: NTIS HC A04/MF A01

The feasibility of using small diameter unventilated, hence relatively inexpensive tunnels for bus links between the central business district and outlying areas was investigated. The tunnels selected were 16 1/2 ft. inside diameter, the same as a single-track tunnel conventionally used for recently constructed U.S. subway rail systems. Concentration levels of exhaust emissions were within acceptable limits to a capacity of 150 diesel buses per hour for a one route-mile bus-tunnel; for a two route-mile tunnel, 54 buses per hour were acceptable. The costs of such an underground guideway are moderate (\$16M per route-mile with simultaneous operation in both directions). Such a guideway can serve as a precursor to a Metro system since it can be converted to use by rail vehicles with little additional cost. An underground station is not mandatory to the bus-tunnel concept. A.R.H.

**N80-20003\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

**CONFERENCE OF REMOTE SENSING EDUCATORS (CORSE-78)**

Washington Mar. 1978 664 p refs Conf. held at Stanford, Calif., 26-30 Jun. 1978

(NASA-CP-2102; A-7755) Avail: NTIS HC A99/MF A01

CSCL 051

Ways of improving the teaching of remote sensing students at colleges and universities are discussed. Formal papers and workshops on various Earth resources disciplines, image interpretation, and data processing concepts are presented. An inventory of existing remote sensing and related subject courses being given in western regional universities is included.

**N80-20008\*#** South Dakota State Univ., Brookings. Remote Sensing Inst.

**REMOTE SENSING RESEARCH ACTIVITIES RELATED TO ACADEMIC INSTITUTIONS**

Victor I. Myers In NASA. Ames Res. Center Conf. of Remote Sensing Educators (CORSE-78) Mar. 1980 p 135-164 refs

Avail: NTIS HC A99/MF A01 CSCL 051

The role of research in the educational setting is discussed. Curriculum developments for integrating teaching and research are described. Remote sensing technology is used as an example of bridging the gap between research and application. Recommendations are presented for strengthening research groups. R.E.S.

**N80-21039#** California Univ., Los Angeles. Graduate School of Management.

**GUIDELINES FOR EVALUATION OF MINICOMPUTER HARDWARE AND SOFTWARE: A USERS PERSPECTIVE**

Bennet P. Lientz Dec. 1979 49 p refs

(Contract N00014-75-C-0266)

(AD-A078460) Avail: NTIS HC A03/MF A01 CSCL 09/2

Guidelines are presented for the evaluation and selection of hardware and system software for minicomputers. The evaluation is presented from a non-technical user point of view as opposed to a detailed technical comparison. The issues covered include defining an approach for computing, acquiring a minicomputer

system, negotiation with vendors, installation and operation. Case examples are given along with examples of failure. GRA

**N80-21134#** Reynolds Electrical and Engineering Co., Inc., Las Vegas, Nev.

**OPERATIONAL RADIOACTIVE WASTE MANAGEMENT PLAN FOR THE NEVADA TEST SITE**

Jul. 1979 44 p Prepared in cooperation with DOE, Las Vegas, Nev.

(Contract EY-76-C-08-0410)

(NVO-185-Rev-1) Avail: NTIS HC A03/MF A01

Procedures and methods for the safe receiving, processing, disposal, or storage of radioactive waste are presented. Nevada test site radioactive waste disposition program guidelines, procedures for radioactive waste management, description of storage areas and facilities, and a glossary of specifications and requirements are included. DOE

**N80-21185#** Messerschmitt-Boelkow-Blohm G.m.b.H., Munich (West Germany).

**PLANNING AND CONTROL OF RESEARCH AND DEVELOPMENT PROJECTS WITH CONTRIBUTIONS FROM SPACE TECHNOLOGY [PLANUNG UND UEBERWACHUNG VON FORSCHUNGS- UND ENTWICKLUNGSPROJEKTEN]**

Bernd J. Madauss Nov. 1978 311 p refs Partly in GERMAN and ENGLISH

Avail: NTIS HC A14/MF A01

The principal planning and control methods are elaborated to include technical and engineering tasks, financial and personnel management. General rules are given which have come from not only the space program, but from management of such large engineering projects as the Caracas subway system. Annexes contain examples of forms and flow charts used as tools in such projects. Author (ESA)

**N80-21186#** General Technology Systems Ltd., London (England).

**STUDY AND IMPLEMENTATION OF AN ESA COMPUTERIZED PLANNING SYSTEM, PHASE 1. VOLUME 2: DATA FILES AND UPDATING**

P. Brunt, G. E. Hall, and L. W. Steines Jan. 1978 173 p 6 Vol.

(Contract ESA-3172/77-F-WMT)

(GTS-760972-Vol-2; ESA-CR(P)-1222-Vol-2) Avail: NTIS HC A08/MF A01

A computerized system which simulates the planning activities, formalizes the decision making process, and aids management information retrieval for the European Space Agency is described. It is indicated that the system permits the analysis of statistical cost data; the manipulation of price levels, currencies and cost elements, the prediction of national space expenditure capabilities and of the margin available for new projects, the selection and 'fitting' of projects into the margin, and the comparison of manpower requirements with forecast industrial capacity. Raw data files are provided as well as instructions for updating. Author (ESA)

**N80-21187#** General Technology Systems Ltd., London (England).

**STUDY AND IMPLEMENTATION OF AN ESA COMPUTERIZED PLANNING SYSTEM, PHASE 2. VOLUME 4: UPDATING OF SUBPROGRAMS ESA 1-5**

G. E. Hall, L. W. Steines, and P. Brunt Oct. 1978 82 p 6 Vol.

(Contract ESA-3172/77-F-WMY(SC))

(GTS-760972-Vol-4; ESA-CR(P)-1222-Vol-4) Avail: NTIS HC A05/MF A01

A computerized system has been defined and implemented which simulates the planning activities, formalizes the decision making process and aids management information retrieval for the European Space Agency. Five subprogram blocks permit the analysis of statistical cost data, the manipulation of price levels, currencies and cost elements, the prediction of national space expenditure capabilities and of the margin available for new projects; the selection and fitting of projects into the margin,

## N80-21188

and the comparison of manpower requirements with forecast industrial capacity. The detailed activities necessary for updating the planning system subprograms are given. Author (ESA)

**N80-21188#** General Technology Systems Ltd., London (England).

### **STUDY AND IMPLEMENTATION OF AN ESA COMPUTERIZED PLANNING SYSTEM, PHASE 2. VOLUME 5: PROJECT RETURNS AND BENEFITS**

P. Brunt, G. E. Hall, and W. Spiess Dec. 1978 154 p 6 Vol. (Contract ESA-3172/77-F-WMT) (GTS-760972-Vol-5; ESA-CR(P)-1222-Vol-5) Avail: NTIS HC A08/MF A01

A computerized system was defined and implemented which simulates the planning activities, formalizes the decision making process, and aids management information retrieval for the European Space Agency. Five subprogram blocks permit the analysis of statistical cost data; the manipulation of price levels, currencies and cost elements; the prediction of national space expenditure capabilities and of the margin available for new projects; the selection and 'fitting' of projects into the margin; and the comparison of manpower requirements with forecast industrial capacity. The definition and programming of the segment of the program dealing with the evaluation of project returns and benefits are presented. The functions foreseen for the program in use, program structure, coding instructions, and description of subprograms are included. Author (ESA)

**N80-21189#** General Technology Systems Ltd., London (England).

### **STUDY AND IMPLEMENTATION OF AN ESA COMPUTERIZED PLANNING SYSTEM. EXECUTIVE SUMMARY**

P. Brunt and G. E. Hall Oct. 1978 32 p 6 Vol. (Contract ESA-3172/77-F-WMT) (GTS-760972-Vol-6; ESA-CR(P)-1222-Vol-6) Avail: NTIS HC A03/MF A01

A computerized system was defined and implemented which simulates the planning activities, formalizes the decision making process, and aids management information retrieval for the European Space Agency. Subprogram blocks which permit the analysis of statistical cost data, the manipulation of price levels, currencies and cost elements, the prediction of national space expenditure capabilities and of the margin available for new projects, the selection and 'fitting' of projects into the margin, and the comparison of manpower requirements with forecast industrial capability are described. Subprograms which provide the additional capability to evaluate project returns and benefits are also discussed. Author (ESA)

**N80-21190\*** National Aeronautics and Space Administration, Washington, D. C.

### **NASA PATENT ABSTRACTS BIBLIOGRAPHY. A CONTINUING BIBLIOGRAPHY. SECTION 1: ABSTRACTS, SUPPLEMENT 16**

Jan. 1980 59 p (NASA-SP-7039(16)) Avail: NTIS HC \$8.50 CSCL 05B

Abstracts are cited for 138 patents and patent applications introduced into the NASA scientific and technical information system during the period July 1979 through December 1979. Each entry consists of a citation, an abstract, and in most cases, a key illustration selected from the patent or patent application. J.M.S.

**N80-21193#** National Technical Information Service, Springfield, Va.

### **MANAGEMENT INFORMATION SYSTEMS, VOLUME 2. A BIBLIOGRAPHY WITH ABSTRACTS Progress Report, Nov. 1977 - Nov. 1979**

Jack E. Jones Dec. 1979 133 p Supersedes NTIS/PS-78/1069; NTIS/PS-77/0918; NTIS/PS-76/0779; NTIS/PS-75/601 (PB80-802739; NTIS/PS-78/1069; NTIS/PS-77/0918; NTIS/PS-76/0779; NTIS/PS-75/601) Avail: NTIS HC \$30.00/MF \$30.00 CSCL 05B

General studies as well as application studies in the fields of transportation, education, personnel management, and military

sciences are cited. This updated bibliography contains 126 abstracts, 65 of which are new entries to the previous edition. GRA

### **N80-21194#** Capital Systems Group, Rockville, Md. **THE IMPACT OF BEHAVIORAL AND TECHNICAL INFORMATION INTERVENTIONS ON INDUSTRIAL R AND D PROJECTS Final Report**

Edwin E. Olson, Elizabeth C. Fake, Dale G. Lake, and Brigitte D. Huybrechts 15 Nov. 1979 214 p

(Grant NSF DSI-77-18073) (PB80-110265) Avail: NTIS HC A10/MF A01 CSCL 05B

The acquisition, use, and transfer of information both within the research and development lab and between the research and development lab and the engineering and manufacturing divisions in one company were investigated. The experiments included information searches for individual projects, information specialists joining project teams, workshops to improve the management of information, and improved communication between research and development scientists and engineers and their clients in the operating divisions. Findings about the correlation of behavioral and technological changes in technical information and the quality of research and development results, and implications for augmenting existing formal and informal channels of communication are discussed. GRA

**N80-21196#** Union Carbide Corp., Oak Ridge, Tenn. Computer Sciences Div.

### **DESCRIPTION OF DATA ENTRY FOR AUTOMATED COST ESTIMATING**

N. H. VanWie Oct. 1979 40 p (Contract W-7405-eng-26)

(K/CSD/TM-29-Rev-1) Avail: NTIS HC A03/MF A01

A series of computer programs, developed to aid the computational and reporting phases of preparing a project cost estimate are presented. The data base for a project is subdivided into three types of data or files: a title file, a nucleus file, and a file of cost sheets with optional schedules. The data requirements and formatting specifications for preparation of these files are described. Examples are presented and alternative approaches to accomplish an end result are explained. DOE

**N80-21199#** Committee on Commerce, Science, and Transportation (U. S. Senate).

### **PATENT POLICY, PART 2**

Washington GPO 1980 110 p refs Joint Hearings before Comm. on Commerce, Sci., and Transportation and the Comm. on the Judiciary, 96th Congr., 2d Sess., 25 Jan. 1980 (GPO-58-551) Avail: Comm. on Commerce, Sci., and Transportation

Legislation and corresponding testimony concerning Federal policy for allocating patent rights to exploit inventions made in the course of government-sponsored research and development is presented. Emphasis is placed on stimulating the industrial innovation process by contributing to more effective utilization of such inventions. J.M.S.

### **N80-21206#** Cambridge Systematics, Inc., Mass. **URBAN TRANSPORTATION ENERGY CONSERVATION:**

#### **CASE CITY APPLICATIONS OF ANALYSIS METHODOLOGIES, VOLUME 3 Final Report, Jul. 1976 - Sep. 1978**

T. J. Atherton and J. H. Suhrbier Oct. 1979 160 p refs (Contract EM-76-C-01-8628)

(DOE/PE/8628-1-Vol-3) Avail: NTIS HC A08/MF A01

Disaggregate travel demand methodologies were applied to the analysis of potential energy conservation strategies in three urban areas: Denver, Colorado; Fort Worth, Texas; and San Francisco, California. The methodologies are sketch planning in nature and include the forecasting of changes in automobile ownership; work trip model shares by drive alone, shared ride, and transit; nonwork trip frequency, destination, and mode choice; fuel consumption and vehicle emissions. Policies analyzed include those related as employer based ride sharing, parking management, transit, pricing, and traffic operations. Considerable variations in

the potential effectiveness was found, among the three urban areas, depending in large part on the availability of alternative travel modes such as transit. Descriptions are provided of the individual policy analyses performed, the methods by which example policies were analyzed, the necessary data preparation activities, and the procedures used to adapt the set of travel demand models to the unique conditions of each of the three metropolitan areas. DOE

**N80-21207#** Cambridge Systematics, Inc., Mass.  
**URBAN TRANSPORTATION ENERGY CONSERVATION: ANALYTIC PROCEDURES FOR ESTIMATING CHANGES IN TRAVEL DEMAND AND FUEL CONSUMPTION, VOLUME 2 Final Report, Jul. 1976 - Sep. 1978**

T. J. Atherton and J. H. Suhrbier Oct. 1979 153 p refs  
 (Contract EM-76-C-01-8628)

(DOE/PE/8628-1-Vol-2) Avail: NTIS HC A08/MF A01

Analytical tools used to evaluate the effectiveness of alternative transportation policies in achieving reductions in overall fuel consumption are presented. To ensure a high measure of accuracy, the analysis goes beyond the first order effects, i.e., the shift from single occupant autos as the mode chosen for the work trip to more fuel efficient means of travel. Questions treated include what will happen with the autos left at home as a result of increased carpooling for work trips. The methodology developed links together several disaggregate travel demand models to predict auto ownership, work trip mode choice, and nonwork travel demands. The theoretical basis for the travel demand models used is introduced. These models and their linkages both with each other and with the various submodels are described. The assumptions made in developing the model system and using it to forecast responses to alternative transportation policies are included. Emphasis is placed on the conceptual framework of the model system and specification of the individual models and submodels. DOE

**N80-21208#** Cambridge Systematics, Inc., Mass.  
**ANALYTICAL PROCEDURES FOR URBAN TRANSPORTATION ENERGY CONSERVATION: SUMMARY OF FINDINGS AND METHODOLOGIES, VOLUME 1 Final Report, Jul. 1976 - Apr. 1979**

J. H. Suhrbier and W. D. Byrne Oct. 1979 54 p refs 5 Vol.  
 (Contract EC-76-C-01-8628)

(DOE/PE/8628-1-Vol-1) Avail: NTIS HC A04/MF A01

Analytical methodologies are described and illustrated for use in analyzing the energy conservation potential of candidate urban transportation measurements. Quantitative methodologies oriented to carpooling, vanpooling, transit, pricing, traffic regulation and control, and auto ownership are provided based on the use of disaggregate behavioral travel demand models. Changes are indicated in trip frequency and distribution as well as in travel model, operating conditions, and vehicle miles of travel. Trip-based estimates of fuel consumption and vehicle emissions are included. The methodologies employ manual sketch planning procedures, a programmable calculator, or a fully-calibrated computer program utilizing a random sample household enumeration forecasting technique. The developed methodologies were applied in cooperation with metropolitan planning organizations representing the Dallas-Fort Worth, San Francisco, and Denver urban areas. DOE

**N80-21214#** Massachusetts Univ., Amherst. Water Resources Research Center.

**URBANIZATION AND WATER QUALITY PLANNING: THE 208 EXPERIENCE IN MASSACHUSETTS**

Harry E. Schwarz, Brandon B. Johnson, Robert J. Caiazzo, and Debra E. Pincus Jan. 1979 146 p refs Prepared in cooperation with Clark Univ., Worcester, Mass.  
 (Contract DI-14-34-0001-8023)

(PB80-106743; W80-00870; Pub-104; OWRT-A-104-Mass(1))  
 Avail: NTIS HC A07/MF A01 CSCL 13a

The degree of urbanization in an area that would affect the scope of the planning process, public participation in planning, and the plan itself was examined. Three measures of urbanization were used: the percentage of the region in urban land use; the proportion of the population served by sewers; and the population

density. Each of these was an independent variable in assessing the interregional variation of attributes of the plans and of the planning process. It was found that the degree of urbanization does not appear to have been a significant factor in the 208 planning process. GRA

**N80-21215#** Public Technology, Inc., Washington, D. C.  
**PRIORITY R AND D NEEDS OF URBAN AMERICA, RESOURCE DOCUMENT**

1979 22 p

(Grant NSF ISP-76-11055)

(PB80-106164; NSF/RA-790191)

Avail: NTIS

HC A02/MF A01 CSCL 13B

Priority statements for 1977 and 1978 of ten Task Forces on the Urban Consortium for Technology Initiatives are reported. The Consortium is a national cooperative of 36 cities and urban counties established to identify research and development needs of urban governments and to channel resources into the most critical areas. By identifying and establishing priorities for urban needs the Consortium provides local governments with a structured means of working together with the nation's R & D resources. Networking of local governments also provides a collective purchasing power. Priority needs were identified by each of the following Task Forces: Community and Economic Development; Criminal Justice; Energy Environmental Services; Fire Safety and Preparedness; Health; Human Resources; Management (finance and personnel); Public Works and Public Utilities; and Transportation. A precis of each listed need is included. GRA

**N80-21221#** American Society of Civil Engineers, New York. Urban Water Resources Research Council.

**CHALLENGES IN URBAN RUNOFF CONTROL (PLANNING, IMPLEMENTATION AND SIMULATION) Final Report**

M. B. McPherson Aug. 1979 47 p refs

(Grant NSF ENV-77-15668)

(PB80-107873; TM-37; NSF/RA-790172) Avail: NTIS

HC A03/MF A01 CSCL 13B

Areawide planning for water pollution management was undertaken in a majority of metropolitan areas. Urban runoff considerations were an issue in many of these areas. In an effort to promote long range conjunctive quantity and quality planning, a dozen seminars, workshops, and conferences hosted by areawide planning agencies were conducted. Responses to points raised at these presentations plus findings from the monitoring of four on-going local jurisdiction master planning projects are reported. The postponed role of stream standards and the implications of their future enforcement are examined. Plan flexibility, cost allocation, available technology, scale of investments and technical interrelationships are considered. GRA

**N80-21242#** RAND Corp., Santa Monica, Calif.

**THE REDUNDANCY OF SCHEDULED AND UNSCHEDULED MAINTENANCE Interim Report**

I. K. Cohen, T. S. Donaldson, and T. M. Rodriguez Sep. 1979 42 p refs

(Contract F49620-77-C-0023)

(AD-A076962; RAND/N-1258-AF)

Avail: NTIS

HC A03/MF A01 CSCL 01/3

This note concerns the extent to which aircraft scheduled and unscheduled maintenance are redundant. It investigates the extent to which Periodic Inspection items on the F-4 aircraft are made visible at the flight line during unscheduled aircraft maintenance. The study focuses on inspection tasks behind aircraft doors, and assumes that once a door is removed for maintenance activity, the inspection item is visible. Visibility or accessibility for condition monitoring is defined as the frequency of door removals. The total number of removals for each aircraft door was counted, and a probability model was used to estimate the probability that a door would be opened within a given inspection interval. The results of this study indicate that most of the F-4 Periodic Inspection tasks are accessible for condition monitoring on the flight line during unscheduled aircraft maintenance. The note discusses the implications of these results for inspection policy. GRA

## N80-21243

**N80-21243#** Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).

### THE USE OF COMPUTERS AS A DESIGN TOOL

Jan. 1980 445 p refs Partly in ENGLISH and FRENCH Flight Mech. Panel Symp. held at Neubiberg, West Germany, 3-6 Sep. 1979

(AGARD-CP-280; ISBN-92-835-0256-6) Avail: NTIS HC A19/MF A01

The positive and negative aspects of computerized aircraft design are considered including the cost and technical effectiveness, the benefits, and the difficulties and limitations of the whole process. Topics covered include: specifications and assessment of requirements; computer aided design and computer graphics; computational aerodynamics and design; structural analysis and design; and propulsion and system design.

**N80-21249#** Vereinigte Flugtechnische Werke-Fokker G.m.b.H., Bremen (West Germany).

### SURVEY PAPER ON COMPUTER AIDED DESIGN

D. Weinhauer *In* AGARD The Use of Computers as a Design Tool Jan. 1980 2 p

Avail: NTIS HC A19/MF A01

A review of a specialists' meeting on computer-aided design in production design is presented. Conclusions and proposals developed at the meeting are described. R.E.S.

**N80-21255#** British Aerospace Aircraft Group, Brough (England). **A FRAMEWORK FOR DISTRIBUTED DESIGN COMPUTING**

A. W. Bishop *In* AGARD The Use of Computers as a Design Tool Jan. 1980 10 p refs

Avail: NTIS HC A19/MF A01

Large, geographically dispersed design teams are now the norm in manufacturing industries. Computer systems are potentially useful for data storage, communications, interactive design, administrative functions and numerical calculations. A framework for the support of such applications systems in a dispersed environment against a background of rapidly changing hardware is described. R.E.S.

**N80-21362\*#** Jet Propulsion Lab., California Inst. of Tech., Pasadena.

### THE DEEP SPACE NETWORK Progress Report, Jan. - Feb. 1980

15 Apr. 1980 154 p refs

(Contract NAS7-100)

(NASA-CR-162857; JPL-PR-42-56) Avail: NTIS HC A08/MF A01 CSCL 22D

Deep Space Network progress in flight project support, tracking and data acquisition research and technology, network engineering, hardware and software implementation, and operations is presented.

**N80-21363\*#** Jet Propulsion Lab., California Inst. of Tech., Pasadena.

### NETWORK FUNCTIONS AND FACILITIES

N. A. Renzetti *In its* The Deep Space Network 15 Apr. 1980 p 1-3

Avail: NTIS HC A08/MF A01 CSCL 14B

The objectives, functions, and organization of the Deep Space Network are summarized; deep space station, ground communication, and network operations control capabilities are described. Author

**N80-21615#** Automated Management Systems, Inc., Lanham, Md.

### MASS TRANSIT METRICATION: A RECOMMENDED POLICY AND METRIC CONVERSION PLAN FOR UMTA Final Report

Jul. 1979 130 p refs

(Grant DOT-UT-80015)

(PB80-125008; UMTA-IT-0209-79-1)

HC A07/MF A01 CSCL 13B

Avail: NTIS

Some actions are suggested which the Urban Mass Transportation Administration, the American Public Transit Association, and the Department of Transportation can take to best fill the perceived needs of members of the mass transit industry, and at the same time, use the proven techniques learned by those who have successfully converted to the metric system. The use of metric units on new designs based on the cumulative cost approach is recommended. The metrication activities of some organizations and their problems and successes are examined. With those companies which have already begun implementation of the metric system, it was found that engineering standards exist for virtually all the needs of the organization impacted by UMTA. GRA

**N80-21620#** Building Technology, Inc., Silver Spring, Md. **EVALUATION AND ANALYSIS OF CURRENT EFFECTIVE BUILDING AND FIRE PREVENTION CODE ADMINISTRATION AND ENFORCEMENT PROGRAMS Final Report**

John G. Degenkolb 31 Aug. 1979 236 p

(Contract FA-78-1030)

(PB80-125974) Avail: NTIS HC A11/MF A01 CSCL 13L

Nine communities recognized as having especially effective code administration and enforcement programs were analyzed. The analysis produced a list of essential features which should be present in an effective program, and a list of features which might improve the effectiveness of a code administration and enforcement program under certain conditions. The study divided the code administration and enforcement processes into a new building development and construction phase and a building maintenance and use phase. Techniques for improved productivity and communications also are included. GRA

**N80-21771#** National Bureau of Standards, Washington, D.C. National Engineering Lab.

### IMAGE PATTERN RECOGNITION IN INDUSTRIAL INSPECTION

Gordon J. VanderBrug and Roger N. Nagel Sep. 1979 49 p refs

(PB80-108871; NBSIR-79-1764)

HC A03/MF A01 CSCL 13H

Avail: NTIS

The labor cost of manual inspection and the high cost of special purpose part delivery systems for robots led many manufacturers to investigate vision systems for use in manufacturing. Digital image processing and pattern recognition are providing the basis for a growing number of attempts to achieve an automated vision system. An historical perspective on image processing and pattern recognition is presented and state of the art examples of visual inspection systems, and robot vision systems is discussed. A list of other areas in manufacturing for the application of vision systems is included along with an assessment of the future of vision systems in manufacturing. GRA

**N80-21857#** Cambridge Systematics, Inc., Mass. **ANALYTIC PROCEDURES FOR URBAN TRANSPORTATION ENERGY CONSERVATION. VOLUME 1: SUMMARY OF FINDINGS AND METHODOLOGIES Final Report**

J. H. Suhrbier and W. D. Byrne Apr. 1979 40 p refs

(Contract EM-76-C-01-8628)

(Cons-8626-T1-Vol-1) Avail: NTIS HC A03/MF A01

Analytical methodologies are described and illustrated for use by metropolitan planning organizations and other state and local transportation agencies in analyzing the energy conservation potential of candidate urban transportation measures. Quantitative methodologies oriented to carpooling, vanpooling, transit, pricing, traffic regulation and control, and auto ownership are provided based on the use of disaggregate behavioral travel demand models. Changes are indicated in trip frequency and distribution as well as in travel model, operating conditions, and vehicle miles of travel. Trip-based estimates of fuel consumption and vehicle emissions are included. Application of the developed methodologies was performed in cooperation with metropolitan planning

organizations representing the Dallas-Fort Worth, San Francisco, and Denver urban areas. DOE

**N80-22120\*** National Aeronautics and Space Administration, Washington, D. C.

**NASA PATENT ABSTRACTS BIBLIOGRAPHY, A CONTINUING BIBLIOGRAPHY, SECTION 2: INDEXES, SUPPLEMENT 16**

Jan. 1980 646 p  
(NASA-SP-7039(16)-Section-2) Avail: NTIS  
HC A99/MF A01 CSCL 05B

Citations of patents and patent applications for the period May 1969 through December 1979 are indexed according to subject, invention, source, U. S. patent number, and accession number. A.R.H.

**N80-22126#** Committee on Science and Technology (U. S. House).

**AUTHORIZING APPROPRIATIONS TO THE NATIONAL AERONAUTICS AND SPACE ADMINISTRATION**

Washington GPO 1980 254 p ref Rept. to accompany H.R. 6413 presented to the Comm. on Sci. and Technol., 96th Congr., 2nd Sess., 22 Apr. 1980  
(H-Rept-96-899; GPO-58-716) Avail: Comm. on Science and Technology

Recommended amendments to the bill to authorize appropriations to the National Aeronautics and Space Administration for research and development, construction of facilities, and research and program management, and for other purposes are presented. A.R.H.

**N80-22128#** Bradford National Corp., Washington, D.C.  
**ADVANCED AUTOMOTIVE PROPULSION SYSTEMS: INCENTIVE FINANCING**

Washington, D. C. DOE Feb. 1979 60 p refs  
(Contract EM-78-C-01-5181)  
(CONS-5181-1) Avail: NTIS HC A04/MF A01

The need for Federal guarantees of financial obligations for advanced automotive propulsion systems research, development, demonstrations, and commercial availability was surveyed in order to facilitate development and rapid implementation of AAPS energy conservation programs. Results of the survey are presented along with a background review of the complexities of AAPS and of financial incentives. Conclusions and recommendations are given. J.M.S.

**N80-22129#** Transportation Research Board, Washington, D.C.  
**URBAN SYSTEMS OPERATIONS**

Mohamed S. Ahmed, Allen R. Cook, Ronald H. Borowski, Mathtys P. Cilliers, and Adolf D. May May 1979 124 p refs  
(PB80-125818; TRB/TRR-722; LC-79-607234;  
ISBN-0-309-02972-4; ISSN-031-1981) Avail: NTIS  
HC A06/MF A01; paper copy also available from Transportation Research Board, 2101 Constitution Ave., NW, Washington, D.C. 20418 CSCL 13B

Techniques used in various cities for reducing automobile traffic in sensitive areas and for managing freeway traffic are described, as well as the planning of rail station parking. Algorithms for detecting freeway incidents, the development of a model for freeway priority lanes, and the simulation of freeway traffic are also discussed. Improved air quality and other results of implementing transportation system management are evaluated. A.R.H.

**N80-22283\*#** National Aeronautics and Space Administration, Ames Research Center, Moffett Field, Calif.

**RESOURCE MANAGEMENT ON THE FLIGHT DECK**

George E. Cooper, ed., Maurice D. White, ed. (Cooper (George E.), Saratoga, Calif.), and John K. Lauber, ed. Mar. 1980 247 p ref Proceedings of a NASA/Industry Workshop, San Francisco, 26-28 Jun. 1979  
(NASA-CP-2120) Avail: NTIS HC A11/MF A01 CSCL 05J

Several approaches to the training and selection of aircrew are presented including both industry and nonindustry perspec-

tives. Human factor aspects of the problem are also examined with specific emphasis on the psychology of the flight deck situation.

**N80-22284\*#** Texas Univ. at Austin.

**SOCIAL PSYCHOLOGY ON THE FLIGHT DECK**

Robert L. Helmreich *In* NASA, Ames Res. Center Resource Management on the Flight Deck. Mar. 1980 p 17-30

Avail: NTIS HC A11/MF A01 CSCL 05J

Social psychological and personality factors that can influence resource management on the flight deck are discussed. It is argued that personality and situational factors intersect to determine crew responses and that assessment of performance under full crew and mission conditions can provide the most valuable information about relevant factors. The possibility of training procedures to improve performance on these dimensions is discussed. Author

**N80-22285\*#** Harvard Univ., Cambridge, Mass. Graduate School of Education.

**AVIATION ACCIDENTS AND THE THEORY OF THE SITUATION**

Lee Bolman *In* NASA, Ames Res. Center Resource Management on the Flight Deck Mar. 1980 p 31-58 refs

Avail: NTIS HC A11/MF A01 CSCL 05J

*Social-psychological factors effecting the performance of flight crews* are examined. In particular, a crew member's perceptual-psychological constructs of the flight situation (theories of the situation) are discussed. The skills and willingness of a flight crew to be alert to possible errors in the theory become critical to their effectiveness and their ability to ensure a safe flight. Several major factors that determine the likelihood that a faulty theory will be detected and revised are identified. M.G.

**N80-22286\*#** United Air Lines, Inc., Denver, Colo.

**FLIGHT SELECTION AT UNITED AIRLINES**

William Traub *In* NASA, Ames Res. Center Resource Management on the Flight Deck Mar. 1980 p 61-75

Avail: NTIS HC A11/MF A01 CSCL 05I

Airline pilot selection procedures are discussed including psychological and personality tests, psychomotor performance requirements, and flight skills evaluation. Necessary attitude and personality traits are described and an outline of computer selection, testing, and training techniques is given. M.G.

**N80-22287\*#** British Airways, Middlesex (England).

**BRITISH AIRWAYS' PRE-COMMAND TRAINING PROGRAM**

L. F. J. Holdstock *In* NASA, Ames Res. Center Resource Management on the Flight Deck Mar. 1980 p 76-86

Avail: NTIS HC A11/MF A01 CSCL 05I

Classroom, flight simulator, and in-flight sessions of an airline pilot training program are briefly described. Factors discussed include initial command potential assessment, precommand airline management studies course, precommand course, and command course. M.G.

**N80-22289\*#** Swissair, Zurich (Switzerland).

**CAPTAINS' TRAINING AT SWISSAIR**

N. Grob *In* NASA, Ames Res. Center Resource Management on the Flight Deck Mar. 1980 p 97-106

Avail: NTIS HC A11/MF A01 CSCL 05I

The objectives, crucial points, and problems of the individual phase of the captain's basic training are examined. The prerequisites to pilot selection are given as well as a generalized outline of pilot career progression. R.C.T.

**N80-22290\*#** Eastern Air Lines, Inc., Miami, Fla.

**LINE-ORIENTED FLIGHT TRAINING**

Berton E. Beach *In* NASA, Ames Res. Center Resource Management on the Flight Deck Mar. 1980 p 107-118

Avail: NTIS HC A11/MF A01 CSCL 05I

## N80-22291

Some of the concepts related to a line-oriented flight training program are discussed. The need to shift from training in manipulative skills to something closer to management skills is emphasized. The program is evaluated in terms of its realistic approaches which include the simulator's optimized motion and visual capabilities. The value of standard operating procedures as they affect the line pilot in everyday operations are also illustrated. R.C.T.

**N80-22291\*#** United Air Lines, Inc., Denver, Colo.  
**FLIGHT MANAGER AND CHECK-AIRMAN TRAINING**  
J. E. Carroll *In* NASA Ames Res. Center Resource Management on the Flight Deck Mar. 1980 p 119-132

Avail: NTIS HC A11/MF A01 CSCL 051

An analysis of industry incidents, accidents, and related human factors research is given. The need to develop more effective resource management training for the flight deck crewmembers is discussed with specific emphasis on flight manager and check-airman training. R.C.T.

**N80-22292\*#** North Central Airlines, Inc., Minneapolis, Minn.  
**LEFT SEAT COMMAND OR LEADERSHIP FLIGHT, LEADERSHIP TRAINING AND RESEARCH AT NORTH CENTRAL AIRLINES**

Gramer C Foster and Michael C. Garvey (Garvey (M. C.) and Associates, Inc.) *In* NASA Ames Res. Center Resource Management on the Flight Deck Mar. 1980 p 133-146 refs

Avail: NTIS HC A11/MF A01 CSCL 05J

The need for flight leadership training for flight deck crewmembers is addressed. A management grid is also described which provides a quantitative management language against which any number of management behaviors can be measured. R.C.T.

**N80-22376\*#** Rockwell International Corp., Downey, Calif.  
Space Operations and Satellite Systems Div.  
**SPACE CONSTRUCTION SYSTEM ANALYSIS. PART 2: COST AND PROGRAMMATICS Final Report**  
F. W. VonFlue and W. Cooper Apr. 1980 76 p  
(Contract NAS9-15718)  
(NASA-CR-160580; SSD-80-0039-Pt-2) Avail: NTIS HC A05/MF A01 CSCL 22A

Cost and programmatic elements of the space construction systems analysis study are discussed. The programmatic aspects of the ETVP program define a comprehensive plan for the development of a space platform, the construction system, and the space shuttle operations/logistics requirements. The cost analysis identified significant items of cost on ETVP development, ground, and flight segments, and detailed the items of space construction equipment and operations. A.W.H.

**N80-22719#** Sandia Labs., Albuquerque, N. Mex.  
**APPLICATIONS OF QUALITY ASSURANCE/QUALITY CONTROL CONCEPTS TO NON-HARDWARE PROJECT MANAGEMENT**

Joseph F. Calek Oct. 1979 63 p refs  
(Contract EY-76-C-04-0789)  
(SAND-79-1921) Avail: NTIS HC A04/MF A01

The concepts of quality assurance and quality control, developed over 40 years ago for high quantity production of hardware, are now routinely and effectively applied to complex one-of-a-kind projects such as design and construction of nuclear power plants. Currently, quality assurance and quality control are being applied to projects where outputs are less tangible, e.g., software, services, technical judgements. To date, this latest application has resulted in some notable successes. DOE

**N80-22720#** European Space Research and Technology Center, Noordwijk (Netherlands). Product Assurance Div.  
**REQUIREMENTS FOR A COMPONENT QUALITY-CONTROL AND PROCUREMENT PROGRAM**

Paris ESA Nov. 1979 22 p  
(ESA-PSS-54/QRC-01-ESTEC-Iss-1) Avail: NTIS HC A02/MF A01

A specification is presented which sets forth the minimum requirements of a component quality control and procurement program applicable to projects of the European Space Agency. It is to be applied by contractors and sub-tier contractors to all ESA contracts for development, fabrication and delivery of spacecraft and associated equipment in which the use of components with specific reliability/quality requirements is mandatory. Author (ESA)

**N80-22788\*#** National Aeronautics and Space Administration, Lewis Research Center, Cleveland, Ohio.  
**THERMAL ENERGY STORAGE: FOURTH ANNUAL REVIEW MEETING**

Mar. 1980 650 p refs Meeting held at Tysons Corner, Va., 3-4 Dec. 1979; sponsored by DOE  
(NASA-CP-2125; E-428; CONF-791232) Avail: NTIS HC A99/MF A01 CSCL 10C

The development of low cost thermal energy storage technologies is discussed in terms of near term oil savings, solar energy applications, and dispersed energy systems for energy conservation policies. Program definition and assessment and research and technology development are considered along with industrial storage, solar thermal power storage, building heating and cooling, and seasonal thermal storage. A bibliography on seasonal thermal energy storage emphasizing aquifer thermal energy is included.

**N80-22790\*#** National Aeronautics and Space Administration, Lewis Research Center, Cleveland, Ohio.

**PROGRAM DEFINITION AND ASSESSMENT OVERVIEW**  
Larry H. Gordon *In its* Thermal Energy Storage Mar. 1980 p 38-41 refs

Avail: NTIS HC A99/MF A01 CSCL 10B

The implementation of a program level assessment of thermal energy storage technology thrusts for the near and far term to assure overall coherent energy storage program is considered. The identification and definition of potential thermal energy storage applications, definition of technology requirements, and appropriate market sectors are discussed along with the necessary coordination, planning, and preparation associated with program reviews, workshops, multi-year plans and annual operating plans for the major laboratory tasks. J.M.S.

**N80-22983** Illinois Univ. at Urbana-Champaign.  
**MODELS OF HUMAN DECISION MAKING IN MULTI-TASK SITUATIONS: EVENT DETECTION, ATTENTION ALLOCATION, AND IMPLICATIONS FOR COMPUTER AIDING Ph.D. Thesis**

Joel Sandor Greenstein 1979 120 p  
Avail: Univ. Microfilms Order No. 8009048

Human decision making in multi-task situations is discussed. Mathematical models of human event detection and attention allocation performance in multi-task situations were developed and validated in a specific multiple process monitoring situation. The implications these models have for the design and implementation of computer aided decision making systems are also discussed. Dissert. Abstr.

**N80-22985\*#** National Aeronautics and Space Administration, Ames Research Center, Moffett Field, Calif.  
**PROBLEM SOLVING AND DECISIONMAKING: AN INTEGRATION**

Duncan L. Dieterly Apr. 1980 20 p refs Prepared in cooperation with Air Force Human Resources Lab., Moffett Field, Calif.  
(NASA-TM-81191; AFHRL/H80-103; A-8160) Avail: NTIS HC A02/MF A01 CSCL 05J

An attempt was made to redress a critical fault of decisionmaking and problem solving research-a lack of a standard method to classify problem or decision states or conditions. A basic model was identified and expanded to indicate a possible taxonomy of conditions which may be used in reviewing previous research or for systematically pursuing new research designs. A generalization of the basic conditions was then made to indicate that the conditions are essentially the same for both concepts, problem solving and decisionmaking. R.E.S.

**N80-23040#** National Aerospace Lab., Amsterdam (Netherlands). Scientific Services Div.

**COST ESTIMATION AND MANAGEMENT CONTROL OF SOFTWARE DEVELOPMENT IN SCIENTIFIC/TECHNICAL PROJECTS**

U. Posthuma deBoer 31 May 1979 150 p refs  
(Contract NIVR-1831)

(NLR-TR-78056-U) Avail: NTIS HC A07/MF A01

Cost estimation of software development and the monitoring and control of factors which affect the development cost is considered. The lack of uniformity in the development approach, the lack of a standard terminology and the limited, difficult to access, cost data bases are included. A cost estimation approach is presented together with a survey of factors affecting the cost of software development, illustrated with figures. To keep these cost factors manageable, a configuration management system is proposed, partly based on procedures and tools already in use for hardware development. Procedures and tools for software configuration management and for related aspects as software testing are described and illustrated with examples from software development projects. Author (ESA)

**N80-23086** New Mexico State Univ., University Park.

**STABILITY OF LARGE-SCALE SYSTEMS Ph.D. Thesis**

Helen Alexandra Ryaciotaki-Boussalis 1980 159 p  
Avail: Univ. Microfilms Order No. 8007674

The stability of classes of large scale systems, consisting of multiterminal, nonlinear, time varying components is examined. Both continuous and discrete time systems are considered. The stability analysis of the interconnected system is determined in terms of the properties of the individual components and their interconnection patterns. Scalar and vector Lyapunov functions are constructed for the composite systems in terms of Lyapunov functions of the subsystems, the system structure, and a parameter vector. The stability criteria derived guarantee the stability of the interconnected system and are given in forms which are well suited for digital computation and design. Several examples are given for illustration. Dissert. Abstr.

**N80-23195** Pennsylvania Univ., Philadelphia.

**AN INTERACTIVE PROCESS FOR HIERARCHICAL DECISION MAKING INCORPORATING THE MULTIPLE OBJECTIVES OF EACH PARTICIPANT Ph.D. Thesis**

Robert Lee Banker 1979 215 p

Avail: Univ. Microfilms Order No. 8009383

A process which extends the concept of multiple criteria decision making to include the multiple objective used perspective of more than a single decision making entity is described. First, the identities of the decision makers are established, objectives with respect to the problem are determined, and how those objectives are related to decision variables is investigated. Next, each decision maker brings implicit preferences to bear on the problem by the use of an interactive satisfying procedure within the set of pareto-optimal alternatives. A final compromise solution to the problem is made by the top level decision makers in light of this information. An algorithm is developed to generate the set of Pareto-optimal alternatives for multiple objective linear programming problems with integer valued variables. Dissert. Abstr.

**N80-23196** George Washington Univ., Washington, D. C.

**SYNTHESIS OF A THEORETICAL APPROACH FOR EMPLOYING ADAPTIVE CONFIGURATION MANAGEMENT IN AERONAUTICAL WEAPON SYSTEM PROGRAMS Ph.D. Thesis**

Angelo John DiMascio 1979 426 p

Avail: Univ. Microfilms Order No. 8008364

A unified systems approach for managing aeronautical weapon system acquisition and life cycle support is discussed. The proposed holistic model provides a structured framework for integration of all of the technical and administrative elements associated with effective life cycle management. The primary integrative mechanism, which is used as the foundation module, is an expanded configuration management discipline. An adaptive configuration baseline management concept, when logically combined with basic integrated logistics management and research

and development processes by a tailored system engineering methodology, is required to mitigate the acquisition and support problems attendant to technology turnover. The adaptive characteristics and the tailoring emphasis are required not only to deal with the volatile state of technology but also to accommodate the continuously decreasing influence of the military markets on the components industries. Dissert. Abstr.

**N80-23197#** Oak Ridge Gaseous Diffusion Plant, Tenn. Operations Analysis and Planning Div.

**UTILIZATION OF PROBABILISTIC NETWORK ANALYSES IN PLANNING LONG-RANGE ENGINEERING PROJECTS**

D. W. Swindle, Jr., E. H. Gift, and F. M. Bustamante 6 Sep. 1979 10 p refs Presented at the Winter Simulation Conf., San Diego, Calif., 3-5 Dec. 1979

(Contract W-7405-eng-26)

(K/OP-268; CONF-791207-1) Avail: NTIS HC A02/MF A01

The application of the GERT (Graphical Evaluation and Review Technique) probabilistic network analysis technique and the results obtained from a program analysis using GERT is discussed. A historical summary of decision analysis techniques leading to the development and application of GERT is included. Discussion is provided on the GERT methodology, study rationale, and results of an analysis examining the receiving and storage task at the Oak Ridge National Laboratory. Long-range program planning advantages using GERT are identified and discussed as relates to the methodology's decision analysis capability. DOE

**N80-23198#** Economic Associates, Inc., Washington, D.C.

**PROBLEMS FACING SMALL COMPANIES PERFORMING RESEARCH AND DEVELOPMENT**

Frank Piovita May 1979 81 p Sponsored in part by NSF

(PB80-126337) Avail: NTIS HC A05/MF A01 CSCL 05A

The results of a 1977 survey on problems faced by small companies performing research and development are presented. The problems are ranked according to importance. Characteristics of the survey participants are included. GRA

**N80-23211#** Committee on Science and Technology (U. S. House).

**AUTHORIZING APPROPRIATIONS TO THE NATIONAL AERONAUTICS AND SPACE ADMINISTRATION**

Washington GPO 1980 7 p Rept. to accompany H.R. 6412 presented by the Comm. on Sci. and Technol., 96th Congr., 2nd Sess., 22 Apr. 1980

(H-Rept-96-898; GPO-60-493) Avail: Comm. on Sci. and Technol.

The supplemental federal budget appropriations to the Space Shuttle Program for the fiscal year 1980 are explained with regard to current and projected cost data, its impact on program schedules and employment, and the effect of the legislation on inflation. A brief description of project activities is included. M.G.

**N80-23212#** Committee on Commerce, Science, and Transportation (U. S. Senate).

**NASA SUPPLEMENTAL AUTHORIZATION FOR FISCAL YEAR, 1980**

Howard W. Cannon Washington GPO 1980 10 p Rept. to accompany S. 2238 presented by the Comm. on Com., Sci., and Transportation at the 96th Congr., 2nd Sess., 12 May 1980

(S-Rept-96-694; GPO-62-346) Avail: US Capitol, Senate Document Room

The supplemental budget appropriations to sustain the space shuttle development efforts for the FY 1980 are discussed. Cost estimates, cost estimate comparisons, and a summary of program progress are given. The impacts of underfunding and program delays are briefly examined. M.G.

**N80-23213#** Committee on Science and Technology (U. S. House).

**NATIONAL AERONAUTICS AND SPACE ADMINISTRATION AUTHORIZATION ACT, 1981**

Washington GPO 1980 11 p A bill on H.R. 6413 presented to the Comm. on Sci. and Technol., 96th Congr., 2nd Sess.,

## N80-23232

5 Feb. 1980

(H-Rept-96-899) Avail: US Capitol, House Document Room

The NASA authorization for five R and D programs are listed. Stipulations for grants to research institutions are given along with those for consultations, and construction of facilities. F.O.S.

**N80-23232#** General Accounting Office, Washington, D. C. Procurement and Systems Acquisition Div.

### **NASA SHOULD PROVIDE THE CONGRESS COMPLETE COST INFORMATION ON THE SPACE TELESCOPE PROGRAM**

3 Jan. 1980 38 p

(PB80-123433; PSAD-80-15) Avail: NTIS HC A03/MF A01 CSCL 03B

NASA's space telescope project is described and an analysis of the program reserves, contract costs, development costs, and life cycle costs is presented. The program's progress and outlook are discussed. A.W.H.

**N80-23985\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

### **CLARIFICATION PROCESS: RESOLUTION OF DECISION-PROBLEM CONDITIONS**

Duncan L. Dieterly May 1980 24 p refs

(NASA-TM-81193; AFHRL-H-80-101; A-8162) Avail: NTIS HC A02/MF A01 CSCL 05J

A model of a general process which occurs in both decisionmaking and problem-solving tasks is presented. It is called the clarification model and is highly dependent on information flow. The model addresses the possible constraints of individual indifferences and experience in achieving success in resolving decision-problem conditions. As indicated, the application of the clarification process model is only necessary for certain classes of the basic decision-problem condition. With less complex decision problem conditions, certain phases of the model may be omitted. The model may be applied across a wide range of decision problem conditions. The model consists of two major components: (1) the five-phase prescriptive sequence (based on previous approaches to both concepts) and (2) the information manipulation function (which draws upon current ideas in the areas of information processing, computer programming, memory, and thinking). The two components are linked together to provide a structure that assists in understanding the process of resolving problems and making decisions. R.E.S.

**N80-23994#** Army Engineer Topographic Labs., Wright-Patterson AFB, Ohio. Hydraulics Lab.

### **PLANNING OF AUTOMATED DATA ACQUISITION AND PROCESS CONTROL SYSTEMS (ADACS) Final Report**

Roger H. Multer Jan. 1980 43 p

(AD-A081043; WES-MP-HL-80-1) Avail: NTIS HC A03/MF A01

This report deals with the planning of Automated Data Acquisition and Control Systems (ADACS) and is written to introduce the general engineering and management audience to the types of considerations which must be addressed for successful implementation of such systems. Brief discussions are presented on such topics as basic system requirements, minicomputer components, systems implementation, programming of minicomputers, data acquisition, process control, and data transmission. The ADACS developed for use at the Chesapeake Bay model, a large hydraulic model of the Chesapeake Bay, is discussed as an example of WES experience. GRA

**N80-23998#** National Bureau of Standards, Washington, D.C. Inst. for Computer Sciences and Technology.

### **COMPUTER SCIENCE AND TECHNOLOGY: SELECTION OF DATA ENTRY EQUIPMENT**

Steve A. Recicar Nov. 1979 80 p

(PB80-144322; NBS-SP-500-55; LC-79-600173) Avail: NTIS HC A05/MF A01 CSCL 09B

Economic and general operational considerations, steps to be followed in acquisition and training, and other factors pertinent to data entry equipment selection are presented. Equipment

profiles for the different data entry methods are also provided. GRA

**N80-24010#** Naval Postgraduate School, Monterey, Calif. **COMPLEXITY AS A FACTOR OF QUALITY AND COST IN LARGE SCALE SOFTWARE DEVELOPMENT M.S. Thesis**

Joe Newton Harris Dec. 1979 98 p refs

(AD-A081604) Avail: NTIS HC A05/MF A01 CSCL 09/2

The impact of complexity on software quality and costs is examined. Historic and current issues relating to complexity in the software development and software cost estimation processes are reviewed. Select complexity models and metrics are described and briefly analyzed. Finally, an argument is presented in support of McCabe's Directed Graph Model as a useful software management tool in controlling complexity, formulating a test strategy and allocating resources. GRA

**N80-24200\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

### **MATRIX MANAGEMENT FOR AEROSPACE 2000**

John F. McCarthy, Jr. May 1980 16 p refs Presented at the Intern. Meeting and Techn. Display: Global Technol. 2000, Baltimore, 5-11 May 1980

(NASA-TM-81509; E-447) Avail: NTIS HC A02/MF A01 CSCL 05A

The matrix management approach to program management is an organized effort for attaining program objectives by defining and structuring all elements so as to form a single system whose parts are united by interaction. The objective of the systems approach is uncompromisingly complete coverage of the program management endeavor. Starting with an analysis of the functions necessary to carry out a given program, a model must be defined; a matrix of responsibility assignment must be prepared; and each operational process must be examined to establish how it is to be carried out and how it relates to all other processes. A.R.H.

**N80-24201#** Naval Postgraduate School, Monterey, Calif. **A MANAGEMENT PERSPECTIVE ON THE ROLE OF INFORMATION PRODUCTION IN THE ORGANIZATION M.S. Thesis**

Richard L. Wooten Sep. 1979 53 p refs

(AD-A081058) Avail: NTIS HC A04/MF A01 CSCL 05/1

The explosive growth of information technology in the last decade has caused a demand for experienced information system managers far beyond the present supply. Consequently, many of these positions are filled by personnel who may lack a comprehensive understanding of the role of information production in the organization. This paper addresses organization processes and interactions of which the information system manager must be made aware in order to perform his job effectively. Discussion includes organization purpose, structure, decision processes, and information production. When appropriate, descriptive models were developed in order to better understand the synergistic relationships which exist. Particular attention was given to the need for systematic valuation of organization information products, and development of the 'product-worth function' is proposed as a possible approach to this problem. GRA

**N80-24202#** Naval Postgraduate School, Monterey, Calif. **A COMPUTER SIMULATION OF ORGANIZATIONAL DECISION-MAKING M.S. Thesis**

Vincent John Andrews Dec. 1979 85 p refs

(AD-A081600) Avail: NTIS HC A05/MF A01 CSCL 09/2

A computer simulation of organizational decision-making is developed based on the Complete Cycle of Choice. The interrelationships between attitudes, individual behaviors, organization choices, and the environment are represented in terms of matrices and mathematical equations. Statistical analysis of the data generated by the simulation program is performed to discern significant variables and decision-making patterns. Refinements to the basic model are proposed to increase its usefulness as a managerial tool. GRA

**N80-24206#** Rolls-Royce Ltd., Derby (England).

### **THE MANAGEMENT OF INFORMATION FLOW IN A HIGH TECHNOLOGY DEVELOPMENT ENVIRONMENT**

D. S. Pearson 1979 28 p refs  
(PNR-90002) Avail: NTIS HC A03/MF A01

Methods for planning, motivating, and managing applied to the activities of technical personnel engaged in a gas turbine development program are described. Average value for numbers of projects begun, the fraction finally reported on, and manhours available for each project were gathered from records of instrumentation tests conducted during a period of 25 years. The data were for modeling anticipated situations, permitting effective assignment of resources. Author (ESA)

**N80-24210#** Committee on Commerce, Science, and Transportation (U. S. Senate).

**NATIONAL AERONAUTICS AND SPACE ADMINISTRATION AUTHORIZATION ACT, 1981**

15 May 1980, 20 p A bill referred to the Comm. on Com., Sci., and Transportation, 96th Congr., 2nd Sess., 30 Jan. 1980 (S-96-719) Avail: US Capitol, Senate Document Room

An amendment is presented to the text of a bill authorizing appropriations to the National Aeronautics and Space Administration for research and development, construction of facilities, and research and program development. A.R.H.

**N80-24283#** Army Natick Research and Development Command, Mass. Clothing Equipment and Materials Engineering Lab.

**US ARMY SURVEY OF AIRCREW SURVIVAL KITS/VESTS Final Report**

Thomas H. Judge Jan. 1980 101 p  
(AD-A081153; CE/MEL-210; NATICK/TR-80/012) Avail: NTIS HC A06/MF A01 CSCL 06/7

For a number of years air crew members have complained of problems with survival kits, vests, and components. These complaints have been debated time and again with no resolution forthcoming to meet the comprehensive crash survival needs of the aircrew members. In an effort to resolve these complaints, a survey was initiated throughout the U.S. Army Aviation Community to identify the problem areas and develop rationale for correction action. This report discusses results of the survey and conferences held following completion of the survey. Medical, Crash, Search and Rescue and Aviation Community Data provided rationale for new approaches to survival kits and vests. These approaches to reduce the amount of present day survival components were modified by each conference and upgraded to improve the aircraft crash survival environment. The reductions in helicopter crash fires and the ability of rescue teams to recover crash survivors in six hours or less has contributed to the need to replace present day nonessential items with only essential, absolute need, survival components. GRA

**N80-24286#** Interaction Research Corp., Stanton, Calif.  
**AN INVESTIGATION OF FACTORS AFFECTING AIRCRAFT PASSENGER ATTENTION TO SAFETY INFORMATION PRESENTATIONS Final Report, Nov. 1978 - Apr. 1979**

Daniel A. Johnson Aug. 1979 32 p refs  
(Contract DOT-FA78WA-4095)  
(AD-A082358; IRC-79-1) Avail: NTIS HC A03/MF A01 CSCL 01/2

Many commercial aircraft passengers do not appear to attend to the safety information presentation given prior to takeoff. This presentation, in the form of the oral briefing given by the flight attendant and the safety information cards, supplies information the passenger may need to increase the probability of safely surviving an aircraft emergency. A questionnaire was administered to 255 respondents who had flown at least twice in the previous two years. A number of factors associated with the way the information is presented, the apparent response of other passengers to the presentation, perceived accident probability, relative adequacy of the oral briefing, and situational and demographic variables are related to whether the passenger reports attending or not attending to the safety presentation. GRA

**N80-24509#** Office of Personnel Management, Washington, D.C. Personnel Research and Development Center.

**THE NEED FOR A COMMON METRIC IN ITEM BIAS STUDIES Final Report**

Neil J. Dorans Sep. 1979 18 p refs  
(PB80-128671; TM-79/20) Avail: NTIS HC A02/MF A01 CSCL 12A

A common metric is essential for valid comparisons in any investigations of subpopulation differences and similarities. Item bias studies are one type of investigation that focuses on testing for subpopulation differences. The techniques of latent trait theory, with its powerful property of item parameter invariance are applied to the item bias question. The property of item parameter invariance is examined, with primary consideration given to the importance of metric in studies that test for item bias by testing for item parameter invariance. Neutral, hypothetical examples illustrate some consequences of ignoring the importance of metric. GRA

**N80-24648\*#** National Aeronautics and Space Administration, Goddard Space Flight Center, Greenbelt, Md.

**EIGHTH NASTRAN USER'S COLLOQUIUM**

May 1980 242 p refs Colloq. held at Greenbelt, Md., 30-31 Oct. 1979

(NASA-CP-2131) Avail: NTIS HC A11/MF A01 CSCL 20K

The general application of finite element methodology and the specific application of NASTRAN to a wide variety of static and dynamic structural problems are discussed.

**N80-24661\*#** National Aeronautics and Space Administration, Langley Research Center, Langley Station, Va.

**APPLICATION OF A DATA BASE MANAGEMENT SYSTEM TO A FINITE ELEMENT MODEL**

James L. Rogers, Jr. In NASA. Goddard Space Flight Center Eighth NASTRAN User's Colloq. May 1980 p 223-234

Avail: NTIS HC A11/MF A01 CSCL 20K

In today's software market, much effort is being expended on the development of data base management systems (DBMS). Most commercially available DBMS were designed for business use. However, the need for such systems within the engineering and scientific communities is becoming apparent. A potential DBMS application that appears attractive is the handling of data for finite element engineering models. The applications of a commercially available, business-oriented DBMS to a structural engineering, finite element model is explored. The model, DBMS, an approach to using the DBMS, advantages and disadvantages are described. Plans for research on a scientific and engineering DBMS are discussed. R.E.S.

**N80-24754\*#** Jet Propulsion Lab., California Inst. of Tech., Pasadena.

**FEDERAL POLICIES TO PROMOTE THE WIDESPREAD UTILIZATION OF PHOTOVOLTAIC SYSTEMS. SUPPLEMENT: REVIEW AND CRITIQUE**

J. L. Smith 15 Apr. 1980 115 p  
(Contracts NAS7-100; EX-76-A-29-1012)  
(NASA-CR-163148; DOE/JPL-1012-45; JPL-80-32) Avail: NTIS HC A06/MF A01 CSCL 10A

Review comments of the Congressional report entitled 'Federal Policies to Promote the Widespread Utilization of Photovoltaic Systems' are presented. Responses to the review comments by the Jet Propulsion Laboratory, preparer of the Congressional report, are also presented. The Congressional report discussed various issues related to promoting the deployment of photovoltaic systems through the Federal Photovoltaic Program. Various program strategies and funding levels were examined. R.E.S.

**N80-25067#** Texas Univ. at Austin. Center for Cybernetic Studies.

**COMPREHENSIVE COMPUTER EVALUATION AND ENHANCEMENT OF MAXIMUM FLOW ALGORITHMS**

Fred Glover (Colorado Univ., Boulder), Darwin Klingman, John Mote (Analysis, Research, and Computation, Inc., Austin, Texas), and David Whitman (Analysis, Research, and Computation, Inc., Austin, Texas) Oct. 1979 80 p refs  
(Contracts N00014-78-C-0222; DOT-OS-70074)  
(AD-A081941; CCS-RR-356) Avail: NTIS HC A05/MF A01 CSCL 12/2

The primary purpose of this study was to refine and streamline all major classes of maximum flow algorithms using the recent developments in network labeling and data organization techniques. To safeguard against being swayed too heavily by preliminary analyses (and past experience in other network settings), it has implemented more than one type of data structure and associated processing techniques for most of the algorithms. Additionally, the resulting codes on four distinct problem topologies has been tested. GRA

**N80-25192** International Institute for Applied Systems Analysis, Laxenburg (Austria).

**THE TENNESSEE VALLEY AUTHORITY: A FIELD STUDY**  
Hans Knop, ed. Jun. 1979 249 p refs  
(IIASA-RR-79-2) Avail: Issuing Activity

The results of an international conference on the Tennessee Valley Authority (TVA) are given. They are divided into four main parts: the systems approach to regional industrial development programs; the managerial structure of the TVA, including specific management case studies of several major departments; the application of models and computer techniques to management; and the integration of environmental factors into the TVA management and planning processes, including a case study dealing with the environmental decision-making process in the siting of a nuclear power plant. Author (ESA)

**N80-25193#** Perceptronics, Inc., Woodland Hills, Calif.  
**AN INTERACTIVE COMPUTER AIDING SYSTEM FOR GROUP DECISION MAKING** Quarterly Technical Report  
Steven Johnston and Randall Steeb May 1979 33 p  
(Contract MDA903-77-C-0184; ARPA Order 3344)  
(AD-A082440; PQTR-1046-79-5) Avail: NTIS  
HC A03/MF A01 CSCL 05/1

This report describes progress on work centered on the transfer of an interactive computer aid for group decision making to the DARPA/CTO Demonstration and Development Facility. The report includes: (1) implementation details of both the black and white version and the color version; (2) a description of software support modules required for system integration as a generalized demonstration program at the DDF; (3) the design description of the Group Aid/CACI Executive Aid integration; and (4) a progress report on the full scale experimental studies currently being administered. GRA

**N80-25194#** Army Research Inst. for the Behavioral and Social Sciences, Alexandria, Va.  
**AN ALGORITHM FOR COMPUTERIZED ADAPTIVE DECISION ANALYSIS** Final Report, Jan. - Sep. 1976  
James L. Raney Sep. 1979 43 p refs  
(DA Proj. 2T1-61101-A-91B)  
(AD-A082924; ARI-TR-406) Avail: NTIS HC A03/MF A01  
CSCL 12/1

This research investigated an application of recent results in conjoint measurement theory research with the aim of developing a new methodology for (1) modeling a decision process used to evaluate preferences for complex choice alternatives; and (2) producing measurement scales for choice component factors and composite choice alternatives based on the decision model. An algorithm for interactive conjoint measurement (ICM) was developed to minimize the problems of redundancy and random error in testing the additive-independence model (AIM) in pair-comparisons designs with fallible data. No provisions were made for handling the systematic error problem or for accommodating more than two choice component factors. The ICM algorithm was tested in error-free data and in data with random error. The results showed that this ICM algorithm performed rather poorly. GRA

**N80-25195#** National Bureau of Standards, Washington, D.C.  
**DIMENSIONS/NBS, VOLUME 63, NO. 11** Monthly Report  
Nov. 1979 41 p refs  
(PB80-141542; NBS/DIM-63/11) Avail: NTIS  
HC A03/MF A02 CSCL 14B

Short summaries of major technical developments, highlights of work in progress, major speeches and statements by Bureau

management, and a listing of NBS publications are presented. Topics covered include: fire safety tips for wood burning appliances; computer interface standards; new photometric calorimeter performs direct measurement; girth weld standards for Alaskan natural gas pipeline; and 'ultra-black' coating for high absorptance of solar energy. GRA

**N80-25196#** National Bureau of Standards, Washington, D.C.  
**DIMENSIONS/NBS, VOLUME 63, NO. 12** Monthly Report  
Dec. 1979 37 p refs  
(PB80-130701; NBS/DIM-63/12) Avail: NTIS  
HC A03/MF A01 CSCL 14B

Short summaries of major technical developments, highlights of work in progress, major speeches and statements by Bureau management, and a listing of NBS publications are presented. Topics covered include: protecting citizens' rights; once is enough; guidelines for the use of modernized metric system; refractory concrete strength measured under simulated usage; chemical degradation of refractory liners in coal gasifier systems; data centers established to aid coal conversion industry; conferences; publications; index; and news briefs. GRA

**N80-25197#** George Washington Univ., Washington, D. C.  
**THE MEANING OF PATENT STATISTICS** Final Report  
L. James Harris, Mary A. Holman, Edmund W. Kitch, and Keith Pavitt Dec. 1979 107 p refs Sponsored by NSF Prepared in cooperation with Chicago Univ., Ill., and Sussex Univ., Brighton, England  
(PB80-137664; NSF/SIU-79-1) Avail: NTIS  
HC A06/MF A01 CSCL 05A

The strengths and weaknesses of patent counts as measures of levels of technical invention are discussed. Long range studies providing insight into the meaning of patent data are suggested. GRA

**N80-25206#** General Electric Co., Arlington, Va.  
**SHIPPING OPERATIONS INFORMATION SYSTEM: EXECUTIVE OVERVIEW** Progress Report, Jun. 1976 - Dec. 1979  
Thomas Choate Dec. 1979 63 p  
(Contract MA-6-38043)  
(PB80-134778; MA-RD-930-80023) Avail: NTIS  
HC A04/MF A01 CSCL 09B

Computer software modules developed for a shipping operations information system are described. The description of each module includes a functional overview as well as highlights of the capabilities, benefits, and operational elements of the module. GRA

**N80-25272#** Air Force Systems Command, Washington, D.C.  
**AIR FORCE SYSTEMS COMMAND RESEARCH PLANNING GUIDE (RESEARCH OBJECTIVES)**  
1 Feb. 1980 379 p Supersedes AFSC-TR-78-01  
(AD-A082043; AFSC-TR-80-01; AFSC-TR-78-01) Avail: NTIS  
HC A17/MF A01 CSCL 15/3

The purpose of the Air Force Systems Command research planning guide (Research Objectives) is to identify research needed by the Air Force. The document provides a method of informing military and civilian research and development communities of mid-term requirements and of long-term requirements directed toward scientific opportunities which offer the greatest potential for impacting on future military operations. Research must also take advantage of new situations and new opportunities to open up wide areas of technology. One such opportunity is the tremendous potential for technology expansion resulting from the space shuttle development and operational deployment. Increased emphasis is being given to those research opportunities which exploit the unique space shuttle capabilities. In addition, new subareas have been added to the Life Sciences and Weaponry technical areas to add emphasis to an Air Force need for new efforts in environmental quality and civil engineering research. GRA

**N80-25046#** Wayne State Univ., Detroit, Mich.  
**MODELLING AND RESOURCE ALLOCATION OF LINEARLY RESTRICTED OPERATING SYSTEMS** Final Technical Report, May 1976 - Jun. 1979

Tse-Yun Feng and C. P. Hsieh Griffiss AFB, N.Y. RADC Dec. 1979 157 p refs

(Contract F30602-76-C-0282; AF Proj. 5597)

(AD-A082363; RADC-TR-79-311)

Avail: NTIS

HC A08/MF A01 CSCL 09/2

Operating System is an integral part of a total computing utility. Its structure is complicated and the viewpoint on the subject is diversified. If the computing system is viewed upon as a collection of different resource types to serve different users with different demands, then the operating system assumes the managerial role. To best utilize the available resources to achieve a desirable level of production, i.e., computation, an optimal planning (programming) is needed. GRA

**N80-26135#** Oak Ridge National Lab., Tenn.

**NUCLEAR WASTE MANAGEMENT: A PERSPECTIVE**

R. E. Leuze 1980 37 p Presented at Am. Nucl. Soc., Tulsa,

Okla., 15 Jan. 1980

(Contract W-7405-eng-26)

(CONF-800117-1) Avail: NTIS HC A03/MF A01

The scope of the problems with nuclear waste management is outlined. Present and future inventories of nuclear wastes are assessed for risk. A discussion of what is presently being done to solve waste management problems and what might be done in the future is presented. DOE

**N80-26200#** Michigan Univ., Ann Arbor. Highway Safety Research Inst.

**FUNDING FOR HIGHWAY SAFETY RESEARCH, DEVELOPMENT, AND DEMONSTRATION IN THE NATIONAL**

**HIGHWAY TRAFFIC SAFETY ADMINISTRATION Final Report, Jul. 1978 - Nov. 1979**

Thomas C. Anderson Nov. 1979 132 p refs Sponsored by

Motor Vehicle Manufacturing Assoc.

(PB80-137672; UM-HSRI-79-88)

Avail: NTIS

HC A07/MF A01 CSCL 05A

The National Highway Traffic Safety Administration's (NHTSA) allocation of resources to highway safety research, development, and demonstration programs is examined for the 1970-1979 time period, and additional analysis is made of the allocation of 403 contract expenditures in NHTSA's proposed 1980-1984 plan. GRA

**N80-26220#** American Association of Community and Junior Colleges, Washington, D.C.

**COMMUNITY COLLEGES AND APPROPRIATE TECHNOLOGY**

1979 36 p refs

(Contract NSF 79-SP-0851)

(PB80-131634) Avail: NTIS HC A03/MF A01 CSCL 05A

Appropriate technology is defined as alternate, intermediate, small-scale, light-capital, and neighborhood technology. Appropriate technology places a high priority on local needs, resources, skills, and benefits. Because of their strong community base, community colleges are in an ideal position to capitalize on this local orientation. Appropriate technology places heavy emphasis on practicality, on developing and employing useful tools to do constructive work. Some avenues for community college involvement in appropriate technology are: job training; hands-on workshops; public education; resource centers; demonstration sites; research, and appropriate technology entrepreneurship. Two strategies for launching appropriate technology programs are characterized as the add-on approach, involving tacking on individual courses of projects wherever there is a need or opportunity, and the institutional approach, entailing a far more systematic effort involving the entire college and the local community. GRA

**N80-26784\*#** Aerospace Corp., El Segundo, Calif.  
**CENTRAL STATION APPLICATIONS PLANNING ACTIVITIES AND SUPPORTING STUDIES Final Report**

S. L. Leonard and B. Siegel Apr. 1980 117 p refs

(Contract JPL-955434)

(NASA-CR-163042; JPL-9950-372; ATR-80(7820-04)-2) Avail: NTIS HC A06/MF A01 CSCL 10B

The application of photovoltaic technology in central station (utility) power generation plants is considered. A program of data collection and analysis designed to provide additional information about the subset of the utility market that was identified as the initial target for photovoltaic penetration, the oil-dependent utilities (especially municipals) of the U.S. Sunbelt, is described along with a series of interviews designed to ascertain utility industry opinions about the National Photovoltaic Program as it relates to central station applications. J.M.S.

**N80-26786#** Committee on Science and Technology (U. S. House).

**OVERSIGHT: INDUSTRIAL ENERGY CONSERVATION, VOLUME 10**

Washington 1979 327 p refs Hearing before Subcomm. on

Energy Develop. and Appl. of the Comm. on Sci. and Technol.,

96th Congr., 1st Sess., no. 49, 11 Sep. 1979

(GPO-53-020) Avail: SOD

Testimony delivered and statements received in support of industrial energy conservation through cogeneration are presented. The Federal government's role and policy on industrial energy conservation is discussed. R.E.S.

**N80-26842#** Department of Energy, Washington, D. C. Office of Solar Applications for Buildings.

**SOLAR FEDERAL BUILDINGS PROGRAM PLAN**

Feb. 1980 27 p

(DOE/CS-0147A) Avail: NTIS HC A03/MF A01

The Solar Federal Buildings Program (SFBP) is a multi-year program designed to stimulate the growth and improve the efficiency of the solar industry by providing funds to Federal agencies for the design, acquisition, construction, and installation of commercially applicable solar hot water, heating, cooling, and process systems in new and existing Federal buildings. The program plan to be used in implementing this major solar commercialization effort is outlined. DOE

**N80-27207#** Environmental Law Inst., Washington, D. C.  
**ENERGY-EFFICIENT PROCUREMENT IN STATE AND LOCAL GOVERNMENTS**

Joe W. Russell, Jr. Jul. 1979 70 p refs

(Contract EM-78-C-01-5255)

(DOE/CS-5255/1) Avail: NTIS HC A04/MF A01

State and local governments have been slow in preparing and implementing plans for energy conservation with respect to the development of energy efficient standards and policies. This lack of compliance with the Energy Policy and Conservation Act is due to a lack of reliable information on many energy-consuming products, a resistance to change on the part of purchasing officials to their superiors, and reluctance in the tax revolt era to spend money in order to save money and energy as well. To overcome these obstacles, states and localities should consider mandating energy-efficient procurement practices through either executive orders or legislation. In addition, states and localities should consider adopting institutional arrangements, such as centralized purchasing and joint or cooperative purchasing that will facilitate energy-efficient procurement. Life cycle costs should be considered as bid evaluation criterion. To further state and local efforts in this area, the federal government should provide technical and financial assistance to an organization of purchasing officials to establish an information clearinghouse. A.R.H.

**N80-27208#** Oak Ridge National Lab., Tenn. Metals and Ceramics Div.

**QA MANAGEMENT APPROACH UNIQUE TO R AND D PROGRAMS**

R. J. Beaver and J. R. Weir, Jr. 1980 7 p Presented at the

34th Ann. Tech. Conf. of the Am. Soc. for Quality Control, Atlanta,

20 May 1980

(Contract W-7405-eng-48)

(CONF-800505-1) Avail: NTIS HC A02/MF A01

The approach to the current quality assurance management of the Metals and Ceramics Division at ORNL is discussed. The organization disciplines interrelate with the QA programming. Procedure QA-MC-1-100 defines control of experimental tasks, which represent about 90% of the Division's work. Procedure QA-MC-1106 defines action plans for projects. The QA coordinator, independent of line management, communicates, audits, and reviews to assist line management in the understanding and acceptance of the Division QA procedures. DOE

**N80-27209#** Office of Personnel Management, Washington, D.C. Personnel Research and Development Center.

**THE DESIGN AND DEVELOPMENT OF AN INTER-ORGANIZATIONAL PERFORMANCE EVALUATION AND REFERRAL SYSTEM Final Report**

Charles N. MacLane Aug. 1979 39 p refs (PB80-151012; TM-79-19) Avail: NTIS HC A03/MF A01 CSCL 051

There has been an increasing recognition that performance appraisal (PA) research should begin from open-systems assumptions. Evidence supporting this view comes from studies showing that contextual variables such as change in organizational setting, rater organizational level, and composition of subordinate work group may explain useful amounts of variance in PA outcomes. In view of these findings, the development of valid and reliable PA instruments for inter-organizational use presents some methodological problems. The development of such a system incorporating a behavioral expectation scale approach which generates measures of the equivalency of performance behavior domains and performance standards across organizations is described. GRA

**N80-27212** Societe Nationale Industrielle Aerospatiale, Paris (France). Direction Centrale Industrielle.

**VALUE ANALYSIS FOR THE AIRCRAFT AIRBUS [L'ANALYSE DE LA VALEUR DANS UN PROGRAMME INTERNATIONAL]**

Robert Tassinari 1979 34 p In FRENCH Presented at Soc. of Am. Value Eng. Intern. Conf. on Save Proc., Vol. 19, 1979 (SNIAS-792-501-105) Avail: NTIS HC A03

The implementation of an agreement among Germany, England, France, Netherlands, and more recently, Spain, to develop a transport aircraft is discussed with emphasis on the economic and technical aspects involved. The method in which the various tasks were assigned and performed is described. Project and value engineering considerations are reviewed as well as the factors determining the choice of materials and the methods for optimizing the system. The management of modification procedures is described and some value analysis examples are included. A.R.H.

**N80-27215\*#** Stanford Univ., Calif. Dept. of Engineering-Economic Systems.

**THE ECONOMIC BASIS FOR NATIONAL SCIENCE AND TECHNOLOGY POLICY**

Donald A. Dunn Oct. 1979 39 p refs (Contract NASw-3204) (NASA-CR-163290; SU-23) Avail: NTIS HC A03/MF A01 CSCL 05C

National science and technology policy is concerned with societal choices with respect to the rate and directions of technological change and the adoption and use of new technology in society. Such policy choices occur primarily in connection with management of the creation, dissemination, and use of scientific and technical information. Two categories of policy instruments discussed are market-oriented approaches, and direct public action. Possibilities for increased use of market-oriented approaches that can provide benefits to society in the form of an increased rate of innovation and of more 'appropriate' technology, better suited to the needs of consumers are indicated. A.R.H.

**N80-27216#** Committee on Commerce, Science, and Transportation (U. S. Senate).

**NASA AUTHORIZATION FOR FISCAL YEAR 1981, PART 2**

Washington GPO 1980 509 p Hearings on S. 2238 and S. 2240 before the Subcomm. on Sci., Technol., and Space of the Comm. on Com., Sci., and Transportation, 96th Congr., 2nd Sess., 6-7 and 20 Feb. 1980

(GPO-58-741) Avail: Subcomm. on Sci., Technol. and Space

Funding requests to support research and development, construction and of facilities and program management are justified in testimony delivered and responses to questions asked during a 6 day hearing period. Particular emphasis is given to the supplemental funds needed to support development and evaluation of space shuttle components, as well as to plans for the Galileo Project and Spacelab experiments. Accomplishments and plans are reviewed for the following areas: space science, space transportation system, astronaut program, energy programs, technology utilization, space and terrestrial applications, international affairs, aeronautics, space research and technology, and tracking and data systems. Employment policies are also examined. A.R.H.

**N80-27218#** Centec Corp., Fort Lauderdale, Fla.

**COMPUTER TECHNOLOGY CAN ENHANCE INDUSTRIAL ENERGY EFFICIENCY**

1979 38 p refs (Contract EX-76-C-01-2123) (DOE/CS-2123/T1) Avail: NTIS HC A03/MF A01

Computer applications that have potential for minimizing energy consumption are discussed. An overview of the current level of computer technology and terminology as it applies to the process industry is given. Emphasis is placed on energy conservation and the use of more energy efficient process equipment. J.M.S.

**N80-27221\*#** Stanford Univ., Calif. Dept. of Engineering Economic Systems.

**GOVERNMENT PATENT POLICY: AN ANALYSIS OF THE EFFECTS OF THREE ALTERNATIVE PATENT POLICIES ON TECHNOLOGY OF GOVERNMENT INVENTIONS**

Mark Matousek Oct. 1979 39 p refs (Contract NASw-3204) (NASA-CR-163283; SU-27) Avail: NTIS HC A03/MF A01 CSCL 05B

The effects of present and proposed Government patent policies on the process of technology transfer and the commercialization of inventions resulting from Government sponsored research are addressed. The function of the patent system in Government research and the value of patents resulting from government sponsored research are examined. Three alternative patent policies, title in the contractor, title in the Government, and the waiver policy, are examined in terms of their effect on the commercialization of inventions, industrial competitions, disclosure of inventions, participation of research contractors and administrative costs. Efforts to reform the present Government patent policy are also described. J.M.S.

**N80-27228#** Committee on Science and Technology (U. S. House).

**ANALYSIS AND COMMENTARY ON THE FIRST ANNUAL SCIENCE AND TECHNOLOGY REPORT**

Dorothy M. Bates, Mary Moguee, and Robert Chivak Washington GPO 1979 128 p refs Rept. presented to the Subcomm. on Library of Congress Sci., Res. and Technol., 96th Congr., 1st Sess., Nov. 1979 Prepared by Congressional Research Service, Library of Congress (GPO-56-097) Avail: Subcomm. on Sci. Res. and Technol.

The requirement that the President transmit to Congress an annual Science and Technology Report was a congressional initiative which was with the signing of the National Science and Technology Policy, Organization and Priorities Act of 1976. An analysis and commentary on the first Science and Technology Report is presented. The commentary considers the legislative history of the requirement and the extent to which the report met the congressional intent as well as the substantive content of the report. The annual requirement was shown to be a normal

congressional requirement. Following this, various proposals for the preparation of an annual science and technology report which were made in the 1965-1974 period were reviewed, including those of several individuals, two congressional subcommittees, and a panel of the National Academy of Sciences. J.M.S.

**N80-27234#** Ventura Regional County Sanitation District, Calif. **RESIDUAL WASTE MANAGEMENT: PHASE 1 REPORT Final Report, 1 Jan. 1975 - 15 Feb. 1978**  
Feb. 1980 145 p refs  
(Contract EPA-S-803223-01-0)  
(PB80-139744; EPA-600/2-80-051) Avail: NTIS  
HC A07/MF A01 CSCL 13B

The economic, social and environmental analysis regarding alternative plans for the handling and disposal of residual organic waste in Ventura County is presented. Waste quantities from municipal treatment plants, livestock operations, agricultural operations and meat and fish processes were inventoried. GRA

**N80-27237#** Florida Dept. of Administration, Tallahassee. **SCIENCE, ENGINEERING, TECHNOLOGY AND FLORIDA'S GOVERNMENT**  
Joseph H. Gerry and Malcolm P. Thomas Apr. 1979 99 p  
(Grant NSF ISP-78-05131)  
(PB80-139389; NSF/RA-790311) Avail: NTIS  
HC A05/MF A01 CSCL 05A

The structure and process of Florida's executive branch in relation to science, engineering, and technology (SET) was examined in order to determine a strategy to facilitate improvements in the way state resources are used in SET endeavors, and to provide assistance in the improvement of the policy formation process within Florida. Topics covered include an organizational profile of Florida's executive branch; a review of the overall relationship of the State Comprehensive Plan to SET; a synthesis of significant observation observations from respondents participating in interviews and survey questionnaires; an overview of the activities of other states including findings to be considered for Florida's improvement in SET; analysis of considerations affecting Florida's utilization of and relationship with SET; and development of strategic requirements and a proposal for an organizational structure for Florida. A project description and an overview of the development of SET in the United States are included in the appendix. GRA

**N80-27239#** Massachusetts Inst. of Tech., Cambridge. Center for Transportation Studies. **POTENTIAL CHANGE STRATEGIES IN URBAN TRANSPORTATION: AN OVERVIEW AND TENTATIVE APPRAISAL Final Report, Jul. 1975 - Jan. 1978**  
Alan Altshuler, James Womack, and John Pucher Dec. 1979 87 p refs  
(Contract DOT-OST-50240)  
(PB80-155278; DOT/RSPA/DPB/50-79/8) Avail: NTIS  
HC A05/MF A01 CSCL 13B

Innovations in the urban transportation system which combine political feasibility and cost effectiveness are identified. Problems of urban transportation in the United States are emphasized. GRA

**N80-27240#** Astronomische Gesellschaft, Hamburg (West Germany). **REVIEW ARTICLES OF THE ASTRONOMISCHE GESELLSCHAFT, NO. 47**  
1980 272 p refs In GERMAN and ENGLISH  
(ISSN-0374-1958) Avail: NTIS HC A12/MF A01

The behavior of the intergalactic and interstellar media is studied with respect to insight into galactic evolution. Emphasis is placed on galactic radio sources, their properties and techniques of observation.

**N80-27248#** Bundesministerium fuer Forschung und Technologie, Bonn (West Germany). **PRESENT STATE AND FUTURE OF THE SCIENTIFIC SPACE PROGRAM OF THE FEDERAL REPUBLIC OF GERMANY**

W. Regula *In* Astronomische Ges. Rev. Articles of the Astronomische Ges., No. 47 1980 p 205-217 In GERMAN; ENGLISH summary

Avail: NTIS HC A12/MF A01

Project management as well as implementation procedures of the European Space Agency are discussed. A number of aspects of science policy are also addressed. R.C.T.

**N80-27249#** Max-Planck-Institut fuer Physik und Astrophysik, Garching (West Germany). Inst. fuer Extraterrestrische Physik. **THE IMPORTANCE OF THE LONG-TERM PLANNING OF THE EUROPEAN SPACE AGENCY FOR SPACE RESEARCH IN THE FEDERAL REPUBLIC OF GERMANY**

K. Pinkau *In* Astronomische Ges. Rev. Articles of the Astronomische Ges., No. 47 1980 p. 219-232 refs In GERMAN; ENGLISH summary  
N80-27240 17-88)

Avail: NTIS HC A12/MF A01

The European space research and the European Space Agency are assessed for their technological contribution. Aspects of operations research as well as of financial management support are addressed. R.C.T.

**N80-27324#** Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).

**AIR TRAFFIC MANAGEMENT: CIVIL/MILITARY SYSTEM AND TECHNOLOGIES**

Feb. 1980 300 p refs Presented at the Guidance and Control Panel Symp., Copenhagen, 9-12 Oct. 1979

(AGARD-CP-273; ISBN-92-835-1347-9) Avail: NTIS  
HC A13/MF A01

Various aspects of air traffic on control in civil and military systems and technologies are presented. The specific areas discussed are: (1) operational scene and requirements; (2) civil/military cooperation; (3) aspects of air traffic management philosophy (criteria and human factors; communications and separation); (4) air traffic management in hostile environment; (5) flight management in terminal area; (6) subsystem technology; and (7) advanced systems.

**N80-27325#** Board of Trade, London (England).

**AIR TRAFFIC IN NATO EUROPE: ITS CHARACTERISTICS AND ITS NEEDS**

I. M. Pedder *In* AGARD Air Traffic Management: Civil/Mil. Systems and Technol. Feb. 1980 3 p

Avail: NTIS HC A13/MF A01

The needs and characteristics of air traffic in NATO Europe are reviewed. The divergent requirements and particular problems of airspace users are described and it is concluded that efficient use of the airspace can only be achieved through cooperation between the civil and military authorities. Areas where research and development would be fruitful are listed. Author

**N80-27326#** Army Avionics Research and Development Activity, Fort Monmouth, N. J. Air Traffic Management Systems Div. **HELICOPTER AIR TRAFFIC MANAGEMENT SYSTEMS WITH CIVIL/MILITARY INTEROPERABILITY**

Joseph T. Saganowich *In* AGARD Air Traffic Management: Civil/Mil. Systems and Technol. Feb. 1980 16 p refs

Avail: NTIS HC A13/MF A01

In order to achieve significant near-term improvement in the Army's air traffic management capability, several configurations of 'very lightweight air traffic management equipment' (VLATME) were developed. Based upon totally compatible use of today's common civil/military system ATCRBS (air traffic control radar beacon system). Concurrently with the VLATME development, helicopter instrument landing technology work over the past few years has revealed that the key to solving this problem lies in the ability to perform deceleration of the aircraft on instruments, along the approach path, so as to bring the aircraft to a hover a few feet above the intended landing point. The decelerated instrument approach means that helicopter spacings will have

to be much smaller than those encountered in fixed wing practice if reasonable flow rates are to be realized. Because of the potential garbling problem in conventional ATCRBS with closely spaced aircraft, a system which integrates the ground and airborne equipments of a scanning beam microwave landing system with the airborne transponder while preserving interoperability was also developed and successfully tested. R.E.S.

**N80-27327#** Selenia S.p.A., Rome (Italy).  
**A STUDY FOR DEVELOPMENT OF METHODS FOR AIR TRAFFIC MANAGEMENT**  
 R. Petrioli, S. Pardini, G. Bertoni (Bologna Univ.), and C. Bonivento (Bologna Univ.) In *AGARD Air Traffic Management: Civil/Mil. Systems and Technol.* Feb. 1980 14 p refs

Avail: NTIS HC A13/MF A01

Models and methods for optimal air traffic management were studied as part of the multi-year project 'Navigation aids and air traffic control' funded by the Italian National Research Council (CNR). The scope of the study on the context of CNR project is reviewed. The software structure, its main characteristics and possible utilizations in the planning and management of air traffic system is discussed. Finally, a description is given of more relevant used models and algorithms. R.E.S.

**N80-27356#** Noah (J. Watson) Associates, Inc., Falls Church, Va.

**COSTS AND BENEFITS OF REQUIRING NEW PRODUCTION OF OLDER AIRCRAFT TYPES TO MEET AMENDED NOISE STANDARDS Final Report**

C. F. Day and E. D. Studholme Sep. 1979 76 p refs  
 (Contract DOT-FA78WA-4192)  
 (AD-A080130; FAA/EE-79-22) Avail: NTIS  
 HC A05/MF A01 CSCL 01/3

This report examines costs and benefits associated with requiring new production of older aircraft models to meet amended noise standards. Two cases are examined: (1) all aircraft produced after 1983 must meet a noise emission standard halfway between Stage 2 and Stage 3 limits; and (2) all aircraft produced after 1985 must meet Stage 3 noise standards. The cost elements are combined and expressed as a change in direct operating costs in either cost-per-passenger mile or cost-per-aircraft mile, as appropriate. Noise benefits are estimated in terms of the change in area under a 100 EPNL contour resulting from the amended standards. GRA

**N80-27544#** Oklahoma State Univ., Stillwater. Fluid Power Research Center.

**FIRE-RESISTANT HYDRAULIC FLUID SAFETY Final Report, 3 Aug. 1978 - 3 Aug. 1979**

E. C. Fitch and J. S. Campbell 3 Aug. 1979 53 p refs  
 (Contract DI-BM-JO-166054)  
 (PB80-159486; BM-OFR-33-80) Avail: NTIS  
 HC A04/MF A01 CSCL 13K

Fire resistant hydraulic fluid safety from three directions are discussed. Results of a survey prepared for the fire resistant hydraulic journal are analyzed. Operational limitations of fire resistant hydraulic fluids are examined. Laws and standards of various foreign countries are investigated. GRA

**N80-27707** California Univ., Berkeley.  
**GRAPHICAL TECHNIQUES IN RELIABILITY THEORY Ph.D. Thesis**

Bernard Paul Davis 1979 71 p  
 Avail: Univ. Microfilms Order No. 8014646

The concept of total time on test is extended to the bivariate case. In the one dimensional situation the failure rate function completely describes the aging characteristics of the underlying life distribution. The bivariate analogue of the failure rate function is the hazard gradient. This is a vector-valued function of two variables and jointly, the two functions in the hazard gradient describe the aging as well as dependence characteristics of the underlying bivariate life distribution. The hazard gradient is studied in detail in the context of some general types of dependence. A

bivariate form of the total time on test transform is defined and some of its properties are discussed. Its relationship to the hazard gradient is shown to be similar to that of the one dimensional total time on test transform to the failure rate function. The empirical total time on test and the bivariate total time on test plot are discussed and some asymptotic properties of the empirical transform are presented. A bivariate version of the cumulative total time on test statistic is defined and some possible applications to data analysis are discussed. Finally, the structure of the cumulative total time on test statistic is investigated and some distributional results are presented. Dissert. Abstr.

**N80-27708#** Virginia Polytechnic Inst. and State Univ., Blacksburg.

**MULTICHARACTERISTIC QUALITY CONTROL: A SURVEY**

P. M. Ghare, Y. V. Hui, and D. R. Jensen Mar. 1980 27 p refs

(Grant DAAG29-78-G-0172)  
 (AD-A083894; ARO-1915194.5-M) Avail: NTIS  
 HC A03/MF A01 CSCL 12/2

Multicharacteristic quality control is concerned with inspecting the quality of an allotment of items and with monitoring production processes when the quality of an item or the state of a process is determined by a number of observable characteristics. This report reviews procedures currently available for multicharacteristic quality control when the characteristics are either variables or attributes. Attention is given to both location and dispersion parameters in the case of variables. Some limitations of these procedures are noted. GRA

**N80-28053** New York Univ., N. Y.  
**RESPONSE TIME, OPERATOR PRODUCTIVITY AND JOB SATISFACTION Ph.D. Thesis**

Raymond Earle Barber 1979 117 p  
 Avail: Univ. Microfilms Order No. 8014200

The impact is examined of on-line system response time on operator productivity and job satisfaction. A user organization in Cincinnati, Ohio and its five on-line systems provided the environment for the study. The impact of response time on productivity suggests that all or nearly all (e.g., 98%) transactions should be completed in 12 seconds or less. Beyond this level, the user organization suffers severe penalties in lost productivity. When response times are less than six seconds, productivity is relatively flat. That is, the impact of response time on productivity is not as great when average response time is less than six seconds as it is when average response time is greater than six seconds. It is concluded that the normal operating range of the systems studied should be in the four to six second range. It was predicted, prior to the study, that all categories of job satisfaction would be adversely affected by longer response times. The results, however, indicate that response time has a mixed impact on job satisfaction. Some categories showed decreased satisfaction as predicted. Others, however, demonstrated an improvement in job satisfaction as response time increased. These were mainly categories dealing with interpersonal relationships. Based upon the results the implications of response time on system operation and system design are discussed. A method is suggested that would allow the response time models to be applied to other online systems. Desirable directions for future research are discussed in depth. Dissert. Abstr.

**N80-28227#** Clemson Univ., S.C. Dept. of Mathematical Sciences.

**STATISTICAL METHODS IN SOLE SOURCE CONTRACT NEGOTIATION**

K. T. Wallenius 19 Nov. 1979 23 p refs Submitted for publication

(Contract N00014-75-C-0451; NR Proj. 047-202)  
 (AD-A083983; N111; TR-327) Avail: NTIS  
 HC A02/MF A01 CSCL 05/1

A scenario is described which involves ill-defined elements of conflict and cooperation: the acquisition of military systems by the Department of Defense (DoD) from large corporations. Current practices lead to situations in which DoD must deal

with a sole source and thus forego savings which might be realized from competition between contractors. In order to deal with this situation, the Armed Services Procurement Regulations (ASPR) prescribes procedures which must be employed in the analysis and negotiation of sole source price proposals. These time-consuming procedures generate enormous proposal backlogs for government price analysts who, because of time pressure, may not be able to do a sufficiently thorough and accurate analysis upon which to base their negotiation position. This analysis paralysis also causes payment delays which, in turn, force contractors to borrow working capital and suffer capital costs. It is clearly in the best interests of all parties to expedite the processing of these proposals. This has been accomplished by developing statistical sampling and estimation techniques which, unlike some classical procedures, are not vulnerable to exploitation through the use of clever padding strategies. GRA

**N80-28228#** National Technical Information Service, Springfield, Va.

**DATA BASE MANAGEMENT. CITATIONS FROM THE NTIS DATA BASE Progress Report, 1979 - Mar. 1980**

Brian Carrigan Apr. 1980 103 p Supersedes NTIS/PS-79/0384; NTIS/PS-78/0328  
(PB80-808165; NTIS/PS-79/0384; NTIS/PS-78/0328) Avail: NTIS HC \$30.00/MF \$30.00 CSCL 09B

The advent of on-line systems and the increasing problems of file organization, file maintenance, and file structures of data bases has required the study and development of data base management systems. This bibliography of Federally funded research cites the development of software packages and implementation of data base management systems into various information systems. This updated bibliography contains 96 abstracts, 87 of which are new entries to the previous edition. GRA

**N80-28230#** National Technical Information Service, Springfield, Va.

**DATA BASE MANAGEMENT. CITATIONS FROM THE NTIS DATA BASE Progress Report, 1976 - 1978**

Brian Carrigan Apr. 1980 262 p  
(PB80-808157) Avail: NTIS HC \$30.00/MF \$30.00 CSCL 09B

The advent of on-line systems, and the increasing problems of file organization, file maintenance, and file structures of data bases, has required the study and development of data base management systems. This bibliography of Federally funded research cites the development of software packages and implementation of data base management systems into various information systems. Also cited are guidelines for use in optimizing and modelling data bases. This updated bibliography contains 255 abstracts, none of which are new entries to the previous edition. GRA

**N80-28238#** California Univ., Los Angeles. School of Management.

**AN ARCHITECTURE FOR INFORMATION SYSTEMS MANAGEMENT**

Bennet P. Lientz and Myles Chen May 1980 36 p  
(Contract N00014-75-C-0266; NR Proj. 049-345)  
(AD-A084545) Avail: NTIS HC A03/MF A01 CSCL 05/1

There has been an increased effort in general management and information systems management to organize information systems and computer activities to respond to organization requirements on a more effective and efficient basis. A model of the current information systems architecture is developed and evaluated. Requirements for a new architecture are determined based on user, manager, and technology needs. An information systems organization architecture is then developed. The architecture is related to Nolan's organizational stages of growth, decision support systems, and information resource management. Implementation and several examples of application are discussed. GRA

**N80-28242#** Committee of Conference (U. S. Congress).  
**AUTHORIZING APPROPRIATIONS TO THE NATIONAL**

**AERONAUTICS AND SPACE ADMINISTRATION**

Washington GPO 1980 11 p Rept. to accompany S. 2240 presented by the Comm. of Conf. at the 96th Congr., 2nd Sess., 27 Jun. 1980

(HR-Rept-96-1142; GPO-64-512) Avail: US Capitol, House Doc. Room

A summary of the adjustments made to the original amendment concerning the FY-81 appropriations to NASA for research and development, construction of facilities, and research and program management is given. The points in disagreement between the House and Senate authorizations, and the committee of conference resolutions are outlined. M.G.

**N80-28256#** Lea (N. D.) and Associates, Inc., Washington, D.C.

**DESCRIPTION AND TECHNICAL REVIEW OF THE DUKE UNIVERSITY AUTOMATED PEOPLE/CARGO TRANSPORTATION SYSTEM Final Report**

H. A. Theumer and C. P. Elms Jul. 1979 139 p  
(Contract DOT-UT-80025)  
(PB80-159734; UMTA-IT-06-0188-79-2) Avail: NTIS HC A07/MF A01 CSCL 13F

The installation of the automated people/cargo transportation system at Duke University in Durham, North Carolina is reviewed. A description of the technical subsystems as well as the designed operation are included; specifications of performance, reliability, and maintainability are reviewed; and system development and implementation are summarized. Where important, the review of technical subsystems includes applicability, modifications and/or improvements for application in an urban environment. GRA

**N80-28259#** National Academy of Sciences - National Research Council, Washington, D. C. Committee for Joint U.S./USSR Academy Study of Fundamental Science Policy.

**SYSTEMS FOR STIMULATING THE DEVELOPMENT OF FUNDAMENTAL RESEARCH Final Report**

1979 773 p refs  
(Grant NSF SRS-74-21141)  
(PB80-162316; NSF/SRS-7421141) Avail: NTIS HC A99/MF A01 CSCL 05A

A series of parallel investigations by U.S. and Soviet specialists on science policy in the two countries in the area of fundamental research is documented. The first two essays present surveys of the national systems for stimulating the development of fundamental research, while subsequent paired case studies treat decision making in the development of a unique scientific facility; organizational mechanisms for initiating new fundamental research projects; development of major scientific centers; using the results of fundamental research in applied problems; and retrospective analysis of the state of fundamental research in the two countries. GRA

**N80-28575#** Societe Nationale Industrielle Aerospatiale, Paris (France). Dept. Analyse de la Valeur.

**VALUE ANALYSIS AND OPTIMUM COST DESIGN PRINCIPLES APPLIED BY SNIAS [L'ANALYSE DE LA VALEUR ET LE PRINCIPE CONCEPTION POUR UN COUT OPTIMUM (C.C.O.) APPLIQUEE A L'AEROSPATIALE]**

Robert Tassinari 1979 16 p In FRENCH Presented at 1st Congr. Natl. pour l'Anal. de la Valeur, Paris, 29-30 Mar. 1979 (SNIAS-792-501-104) Avail: NTIS HC A02/MF A01

The optimum cost method derived from the United States design-to-cost considerations was successfully exploited by the SNIAS. This method is based on training personnel to perform the necessary analysis. A group leader is given the responsibility of: (1) establishing performance, costs and delivery times; (2) evaluating the financial bases of the program (above all the life cycle and production costs); (3) breaking down the work into different tasks together with associated costs; and (4) organizing operational groups to study the different tasks and their implementation. Specific examples are given.

Author (ESA)

**N80-28576#** Research Inst. of National Defence, Stockholm (Sweden).

**SIMULATED ACCIDENTS IN THE HANDLING OF PHOSGENE AT KENOGARD AIR BASE, SWEDEN [MODEL-LHAVERIER VID FOSGENHANTERING VID KENOGARD AB I SUNDSVALL]**

Gunnel Dreborg, Lars Frankenberg, Edvard Karlsson, and Kenneth Nyren Dec. 1979 42 p refs In SWEDISH (FOA-A-40030-C1) Avail: NTIS HC A03/MF A01

Scenarios were prepared for activities following a leak in a phosgene processing facility. Diffusion and toxicity levels were compared for various distances for two cases. The influence of weather conditions on the severity of an accident was considered. It is concluded that an accident involving phosgene would be no worse than one involving chlorine. Author (ESA)

**N80-29201#** Massachusetts Inst. of Tech., Cambridge. Lab. for Information and Decision Systems.

**OPEN-LOOP SOLUTIONS FOR THE DYNAMIC ROUTING PROBLEM**

Samuel Shats and Adrian Segall May 1980 49 p refs (Contracts N00014-75-C-1183; N00014-77-C-0532) (AD-A085109; LIDS-R-992) Avail: NTIS HC A03/MF A01 CSCL 12/2

This work deals with the problem of obtaining an open-loop solution to the minimum delay dynamic routing problem. The dynamic routing problem is stated using a dynamic model suggested in previous works. This work uses some previously known properties of the optimal solution and formulates the routing problem as a cubic optimization problem. In general such problems are very hard to solve; however, the specific problem at hand is finally formulated as a nonconvex quadratic program by using its special structure. Two different approaches, based on the latter representation of the problem, are proposed: (a) utilization of existing methods for solving nonconvex quadratic programs, (b) development of a special purpose algorithm. The algorithm is developed for single destination networks with unity weightings in the cost functional, and it finds the optimal solution by solving a series of linear programs. The algorithm is based on a series of specially developed theorems. These theorems provide use with new insight into the behaviour of the dynamic routing in networks. The method is implemented by a computer program and several examples are run to test its applicability.

GRA

**N80-29202#** Federal Coordinating Council for Science, Engineering and Technology, Washington, D. C.

**A RESEARCH AND DEVELOPMENT MANAGEMENT APPROACH: REPORT OF THE COMMITTEE ON APPLICATION OF OMB CIRCULAR A7-76 TO R AND D**

31 Oct. 1979 105 p refs (PB80-170053) Avail: NTIS HC A06/MF A01 CSCL 05A

The general policy of the Government is established to buy the products and services it needs and to provide them, using Government resources, only on an exception basis. The need for research and development activities as a Government function is recognized through the inclusion of an 'in-house core capability' in the area of research development and testing. It is also recognized that additional guidance is required to apply the policy to research and development activities and an interagency committee under the auspices of the Federal Coordinating Council for Science, Engineering and Technology was established to study the issues and recommended guidelines for consistent and uniform agency implementation.

GRA

**N80-29203#** General Accounting Office, Washington, D. C. Program Analysis Div.

**THE NATIONAL SCIENCE FOUNDATION'S MANAGEMENT INFORMATION SYSTEM: A STATUS REPORT**

8 Apr. 1980 77 p (AD-A084753; GAO/PAD-80-7) Avail: NTIS HC A05/MF A01 CSCL 05/1

The review of the current status of the National Science Foundation's management information system and its plans for making needed improvements focuses on identifying changes planned or in process, quality controls, user satisfaction, and

cost. Reliability problems, including inaccurate and incomplete data and slow response time at computer terminals, seriously impair the system's effectiveness and frustrate its users. Recommendations for management and technical improvements made by a Foundation consultant 3 years ago have not been carried out. September 1979 study of system performance also pointed out the need for many system improvements. The Foundation can increase system reliability by improving quality control, system response time, long-range planning, performance evaluation, and administrative management. The Foundation also should determine users' needs, and establish specific, quantified goals and target dates for correcting deficiencies. GRA

**N80-29204#** Naval Postgraduate School, Monterey, Calif. **ON-LINE REAL-TIME MANAGEMENT INFORMATION SYSTEMS AND THEIR IMPACT UPON USER PERSONNEL AND ORGANIZATIONAL STRUCTURE IN AVIATION MAINTENANCE ACTIVITIES M.S. Thesis**

Benjamin A. Bayma, Jr. Dec. 1979 97 p refs (AD-A085111) Avail: NTIS HC A05/MF A01 CSCL 15/7

The introduction of a new technology into an organization can significantly impact the organization's effectiveness. Some possible effects on user personnel and organizational structure during and after the implementation of an on-line real-time computer-based management information system are explored in this thesis. The organizational structure and Management Information Service (MIS) users within aviation maintenance activities are identified. The possible impact on the informal and formal decision-making structures within these activities is predicted using a contingency model. Possible implementation strategies to minimize that impact and maximize the probability of MIS implementation success are investigated. The Naval Aviation Logistics Command Management Information System (NALCOMIS) is used as a vehicle to predict possible implementation impacts and strategies. The NALCOMIS Project Manager and his staff are provided with a partial list of possible problems areas to be aware of during NALCOMIS implementation.

GRA

**N80-29206#** Executive Office of the President, Washington, D. C. Office of Administration.

**TOWARD AN INFORMATION EFFICIENT EXECUTIVE OFFICE OF THE PRESIDENT**

15 Feb. 1980 75 p refs (PB80-167406) Avail: NTIS HC A04/MF A01 CSCL 05B

The political/policy decision making process is examined in terms of more efficient use of available information. The organization of the information to be accessed and improved support services are among the topics discussed. The role of the information processing systems in providing support services and automation of clerical activities are considered. J.M.S.

**N80-29211#** Transportation Research Board, Washington, D.C. **TECHNOLOGY TRANSFER, THE RESEARCH PROCESS, AND CREATING A PRODUCTIVE ENVIRONMENT**

W. L. Garrison, Robert C. Crawford, Al B. Linhares, George F. Linstead, Milton P. Criswell, James F. Shamblin, Dean Anklan, Dale E. Peterson, Robert P. Schmitt, and Edward A. Beimborn 1979 58 p refs

(PB80-173875; TRB/TRR-738; ISBN-0-309-02993-7; LC-80-12980; ISSN-0361-1981) Avail: NTIS HC A04/MF A01 PC also available from Transportation Research Board, 2101 Constitution Ave., NW., Washington, D.C. CSCL 13B

Several views of technology transfer and research and their effective utilization with an emphasis on transportation technology are presented. Federal, state, and local programs and activities for transportation technology transfer are examined. Also, the effectiveness of a research program, the role of management support for research, and the development of multidisciplinary research programs is addressed.

GRA

**N80-29213#** Baldwin (Fred D.), Carlisle, Pa. **THE NATIONAL CENTER FOR APPROPRIATE TECHNOLOGY: AN EVALUATION AT THE END OF ITS SECOND PROGRAM YEAR**

Fred D. Baldwin and Laurence F. Kinney 30 Jun. 1979 87 p  
(PB80-166184; CSA-LN-2414) Avail: NTIS  
HC A05/MF A01 CSCL 05A

Management of the National Center for Appropriate Technology (NCAT) is evaluated. During its first year, NCAT built up a competent technical staff and launched some promising in-house work, but otherwise largely dissipated its small resources, even after allowance was made for the inevitability of start up problems. During its second year, however, it has made a remarkable recovery, in part by adopting more conventional priorities and management methods. In several areas, it is still spreading its resources too thinly. GRA

**N80-29241#** National Bureau of Standards, Washington, D.C.  
**DIMENSIONS/NBS, VOLUME 64, NO. 1, FEBRUARY 1980**  
Feb. 1980 29 p refs  
(PB80-169527; NBS-DIM-64/1) Avail: NTIS  
HC A03/MF A01 CSCL 14B

Major technical developments, works in progress, major speeches, and statements by Bureau management, and a list of NBS publications are presented. Topics covered include: (1) the use of standard reference materials to assure quality and provide equity for consumers and producers; (2) computer models of energy and economic systems for operations research; (3) attaining improved values of fundamental physical constants such as gas constants, Rydberg constant, and electron-photon mass ratio; (4) gas standard reference materials for emissions testing of heavy duty motor vehicles; (5) eddy current imaging system; (6) calculating atomic properties; and (7) the resolution of photon-recoil components of the visible line spectral line. A.R.H.

**N80-29246#** CACI, Inc. - Federal, Arlington, Va.  
**AVIATION COMPONENT REPAIR PROGRAM ANALYSIS, VOLUME 1 Final Report**  
Mar. 1980 65 p  
(Contract N00014-80-C-0097)

(AD-A086060) Avail: NTIS HC A04/MF A01 CSCL 15/5  
Depot repair of aviation repairable components supports the flight operations of the U.S. Navy and Naval Reserve Aircraft. In order to determine an appropriate measure of effectiveness which could be used to assess the impact of the component repair program, several statistical analyses were performed comparing financial and other data related to the Aviation Component Repair Program, data in aviation related programs and various effectiveness measures. GRA

**N80-29247#** Cost Analysis Improvement Group, Washington, D.C.

**AIRCRAFT OPERATING AND SUPPORT COST DEVELOPMENT GUIDE**

15 Apr. 1980 23 p  
(AD-A085854) Avail: NTIS HC A02/MF A01 CSCL 14/1

This document provides guidelines for preparing and presenting estimates of operating and support (O S) costs to the OSD Cost Analysis Improvement Group (CAIG) and the Defense Systems Acquisition Review Council (DSARC). These guidelines are intended to achieve consistent and effective preparation and documentation of major system O S cost estimates. This guide updates and expands the CAIG 'Cost Development Guide for Aircraft Systems' originally published in May 1974. GRA

**N80-29265#** Battelle Columbus Labs., Ohio.  
**EVALUATION OF SAFETY PROGRAMS WITH RESPECT TO THE CAUSES OF AIR CARRIER ACCIDENTS**

T. M. Connor and C. W. Hamilton Jan. 1980 257 p refs  
(Contract DOT-FA77WA-4072)  
(AD-A085347; FAA-ASP-80-1) Avail: NTIS  
HC A12/MF A01 CSCL 13/12

The objective of this study was to determine the extent to which the FAA safety programs were aligned with the causes of air carrier accidents. The data base used in this study consisted of a total of 760 air carrier accident records compiled by the National Transportation Safety Board (NTSB) from 1966 through 1975. Analysis of these records was made with

respect to NTSB-cited cause/factors. FAA programs implemented during the study time period and pertaining to safety were also included in this study. Conclusions of this study are: (1) no substantive change is required with respect to mechanical safety programs, (2) broader investigation into the integration of environmental programs with human factors programs is required, (3) new program initiatives addressing human error problems in behavior terms are required. GRA

**N80-29269#** ECON, Inc., Princeton, N. J.  
**THE ALLOCATION OF RUNWAY SLOTS BY AUCTION, VOLUME 1: EXECUTIVE SUMMARY Final Report**

F. M. Sand and M. L. Balinski 15 Apr. 1980 50 p refs 3 Vol.

(Contract DOT-FA79WA-4374)  
(AD-A085739; FAA-AVP-80-3-Vol-1) Avail: NTIS  
HC A03/MF A01 CSCL 01/2

The allocation of runway slots at the high-density airports by means of an auction is studied. Previous approaches to slot auctions have not allowed for the interdependency of slot values to the air carriers; a single slot for a landing of an aircraft is likely to be of little value without a corresponding slot for a subsequent take-off of that aircraft. A Slot Exchange Auction is designed, its theoretical properties and practical implementation discussed. It is shown to allow the slot market to reach an efficient equilibrium under competitive conditions. The Airline Management Game is used to create a simulation test of the Slot Exchange Auction and its associated continuous market, the slot exchange. GRA

**N80-29270#** ECON, Inc., Princeton, N. J.  
**THE ALLOCATION OF RUNWAY SLOTS BY AUCTION, VOLUME 2: THE AIRLINE MANAGEMENT GAME AND SLOT AUCTION TESTING Final Report**

F. M. Sand and M. L. Balinski Apr. 1980 178 p refs Prepared in cooperation with Flight Transportation Associates, Cambridge, Mass. 3 Vol.

(Contract DOT-FA79WA-4374)  
(AD-A085438; FAA-AVP-80-3-Vol-2) Avail: NTIS  
HC A09/MF A01 CSCL 01/2

A specific mechanism for allocating slots between competing air carriers based on a sequential auction procedure is analyzed. The mechanism is shown to achieve an efficient slot solution where one exists. In case there is no efficient solution, it is proposed that the slot market remain open continuously throughout the six months of operations so that air carriers can exchange slots on the open slot market in order to improve the balance between slot allocations and flight schedules. The continuous slot exchange has the additional advantage that it allows changes in the allocation of scarce runway capacity in response to changing economic and air transportation conditions. J.M.S.

**N80-29271#** ECON, Inc., Princeton, N. J.  
**THE ALLOCATION OF RUNWAY SLOTS BY AUCTION, VOLUME 3: THEORY AND TECHNICAL ISSUES FOR IMPLEMENTATION Final Report**

F. M. Sand and M. L. Balinski Apr. 1980 87 p refs 3 Vol.  
(Contract DOT-FA79WA-4374)  
(AD-A085455; AVP-80-3-Vol-3) Avail: NTIS  
HC A05/MF A01 CSCL 01/2

In order to evaluate the viability of the slot exchange auction and subsequent continuous slot exchange, an interactive computer simulation of actual slot auctions was conducted using the Airline Management Game. The scenario included 5 competing airlines and 17 airports with 3 of them being capacity-limited. Hourly quotes for the airports were established based on the airport activity profiles obtained in the base case. The participants were instructed to maximize short-run airline profits using a fixed fleet of aircraft and fixed fares, but free choice of routes and schedules. The schedules were assumed to operate for six months at a time. The Airline Management Game is outlined, and the experimental design, the bidding rules, and the results and analyses of the evaluation exercise are included. The testing of the slot allocation methods is demonstrated. The test was inconclusive

## N80-29289

in regard to convergence to equilibrium and the economic efficiency and equitability of the slot exchange method. J.M.S.

### **N80-29289#** Naval Air Systems Command, Washington, D. C. **DESIGNING ON-CONDITION TASKS FOR NAVAL AIR-CRAFT**

1 Mar. 1980 50 p  
(AD-A085450) Avail: NTIS HC A03/MF A01 CSCL 01/3

Contents: Preventive Maintenance Processes, A History of the 'On Condition' Maintenance Process, A Comparison of Benefits; Non-Destructive Inspection and Testing -- Current Commercial Practice, Future Opportunities; Applications -- Structures, Powerplants, Examples; Designing an 'On-Condition' Task and Measuring Results -- Designing an 'On-Condition' Task, Measuring Results. GRA

### **N80-29833** Centec Corp., Fort Lauderdale, Fla. **THE COATING INDUSTRY: ENERGY SAVINGS WITH VOLATILE ORGANIC COMPOUND EMISSION CONTROL** Washington, D.C. DOE 1979 111 p refs (TID-28706) Copyright. Avail: Issuing Activity

Technical and economic data are presented to enable engineers and managers in the coating industry to evaluate the energy-conservation opportunities for installation of solvent emission-control systems. Although the properties of the solvents vary considerably, the information will serve to improve the ability of the engineer to make quick estimations of energy savings, energy rates, economics, and performance of control systems and heat-recovery options. Emphasis is directed to a discussion of add-on devices, such as thermal and catalytic incineration. Extensive graphics and illustrations show energy use, and economics; these are supplemented by calculations to be used by each plant to determine site-specific data. Author

### **N80-30061#** Colorado Univ. at Boulder. **FLIGHT SOFTWARE REQUIREMENTS AND DESIGN SUPPORT SYSTEM Final Report** William E. Riddle and Bryan Edwards Aug. 1980 18 p (Grant NsG-1638) (NASA-CR-163425) Avail: NTIS HC A02/MF A01 CSCL 09B

The desirability and feasibility of computer-augmented support for the pre-implementation activities occurring during the development of flight control software was investigated. The specific topics to be investigated were the capabilities to be included in a pre-implementation support system for flight control software system development, and the specification of a preliminary design for such a system. Further, the pre-implementation support system was to be characterized and specified under the constraints that it: (1) support both description and assessment of flight control software requirements definitions and design specification; (2) account for known software description and assessment techniques; (3) be compatible with existing and planned NASA flight control software development support system; and (4) does not impose, but may encourage, specific development technologies. An overview of the results is given. R.K.G.

### **N80-30062#** Colorado Univ. at Boulder. Dept. of Computer Science. **FUNCTIONAL SPECIFICATIONS OF THE ANNULAR SUSPENSION POINTING SYSTEM, APPENDIX A** Bryan Edwards Jan. 1980 22 p (Grant NsG-1638) (NASA-CR-163419; CU-CS-171-80-APP-A; RSSM/99-App-A) Avail: NTIS HC A02/MF A01 CSCL 09B

The Annular Suspension Pointing System is described. The Design Realization, Evaluation and Modelling (DREAM) system, and its design description technique, the DREAM Design Notation (DDN) is employed. R.K.G.

### **N80-30063#** Colorado Univ. at Boulder. Dept. of Computer Science.

### **TOOLS TO AID THE SPECIFICATION AND DESIGN OF FLIGHT SOFTWARE, APPENDIX B**

Guy Bristow Jan. 1980 11 p refs  
(Grant NsG-1638)  
(NASA-CR-163420; CU-CS-168-80-App-B; RSSM/97-App-B) Avail: NTIS HC A02/MF A01 CSCL 09B

The tasks that are normally performed during the specification and architecture design stages of software development are identified. Ways that tools could perform, or aid the performance, of such tasks are also identified. Much of the verification and analysis that is suggested is currently rarely performed during these early stages, but it is believed that this analysis should be done as early as possible so as to detect errors as early as possible. R.K.G.

### **N80-30064#** Colorado Univ. at Boulder. Dept. of Computer Science.

#### **SOFTWARE DEVELOPMENT TOOLS: A BIBLIOGRAPHY, APPENDIX C.**

William E. Riddle Jun. 1980 13 p  
(Grant NsG-1638)  
(NASA-CR-163421; CU-CS-183-80-App-C; RSSM/103-App-C) Avail: NTIS HC A02/MF A01 CSCL 09B

A bibliography containing approximately 200 citations on tools which help software developers perform some development task (such as text manipulation, testing, etc.), and which would not necessarily be found as part of a computing facility is given. The bibliography comes from a relatively random sampling of the literature and is not complete. But it is indicative of the nature and range of tools currently being prepared or currently available. R.K.G.

### **N80-30065#** Colorado Univ. at Boulder. Dept. of Computer Science.

#### **SOFTWARE DEVELOPMENT ENVIRONMENTS: PRESENT AND FUTURE, APPENDIX D**

William E. Riddle 1980 8 p refs Repr. from the Proc. Intern. Computer Technol. Conf., Aug. 1980 8 p Presented at the Intern. Computer Technol. Conf., San Francisco, Aug. 1980  
(Grant NsG-1638)  
(NASA-CR-163426; RSSM/96-App-D) Avail: NTIS HC A02/MF A01 CSCL 09B

Computerized environments which facilitate the development of appropriately functioning software systems are discussed. Their current status is reviewed and several trends exhibited by their history are identified. A number of principles, some at (slight) variance with the historical trends, are suggested and it is argued that observance of these principles is critical to achieving truly effective and efficient software development support environments. Author

### **N80-30066#** Colorado Univ. at Boulder. **AN ASSESSMENT OF DREAM, APPENDIX E**

William E. Riddle 1980 32 p refs Repr. from Software Eng. Environ. (Amsterdam), 1980 32 p  
(Grant NsG-1638)  
(NASA-CR-163422; RSSM/100-App-E) Avail: NTIS HC A03/MF A01 CSCL 09B

The design realization, evaluation and modelling (DREAM) system is evaluated. A short history of the DREAM research project is given as well as the significant characteristics of DREAM as a development environment. The design notation which is the basis for the DREAM system is reviewed, and the development tools envisioned as part of DREAM are discussed. Insights into development environments and their production are presented and used to make suggestions for future work in the area of development environments. A.R.H.

### **N80-30067#** Colorado Univ. at Boulder. Dept. of Computer Science.

#### **SOFTWARE DEVELOPMENT ENVIRONMENT, APPENDIX F**

William E. Riddle Oct. 1980 12 p Presented at the COMPSAC 80 Panel, Chicago, Oct. 1980  
(Grant NsG-1638)

(NASA-CR-163423; CU-CS-182-80-App-F) Avail: NTIS HC A02/MF A01 CSCL 09B

The current status in the area of software development environments is assessed. The purposes of environments, the types of environments, the constituents of an environment, the issue of environment integration, and the problems which must be solved in preparing an environment are discussed. Some general maxims to guide near-term future work are proposed. R.K.G.

**N80-30068\***# Colorado Univ. at Boulder. Dept. of Computer Science.

**SOFTWARE DEVELOPMENT ENVIRONMENTS: A BIBLIOGRAPHY, APPENDIX G**

William E. Riddle Jun. 1980 10 p  
(Grant NsG-1638)

(NASA-CR-163424; CU-CS-184-80-App-G; RSSM/104-App-G) Avail: NTIS HC A02/MF A01 CSCL 09B

A bibliography containing approximately 100 citations on software development environments is given. The bibliography comes from a relatively random sampling of the literature and is not complete. R.K.G.

**N80-30134** Kentucky Univ., Lexington.

**OPTIMAL ALLOCATION OF RESOURCES TO REDUCE PRODUCT OR PROCESS VARIABILITY; A COMPARISON OF SOME DESIGNS TO ESTIMATE THE ALLOCATION PARAMETERS AND THE VARIANCE COMPONENTS**  
Ph.D. Thesis

Jeffrey Howell Schwartz 1980 143 p  
Avail: Univ. Microfilms Order No. 8018263

Assuming the variance to be reduced is the sum of variance components, optimal reduction entails optimally allocating a limited resource to reduce each component. Two specific variance reduction function (VFR) types, an exponential-type VFR and a step-type VFR, are defined. For both VFR types, the solution to the optimal allocation problem is obtained. The solutions are valid for an arbitrary number of variance components. To investigate the effect, on optimal reduction, of variance component estimation and experimental design, a three stage nested model is adopted and a simulation study carried out. The simulation, together with asymptotic results, is used to compare the designs with respect to variance component estimation. Tables of the mean variance, bias, and MSE of the estimates are presented. Asymptotic variance-covariance matrices are derived. Numerical values of the determinant, trace, and adjusted trace are calculated and tabulated. Equivalence of two formulations of asymptotic variance is demonstrated. An overall design comparison summary table, including asymptotic and simulation results, variance reduction and variance component estimation results, is presented. Dissert. Abstr.

**N80-30218#** Decisions and Designs, Inc., McLean, Va.

**QVAL AND GENTREE: TWO APPROACHES TO PROBLEM STRUCTURING IN DECISION AIDS**

Jonathan J. Weiss Apr. 1980 157 p refs

(Contract N00014-79-C-0068; ARPA Order 3668)  
(AD-A086059; TR-80-3-97) Avail: NTIS HC A08/MF A01 CSCL 09/2

Decision analysis is a technology which offers the decision maker a logical structure for solving a specific problem. Through the process of decision analysis, the decision maker may select from several options the one that best suits his/her needs. In practical applications, most decision analytic techniques require a specially trained decision analyst and a sizeable amount of time and expense. This report describes two computer-assisted decision aids which are designed to perform preliminary decision analyses in the absence of a professional decision analyst and for a restricted set of decision problems. The first decision aid, QVAL (Quick Evaluation), has been implemented on an IBM 5110 portable computer and is ready for operation on an experimental basis. QVAL is an interactive program designed to probe the user's memory for a complete set of attributes together with the scores and weights for a consistent evaluation of a set of options. The second decision aid, GenTree (Generic Tree

Structuring), is still in the planning stage, but promises to be very valuable in storing experience and knowledge gained while working on problems and applying it to guide the analysis of subsequent ones. By utilizing prior knowledge stored in the GenTree database, this decision aid would approximate the performance of a decision analyst on familiar problem types. In contrast, QVAL would more resemble the performance of the decision analyst on a completely new application area. With the continuing progress being made in the fields of artificial intelligence and interactive computer graphics, more sophisticated computer-assisted decision aids of this nature may be designed. GRA

**N80-30219#** Honeywell Systems and Research Center, Minneapolis, Minn.

**DECENTRALIZED CONTROL Final Report, 1 Jul. 1978 - 30 Dec. 1979**

E. D. Jensen May 1980 34 p refs

(Contract N00014-78-C-0511)  
(AD-A085956; HONEYWELL-80SRC36) Avail: NTIS HC A03/MF A01 CSCL 12/1

A conceptual model of decentralized control for computer systems is presented. The model is founded on the principle that an activity at any particular level of abstraction is decentralized if there is no unique lowerlevel entity which enforces a consistent view of the activity state on the entities involved in that activity. Three factors are presented to determine how decentralized the control of an individual resource is: the number of controllers of a resource, the extent that each controller is involved in every control activity, and the parity of the controllers: authority. Two factors are presented to determine the decentralization of system-wide control: the number of controllers involved in each instance of multilateral management and the number of resources involved in each instance of multilateral management. Physical communication issues are discussed which effect the logical decentralization of control. Communication is considered to consist of the production and manifestation of signals. The observability of signals is the practical difference between the signal production and manifestation. Three factors of signal observability are presented: completeness, coherence, and latency. GRA

**N80-30220#** Massachusetts Inst. of Tech., Cambridge.

**THE INTRODUCTION OF FEEDBACK INTO A HIERARCHICAL PRODUCTION PLANNING SYSTEM**

Stephen C. Graves Mar. 1980 31 p refs

(Contract N00014-75-C-0556)  
(AD-A085833; TR-177) Avail: NTIS HC A03/MF A01 CSCL 12/2

This paper proposes and tests a framework for decomposing a large scale production planning problem, modeled as a mixed-integer linear program. We interpret this decomposition in the context of Hax and Meal's hierarchical framework for production planning. The procedure decomposes the production planning problem into two subproblems which correspond to the aggregate planning subproblem and a disaggregation subproblem in the Hax-Meal framework. The linking mechanism for these two subproblems is an inventory consistency relationship which is priced out by a set of Lagrange multipliers. The best values for the multipliers are found by an iterative procedure which may be interpreted as a feedback mechanism in the Hax-Meal framework. At each iterative, the procedure finds both a lower bound on the optimal value to the production planning problem and a feasible solution from which an upper bound is obtained. Our computational tests show that the best feasible solution found from this procedure is very close to optimal. For thirty-six test problems the percentage deviation from optimality never exceeds 4.4%, and the average percentage deviation is 2.2%. Twenty-seven of the test problems are mixed-integer linear programs with 240 zero-one variables, while nine test problems have 480 zero-one variables. GRA

**N80-30226#** Committee of Conference (U. S. Congress).

**NATIONAL AERONAUTICS AND SPACE ADMINISTRATION AUTHORIZATION ACT, 1981**

## N80-30227

Washington, D.C. GPO 1980 5 p  
(Pub-Law-96-316; GPO-59-139) Avail: US Capitol, Senate Document Room

The congressional act authorizing appropriations to the National Aeronautics and Space Administration for research and development, construction of facilities, and research and program management is presented. A breakdown of allocations to specific projects is provided, and expenditure provisions are outlined.

M.G.

## N80-30227 Columbia Univ., New York. ALTERATION AND ADAPTION AS DECISION-MAKING CRITERIA FOR THE TRANSFER OF TECHNOLOGY Ph.D. Thesis

Hyo Joon Hahm 1978 187 p  
Avail: Univ. Microfilms Order No. 8016957

The patterns of transfer of technology are discussed. It is suggested that the effective transfer of technology is directly related to the capability of the technology recipient to (1) alter the imported technology to conform to defined local conditions; (2) to adapt itself to that technology; or (3) both. Criteria for the effective transfer of technology (alteration and adaptation) are identified and their importance is demonstrated.

Dissert. Abstr.

## N80-30345# European Space Agency, Paris (France). [REPORT ON EUROPEAN SPACE ACTIVITIES, 1979] Annual Report

1979 175 p refs Original contains color illustrations  
Avail: NTIS HC A08/MF A01

The year's activities are outlined including the scientific program, remote sensing, telecommunications, Spacelab, Ariane, satellite operations and data processing. Scientific and technical information services, ground facilities, administration, and budget are also discussed.

Author (ESA)

## N80-30488# University Coll. of Swansea (Wales). Dept. of Metallurgy and Materials Technology. REVIEW OF EUROPEAN POWDER METALLURGY OF SUPERALLOYS Technology Assessment Report

R. W. Evans Dec. 1979 65 p refs Sponsored in part by AFOSR  
(AD-A086682; EOARD-TR-80-10) Avail: NTIS  
HC A04/MF A01 CSCL 11/6

This review is an attempt to summarize the state of research and development in Europe into powder metallurgy of superalloys, and to ascertain which areas of the technology still require attention before the promised advantages of the powder metallurgy route are achieved. Although 'superalloys' are normally taken to be those alloys whose bases are nickel or cobalt, the present review deals with materials which are currently in prospect of production by powder metallurgy and which find use in the hot parts of aeroturbines. Thus it includes an account of some ferritic materials and some titanium alloys. The review deals with disc and blade alloys and discusses powder production, consolidation and the relationships between processing, structure and the final properties of powder alloys.

GRA

## N80-31264# General Accounting Office, Washington, D. C. Financial and General Management Studies Div.

### WIDER USE OF BETTER COMPUTER SOFTWARE TECHNOLOGY CAN IMPROVE MANAGEMENT CONTROL AND REDUCE COSTS Report to the Congress

29 Apr. 1980 67 p refs  
(PB80-178254; FGMSD-80-38) Avail: NTIS  
HC A04/MF A01 CSCL 05A

Because the Federal Government spends billions of dollars annually on computer programs, GAO made this review to determine if the latest tools and techniques were being used to develop and maintain those programs. Computer specialists at many agencies were unaware of the newer, better methods; others were reluctant to change to them. The Government can improve management control and save significant amounts through appropriate use of better software tools and techniques. GAO recommends various ways to promote such use.

GRA

## N80-31269\*# National Aeronautics and Space Administration, Washington, D. C.

### NASA PROGRAM PLAN Fiscal Years, 1981 - 1985

Jan. 1980 233 p  
Avail: NTIS HC A11/MF A01 CSCL 05A

Major facts are given for NASA'S planned FY-1981 through FY-1985 programs in aeronautics, space science, space and terrestrial applications, energy technology, space technology, space transportation systems, space tracking and data systems, and construction of facilities. Competition and cooperation, reimbursable launchings, schedules and milestones, supporting research and technology, mission coverage, and required funding are considered. Tables and graphs summarize new initiatives, significant events, estimates of space shuttle flights, and major missions in astrophysics, planetary exploration, life sciences, environmental and resources observation, and solar terrestrial investigations. The growth in tracking and data systems capabilities is also depicted.

A.R.H.

## N80-31342# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).

### THE APPLICATION OF DESIGN TO COST AND LIFE CYCLE COST TO AIRCRAFT ENGINES

May 1980 168 p refs Conf. held at Saint Louis, France,  
12-13 May 1980 and London, 15-16 May 1980  
(AGARD-LS-107; ISBN-92-835-0265-5) Avail: NTIS  
HC A08/MF A01

The cost of design and development of weapon systems must include not only the cost of production but also deployment training, operational use, and support. The latest methodologies of cost/performance comparison and tradeoffs for aircraft engines are examined with emphasis on data collection, analysis, modelling and estimating all development and operations costs. Contractual provisions and the costs related to incentives for performance and reliability are included. For individual titles, see N80-31343 through N80-31349.

## N80-31345# Air Force Systems Command, Wright-Patterson AFB, Ohio. Aeronautical Systems Div.

### PROGRESS ON THE US AIR FORCE APPROACH FOR THE PRACTICAL MANAGEMENT OF ENGINE LIFE CYCLE COSTS

Richard E. Steere, Edward G. Koepnick, and Robert A. Dean /In  
AGARD The Appl. of Design to Cost and Life Cycle Cost to  
Aircraft Eng. May 1980 10 p refs

Avail: NTIS HC A08/MF A01

Efforts to more effectively influence the life cycle costs of newly acquired gas turbine power plants are reviewed. A combination of technical and business practice initiatives was undertaken or planned across the entire life cycle spectrum, i.e., from first entry with the exploratory development program through the decision to phase the product out of the active inventory. The status of technical and management activities is addressed and various business concepts and strategies being studied by the U.S. Air Force which complement the earlier initiatives as they impact engine life cycle costs are presented. The role of the USAF Propulsion System Program Office as the continuing focal point for these life cycle efforts is discussed. The ideas presented are not new as they have been employed successfully at one time or another on an individual basis in the development and support of military and commercial gas turbine power plants. What is new, is the systems management view of the life cycle process and what can be done practically today vs tomorrow to enhance engine life cycle costs in an integrated fashion.

A.R.H.

## N80-31346# Societe Nationale d'Etude et de Construction de Moteurs d'Aviation, Paris (France).

### MILITARY ENGINE PROGRAMS WITH COST OBJECTIVES [PROGRAMMES DE MOTEURS MILITAIRE A OBJECTIES DE COUT]

Claude Foure /In AGARD The Appl. of Design to Cost and  
Life Cycle Cost to Aircraft Eng. May 1980 28 p In FRENCH  
Avail: NTIS HC A08/MF A01

Approaches discussed include the analysis of value; reliability and maintainability studies; the direct operating cost of motor parts as considered by aircraft companies; and the management of efforts in technological progress. Topics covered include means for forecasting costs which are desirable to set at each phase of the program; the types of organization adapted to such programs; and possible action to be taken when the objectives are fixed or revised after initial definition, with or without modification of the definition. Economy measures related to the high cost of fuels and return from the value concept and tradeoffs are also examined. Transl. by A.R.H.

**N80-31347#** General Electric Co., Lynn, Mass. Aircraft Engine Group.

**LOGISTICS FORECASTING FOR ACHIEVING LOW LIFE CYCLE COST**

G. Walker *In* AGARD The Appl. of Design to Cost and Life Cycle Cost to Aircraft Eng. May 1980 25 p refs

Avail: NTIS HC A08/MF A01

The on condition maintenance concept (OCM) provides the potential for reduced life cycle costs (LCC) by fully utilizing potential parts life and reducing maintenance frequency. With the advent of OCM logistics requirements are heavily influenced by wearout characteristics and usage severity. In such cases more sophisticated forecasting methods are required which realistically represent the dynamics of the logistics system inherent in such a maintenance philosophy. If efficient logistics management is to be attained, such forecasting tools should also provide the capability to perform tradeoff studies on the cost effectiveness of alternative maintenance or logistics systems. The use of modelling methods which are proving practical in forecasting and tradeoff analyses and therefore in establishing an optimum logistics and support environment is explored. Methods discussed include the consideration of wearout characteristics where components exhibit an age related replacement rate, and also replacement of components which may have a specified maximum life in terms of operating cycles or mission severity. The use of engine history recorders and parts tracking systems and their impact on achieving optimum LCC is also discussed. A.R.H.

**N80-31348#** Rolls-Royce Ltd., Bristol (England). Aero Div. **THE APPLICATION OF DESIGN TO COST AT ROLLS-ROYCE**

R. J. Symon and K. J. Dangerfield *In* AGARD The Appl. of Design to Cost and Life Cycle Cost to Aircraft Eng. May 1980 17 p

Avail: NTIS HC A08/MF A01

Experience in evolving and applying a formal design to cost discipline is described in chronological order of the main events which occurred during the last five years with brief reference to the previous period. A new type of department was created to face the principal problem, that control of costs requires interactive links between the management disciplines at all levels. The way in which this group fits into the existing organization to ensure that effective cost control becomes part of the established routines is discussed. Comments are made on the nature of cost and its fundamental difference from the other parameters which the designer has traditionally managed. Conclusions likely to apply to any commercial manufacturing company are suggested and comments made regarding the future responsibility of engineers in determining the financial success of the companies for which they work. Complementary roles for management and financial accountants to support the new responsibilities of the engineers are also indicated. A.R.H.

**N80-31349#** Boeing Aerospace Co., Seattle, Wash. Systems Cost Analysis Div.

**EVALUATING AND SELECTING THE PREFERRED AIR BREATHING WEAPON SYSTEM**

Frank A. Watts *In* AGARD The Appl. of Design to Cost and Life Cycle Cost to Aircraft Eng. May 1980 16 p

Avail: NTIS HC A08/MF A01

The life cycle costs of three equally effective strategic forces are discussed with the objective of isolating the preferred air-

breathing component. Terms are defined, cost elements are reviewed, and an example is described in which various strategic forces containing advanced aircraft are compared and the preferred choice is dependent on whether least cost is measured by short term, long term, or intermediate budgetary considerations. A.R.H.

**N80-31418\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

**MATERIALS PROCESSING IN SPACE PROGRAM TASKS Fiscal Year, 1980**

R. J. Naumann, ed. Aug. 1980 193 p (NASA-TM-78294) Avail: NTIS HC A09/MF A01 CSCL 22A

The history, strategy, and overall goal of NASA's Office of Space and Terrestrial Applications program for materials processing in space are described as well as the organizational structures and personnel involved. An overview of each research task is presented and recent publications are listed. A.R.H.

**N80-31626#** Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Systems and Logistics.

**SOME CIVIL ENGINEERING AND MANAGEMENT ASPECTS OF CONVERSION FROM JP-4 TO JP-8 FUEL BY THE UNITED STATES AIR FORCE IN THE CONTINENTAL UNITED STATES M.S. Thesis**

Steven M. Pittman and J. Parke K. Smith Jun. 1980 96 p refs

(AD-A087221; AFIT-LSSR-5-80) Avail: NTIS HC A05/MF A01 CSCL 15/5

The purpose of this thesis is to examine the possible conversion in the CONUS from JP-4 turbine fuel to JP-8. While many studies have been conducted to analyze the effects of the conversion on aircraft and support systems there has been little work done to analyze the effects on the facilities in which the fuel is stored and transported. This thesis examines the effects of conversion on the fuel bulk storage tanks and on the piping and pumping system used to transport the fuel. Where appropriate, recommendations have been made concerning the modifications necessary to these facilities to counter any detrimental effects associated with the conversion. GRA

**N80-31685\*#** Arinc Research Corp., Annapolis, Md. **VIDEO DISTRIBUTION SYSTEM COST MODEL Final Report**

I. Gershkoff, J. Kent Haspert, and B. Morgenstern Jul. 1980 225 p

(Contract NAS5-25401)

(NASA-CR-160020; Publ-1358-01-3-2238) Avail: NTIS HC A10/MF A01 CSCL 17B

A cost model that can be used to systematically identify the costs of procuring and operating satellite linked communications systems is described. The user defines a network configuration by specifying the location of each participating site, the interconnection requirements, and the transmission paths available for the uplink (studio to satellite), downlink (satellite to audience), and voice talkback (between audience and studio) segments of the network. The model uses this information to calculate the least expensive signal distribution path for each participating site. Cost estimates are broken down by capital, installation, lease, operations and maintenance. The design of the model permits flexibility in specifying network and cost structure. T.M.

**N80-32116** California Univ., Santa Barbara. **MODELING A SOFTWARE ENGINEERING PROJECT MANAGEMENT SYSTEM Ph.D. Thesis**

Richard Hall Thayer 1979 751 p

Avail: Univ Microfilms Order No. 8019850

A model of a Software Engineering Project Management System was developed and then verified (or corrected) through the use of structured case studies. The major issues opinion survey identified 20 major problems in project management: 13 of the 20 were overwhelming major problems; 7 were problems of a lesser magnitude. The project management survey data (structured case studies), were also used to verify the results of

## N80-32125

the major issues opinion survey. Nine of the 20 major issues were verified as problems, two were inconclusive, and nine were not problems. As a result, six major issues concerning planning and one concerning controlling were judged conclusively as problems by both surveys. It is shown that software engineering project management has all the basic functions of any management task; that the major issues of software engineering project management can be identified and will act as road signs for research in project management; and, that various functions and activities of a development project can be identified that will improve the project manager's capability to deliver his project on time, within cost, and in response to the user's needs.

Dissert. Abstr.

**N80-32125#** Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).

### **GUIDANCE AND CONTROL SOFTWARE**

Louis J. Urban, ed. (Aeronautical Systems Div.) May 1980 221 p refs In ENGLISH and FRENCH (AGARD-AG-258; ISBN-92-835-0267-1) Avail: NTIS HC A10/MF A01

Software design and management are discussed with respect to avionics applications. Particular attention is given to guidance and control systems, communication systems, and weapon systems.

**N80-32128#** Naval Air Development Center, Warminster, Pa. Advanced Software Technology Div.

### **A MODERN FACILITY FOR SOFTWARE PRODUCTION AND MAINTENANCE**

H. G. Stuebing In AGARD Guidance and Control Software May 1980 14 p refs

Avail: NTIS HC A10/MF A01

A facility was designed, developed, and used for the life cycle support of weapon system software. This facility consists of a software system which runs on a commercial multicomputer configuration. The approach features increased management visibility of the software development process, increased programmer productivity through automation, reducing the cost of change during maintenance, and the use of automated regression testing to improve software quality. R.C.T.

**N80-32133#** Naval Air Development Center, Warminster, Pa. **SOFTWARE MAINTENANCE MANAGEMENT PROCESS**

William R. Bogdan In AGARD Guidance and Control Software May 1980 9 p

Avail: NTIS HC A10/MF A01

The management concepts utilized in developing a maintenance capability to support fleet tactical software are addressed. The tactical software being maintained is described and the kind of management planning that is essential to fleet software maintenance is presented. Software design factors are discussed that will reduce maintenance costs by making the initial software development more amenable to subsequent modification. The methodology the Navy uses to control changes to a software configuration baseline is addressed and how the Navy insures reliability of the software prior to fleet release is included. Also provided is an overview for the work breakdown structure and the organization of resources for work accomplishment. Estimating procedures are described for determining software maintenance cost. R.C.T.

**N80-32141#** Naval Air Development Center, Warminster, Pa. Combat Systems Software Div.

### **SOFTWARE APPLICATIONS AS DEMONSTRATED IN THE P-3C AVIONICS SYSTEM**

John W. Heap In AGARD Guidance and Control Software May 1980 15 p refs

Avail: NTIS HC A10/MF A01

The software management methodology developed for generation of the P-3C system software for the three UPDATE

versions of the avionics system is covered. Emphasis is placed on the software development flow process depicting control points and deliverables, standards and objectives set for the software functions and design, the contracting strategy, and tool and facilities employed. M.G.

**N80-32270\*#** National Aeronautics and Space Administration, Marshall Space Flight Center, Huntsville, Ala.

### **PAYLOAD CREW TRAINING SCHEDULER (PACTS) USER'S MANUAL**

David L. Shipman Jul. 1980 308 p (NASA-TM-78284) Avail: NTIS HC A14/MF A01 CSCL 05A

The operation of the payload specialist training scheduler (PACTS) is discussed in this user's manual which is used to schedule payload specialists for mission training on the Spacelab experiments. The PACTS program is a fully automated interactive, computerized scheduling program equipped with tutorial displays. The tutorial displays are sufficiently detailed for use by a program analyst having no computer experience. The PACTS program is designed to operate on the UNIVAC 1108 computer system, and has the capability to load output into a PDP 11/45 Interactive Graphics Display System for printing schedules. The program has the capacity to handle up to three overlapping Spacelab missions. R.K.G.

**N80-32271#** Air Force Academy, Colo.

### **A RESEARCH ACTIVITIES MANAGEMENT SYSTEM Final Report, 1 Nov. 1979 - 27 Feb. 1980**

John S. Wilkes Feb. 1980 43 p (AF Proj. 2303) (AD-A086576; FJSRL-TR-80-0007) Avail: NTIS HC A03/MF A01 CSCL 05/2

A Research Activities Management System is described. It is a computerized storage and retrieval system that allows the manager of a scientific or engineering research organization to receive an organized accounting of the research activities of the organization. The scope of the data base and the nature of the items comprising the data base are defined. Examples of the use of the system are presented, using the research activities of a chemistry basic research laboratory as the data base. GRA

**N80-32272#** Skelly and Loy, Harrisburg, Pa.

### **GENERAL APPLICATION OF THE CRITICAL PATH METHOD TO RESOURCE CHARACTERIZATION AND PLANNING FOR UNDERGROUND COAL MINING Final Technical Report May 1980 287 p refs**

(Contract DE-AC01-79ET-11268) (DOE/ET-11268/3) Avail: NTIS HC A13/MF A01

Application of the critical path method (CPM) to the total mine planning process is described. A commercially available CPM software package called SPRED (Solution of the Precedence Diagram) was chosen. A key prerequisite to the application of CPM was the identification of all of the activities involved in the mine planning process and the determination of all of the interrelationships that exist between them. A network format depicted all of the activities as labeled boxes in their proper logical sequence of events. Interdependencies were shown by lines connecting the related activities. Information necessary for the application of critical path scheduling techniques was produced and the data prepared in the format suitable for input to the SPRED system. DOE

**N80-32274#** Range Commanders Council, White Sands Missile Range, N. Mex. Documentation Group.

### **UNIVERSAL DOCUMENTATION SYSTEM HANDBOOK, VOLUME 1: SYSTEM DESCRIPTION, PROGRAM INTRODUCTION AND STATEMENT OF CAPABILITY Final Report**

Nov. 1979 91 p Supersedes DG-501-70-Vol-1 3 Vol. (AD-A087072; DG-501-79-Vol-1; DG-501-70-Vol-1) Avail: NTIS HC A05/MF A01 CSCL 14/2

This handbook describes the Universal Documentation System (UDS). The UDS is used to formally document user agency test program support requirements and support agency capabilities

and commitments to support those requirements. The UDS handbook is published in three volumes. Volume 1 describes the total UDS structure, the individual documents within the system, and the use and control of the system. Volume 1 also includes sample forms and specific instructions for the Program Introduction (PI) and Statement of Capability (SC) documents which are the first level of UDS documents. GRA

**N80-32275#** Range Commanders Council. White Sands Missile Range, N. Mex.

**UNIVERSAL DOCUMENTATION SYSTEM HANDBOOK. VOLUME 2: PROGRAM REQUIREMENTS AND OPERATIONS REQUIREMENTS DOCUMENTS**

Nov. 1979 281 p 3 Vol.  
(AD-A087073) Avail: NTIS HC A13/MF A01 CSCL 14/2

This handbook describes the Universal Documentation System (UDS). The UDS is used to formally document user agency test program support requirements and support agency capabilities and commitments to support those requirements. The UDS handbook is published in three volumes. This volume, Volume 2, describes the system and the procedure for preparation of the Program Requirements Document (PRD) and the Operations Requirements (OR) document. Each requirements document will be prepared by the user agency according to the format and policies prescribed in this volume. GRA

**N80-32277#** Defense Technical Information Center, Alexandria, Va.

**DATA ELEMENT DICTIONARY: DTIC UNIFORM DATA SYSTEM**

Allan Kuhn, comp. and Melissa L. Young, comp. Apr. 1980 553 p

(AD-A083800; DTIC-4185.8) Avail: NTIS HC A24/MF A01 CSCL 05/2

The dictionary standardizes the data elements and identifies the data uses that constitute the Defense Technical Information Center uniform system. These standardized data elements enable DTIC to incorporate its data banks, currently operating independently, into a uniform system. They provide the capability of standardized access to all component data bases, or any combination of them. The dictionary serves as a communication link between system designers, programmers and subject specialists. It provides a foundation for effective management of data. Detailed descriptions of the current data banks and their relationships to the planned uniform system are included.

Author (GRA)

**N80-32283#** Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).

**INTERNATIONAL ACCESS TO AEROSPACE INFORMATION**

Apr. 1980 105 p refs In ENGLISH and FRENCH Meeting held in Athens, 17-18 Oct. 1979

(AGARD-CP-279; ISBN-92-835-0264-7) Avail: NTIS HC A06/MF A01 CSCL 05B

A review of the status of Greek organization and facilities with respect to access to aerospace information is presented. The state of European cooperation in the field and the nature of NASA's contribution is considered. Requirements and tools for international cooperation and data exchange are discussed, as well as problems in the utilization of aerospace literature and nonliterature data in aerospace research and development.

**N80-32284#** Scientific Research and Technical Agency, (Greece). **ACCESS TO AEROSPACE INFORMATION: THE GREEK SITUATION**

K. N. Kourgenis In AGARD Intern. Access to Aerospace Inform. Apr. 1980 4 p refs

Avail: NTIS HC A06/MF A01

The establishment of the Greek National Information Program in the form of the National Documentation Center (NDC) is described. The role of the NDC is to create and coordinate a national network of scientific and technical data and information in accordance with international standards and to disseminate

processed information to those interested with a view to the economic development of the country. Bibliographies, reprographic services and translation and terminology services are to be provided by the NDC. E.D.K.

**N80-32290#** Lucas Group Services Ltd., Solihull (England). **KINDS OF ACCESS TO UNCLASSIFIED LITERATURE**

C. P. Auger In AGARD Intern. Access to Aerospace Inform. Apr. 1980 4 p refs

Avail: NTIS HC A06/MF A01

The nature of unclassified literature is reviewed and the categories available and their organization are examined. The preponderance of reports literature is noted and current awareness and on line services receive particular attention. Consideration is given to the great variety of users seeking access for one reason or another and the different routes open to them. Finally attention is turned to some of the problems which need to be overcome if access is to be improved. E.D.K.

**N80-32291#** Centre de Documentation de l'Armement, Paris (France). Div. Information.

**THE MANAGEMENT OF DOCUMENTS HAVING A RESTRICTED CHARACTER [LA QUESTION DES DOCUMENTS AYANT UN CARACTERE DE RESTRICTION]**

J. H. Klopp In AGARD Intern. Access to Aerospace Inform. Apr. 1980 5 p ref In FRENCH

Avail: NTIS HC A06/MF A01

Documents containing military or industrial secrets or information reserved to the needs of the State are best managed in a manner analogous to that used for open documents, but with important security regulations imposed by a documentation center. It is preferable for a defense documentation center to create a chain of use parallel to the classic chain of use for open documents, rather than to intermingle documents. The most important advantage of the decision to create a special center for processing classified documents is an uncontested control of the stamping, stocking, and dissemination of these documents. The importance of declassification is discussed and a table is provided showing the markings used by NATO and 14 of its member nations for the various classifications of restricted documents. Transl. by A.R.H.

**N80-32292#** Atomic Energy Research Establishment, Harwell (England). Computer Science Div.

**FULL TEXT HANDLING: A CRITICAL REVIEW**

R. P. L. Jones In AGARD Intern. Access to Aerospace Inform. Apr. 1980 10 p

Avail: NTIS HC A06/MF A01

The wide capabilities of full text information retrieval systems are demonstrated. The basic capabilities of such systems are described including the strengths and weaknesses that seem to be inherent in the techniques that are in use. The wider application of such systems is also described. Emphasis is placed on their capability to form a nucleus for integrated information management systems which are flexible in use and do not require programming skills to exploit them. E.D.K.

**N80-32326#** Arizona State Univ., Tempe. Dept. of Industrial and Management Systems Engineering.

**DEVELOPMENT OF AN EFFECTIVENESS PLANNING AND EVALUATION MODEL FOR AIR FORCE MAINTENANCE ORGANIZATIONS Final Scientific Report, 1 May 1979 - 15 Feb. 1980**

Hewitt H. Young 1 Apr. 1980 216 p refs

(Grant AF-AFOSR-0111-79; AF Proj. 2313)

(AD-A088061; ASU-ERC-R-80016; AFOSR-80-0598TR) Avail: NTIS HC A10/MF A01 CSCL 15/5

A preliminary effort was made to generate a survey-supported model which would (1) permit periodic evaluation of the performance effectiveness of an Air Force maintenance squadron and (2) highlight equipment and human resource factors which are contributing either positively or negatively to maintenance

squadron performance. The model is generated from survey data, collected from a stratified sample of maintenance technicians and their shift supervisors, and processed by means of a stepwise, linear multiple regression statistical package to provide a performance prediction equation. Factors which surface as significant in the equation indicate positive and negative contributions to squadron performance effectiveness. The modeling effort is based on studies with the 82nd Air Training Command Wing at Williams AFB and the 405th Tactical Air Command Wing at Luke AFB, both in Arizona. The model was validated using immediate supervisor ratings of maintenance technician performance in speed and quality of work, averaged across a squadron. Based on the analyses and results of studies covering two maintenance squadrons at Williams AFB and three maintenance squadrons at Luke AFB, the model provides excellent predictions of squadron performance effectiveness and highlights significant contributing factors. GRA

**N80-32355#** Battelle Columbus Labs., Ohio.  
**EVALUATION OF SAFETY PROGRAMS WITH RESPECT TO THE CAUSES OF GENERAL AVIATION ACCIDENTS: VOLUME 1: TECHNICAL REPORT**  
 T. M. Connor and C. W. Hamilton May 1980 221 p refs  
 (Contract DOT-FA78WA-4159)  
 (AD-A0887685; FAA-ASP-80-2-Vol-1) Avail: NTIS  
 HC A10/MF A01 CSCL 01/2

The objective of this study was to determine the extent to which the FAA safety programs were aligned with the causes of general aviation accidents. The data base used in this study consisted of a total of 30,592 general aviation accident records compiled by the National Transportation Safety Board (NTSB) from 1971 through 1977. Analysis of these records was made with respect to NTSB-cited cause/factors. FAA programs implemented during the study time period and pertaining to safety were also included in this study. GRA

**N80-32415#** Range Commanders Council, White Sands Missile Range, N. Mex. Documentation Group.  
**UNIVERSAL DOCUMENTATION SYSTEM HANDBOOK. VOLUME 3: PROGRAM SUPPORT PLAN AND OPERATIONS DIRECTIVE Final Report**  
 Nov. 1979 218 p  
 (AD-A088222; DG-501-79-Vol-3) Avail: NTIS  
 HC A10/MF A01 CSCL 14/2

This volume of the Universal Documentation System handbook presents procedures to be followed in preparing the program support plan and operations directive documents to be used by support agencies. Responsibilities and security aspects are considered in the support requirements. GRA

**N80-32462#** American Wind Energy Association, Washington, D.C.  
**CAPITAL FORMATION FOR SMALL WIND ENERGY CONVERSION SYSTEM MANUFACTURERS: A GUIDE TO METHODS AND SOURCES Final Report**  
 Peter. H. Smeallie and Benjamin Wolff May 1980 55 p refs  
 Prepared in cooperation with Vonier (Thomas) Associates, Inc., Washington, D.C.  
 (Contract EG-77-C-01-4042)  
 (SERI/TR-98298-1) Avail: NTIS HC A04/MF A01

Sources of capital are described and the development of a business plan explained. Case histories of four wind companies' experiences in raising capital are included. DOE

**N80-32900#** Brookhaven National Lab., Upton, N. Y. National Center for Analysis of Energy Systems.  
**COSTING METHODOLOGIES FOR ENERGY SYSTEMS**  
 Jack Allentuck, Vinod Mubayi, and Ann W. Reisman Nov. 1979 23 p refs Presented at Conf. on Long-Term Energy Resources, Montreal, 3 Dec. 1979  
 (Contract DE-AC02-76CH-00016)  
 (BNL-27603; CONF-791216-3) Avail: NTIS  
 HC A02/MF A01

The problem of devising a methodology for arriving at costs of systems which may be used to compare alternative sources

was addressed. The basic elements of such a methodology were examined. Diverse subjects such as resource supply curves, experience and learning, and the cost of environmental pollution were investigated. DOE

**N80-33166#** Purdue Univ., Lafayette, Ind. Krannert Graduate School of Management.  
**A GENERALIZED DECISION SUPPORT SYSTEM USING PREDICATE CALCULUS AND NETWORK DATA BASE MANAGEMENT**  
 Robert H. Bonczek, Clyde W. Holsapple (Illinois Univ., Urbana), and Andrew B. Whinston Jul. 1980 36 p refs  
 (Contract DAAG29-79-C-0154)  
 (AD-A088079; ARO-16231.5-EL) Avail: NTIS  
 HC A03/MF A01 CSCL 12/2

In view of the growing prominence of corporate modeling, an important area of research concerns techniques for facilitating the design and utilization of models. In this paper, we show how first-order predicate calculus can be used as a language for formally stating modeling knowledge. Furthermore, knowledge stated in this manner can be subjected to the resolution principle. The result is that application specific modeling knowledge need not be embedded in a computer program. Rather, it can be stored in a data base and utilized as needed by a problem processing system employing resolution techniques. Advantages of a decision support system taking an approach of this sort are considerable modeling flexibility, capacity for automating the model formulation and execution processes, and compatibility with a high-level user interface language. GRA

**N80-33289#** Purdue Univ., Lafayette, Ind.  
**FUTURE DIRECTIONS FOR DECISION SUPPORT**  
 Robert H. Bonczek, Clyde W. Holsapple, and Andrew B. Whinston Jun. 1980 36 p refs Prepared in cooperation with Illinois Univ., Urbana  
 (Contract DAAG29-79-C-0154)  
 (AD-A087355; ARO-16231.2-EL) Avail: NTIS  
 HC A03/MF A01 CSCL 05/8

A formal, generic description of decision support systems is introduced. This description views a decision support system as having three principal components: a language system, a knowledge system and a problem processing system. Several systems are described which fit the generic DSS idea, but which are (for the most part) not the customary kinds of systems encountered in business applications. Nevertheless, the concepts and techniques employed in these systems can make important contributions to the emergence of more powerful business oriented decision support systems. GRA

**N80-33290#** Sandia Labs., Albuquerque, N. Mex.  
**REALISTIC APPROACH TO THE PLANNING OF HIGH-TECHNOLOGY, HIGH-RISK PROJECTS**  
 Marvin J. Beckett May 1980 10 p refs  
 (Contract DE-AC04-76DP-00789)  
 (SAND-79-1483) Avail: NTIS HC A02/MF A01

Approaches to high-risk project planning are reviewed and assessed. It is recognized that the need for changes in philosophy and for a practical and realistic approach to the management plan used to support high technology, high-risk projects, calls for bold, honest planning, and unbiased, objective guidance. DOE

**N80-33306#** North Dakota Energy Management and Conservation Office, Bismarck.  
**APPLYING SCIENTIFIC AND TECHNOLOGICAL RESOURCES FOR NORTH DAKOTA POLICY DEVELOPMENT: STATE SCIENCE, ENGINEERING AND TECHNOLOGY PROGRAM Final Report**  
 Clifford A. Ness, Jr. Sep. 1979 25 p refs  
 (Grant NSF ISP-78-04618)  
 (PB80-189624; NSF/RA-790418) Avail: NTIS  
 HC A02/MF A01 CSCL 05B

The establishment of a science and technology (S & T) resource system designed to improve access of North Dakota Statepolicymakers to S & T resources is described. The S & T system emerged from a realization that the current method of gathering S & T information by an informal ad hoc method

should be replaced by a more formal structure to meet specific and expanding needs. S & T resource systems and practices in other states as well as in North Dakota were reviewed. GRA

**N80-33310#** Committee on Appropriations (U. S. House).  
**DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT - INDEPENDENT AGENCIES APPROPRIATIONS FOR 1981. PART 4: NATIONAL AERONAUTICS AND SPACE ADMINISTRATION**

Washington GPO 1980 1175 p Hearings before the Subcomm. on HUD-Independent Agencies of the Comm. on Appropriations, 96th Congr., 2nd. Sess., 28 Nov. 1979 (GPO-57-166) Avail: Subcommittee on HUD-Independent Agencies

Hearings before a subcommittee of the Committee on Appropriations are presented. Appropriations for NASA during the fiscal year 1981 are presented. T.M.

**N80-33311#** Committee on Commerce, Science, and Transportation (U. S. Senate).

**NASA AUTHORIZATION FOR FISCAL YEAR 1979, PART 1**

Washington GPO 1978 513 p refs Hearings on S. 2527 before the Subcomm. on Sci., Technol., and Space of the Comm. on Com., Sci., and Transportation, 95th Congr., 2nd Sess., 21-22 and 28 Feb. 1978 (GPO-25-603) Avail: Subcommittee on Science, Technology, and Space

The hearings before the Subcommittee on Science, Technology, and Space of the United States Senate are presented. Appropriations to NASA for research and development, construction of facilities, and operational costs during the 1979 fiscal year are presented. T.M.

**N80-33343#** Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Systems and Logistics.

**CRITERIA FOR APPLYING COMMERCIAL AIRCRAFT WARRANTIES IN USAF AIRCRAFT PURCHASES M.S. Thesis**

Jack L. Grubb and Thomas O. Sutliff Jun. 1980 142 p refs (AD-A088774; AFIT-LSSR-37-80) Avail: NTIS HC A07/MF A01 CSDL 15/5

The airlines' criteria in evaluating warranties to determine if these commercial practices can be used by Air Force buying activities were studied. Criteria to evaluate warranties were obtained from the trunk airlines through interviews and a questionnaire. The airlines' rankings of the criteria were compared to rankings by Aeronautical Systems Division (ASD) contracting experts. The airlines and the Air Force emphasize different factors in evaluating warranties. The greatest difference was the emphasis placed on cost effectiveness of a warranty by the ASD experts compared to the lack of emphasis on this factor by the airline experts. The Air Force contracting experts have a false perception of airline practices in evaluating aircraft warranties. T.M.

**N80-33382\*#** McDonnell-Douglas Corp., Long Beach, Calif.  
**CARGO LOGISTICS AIRLIFT SYSTEMS STUDY (CLASS). VOLUME 5: SUMMARY**

R. J. Burby and W. H. Kuhlman Jul. 1980 103 p (Contract NAS1-14948) (NASA-CR-158951) Avail: NTIS HC A06/MF A01 CSDL 01C

Findings and conclusions derived during the study of freighter aircraft requirements to the year 2008 are summarized. These results represent the stepping off point for the much needed coordinated planning efforts by government agencies, the airlines, the users, and the aircraft manufacturers. The methodology utilized in the investigations is shown. The analysis of the current system encompassed evaluations of the past and current cargo markets and on sight surveys of airport and cargo terminals. The findings that resulted provided the basis for formulating the case study procedures, developing the future scenario, and developing the future cargo market demand. J.M.S.

**N80-33405#** Dynamics Research Corp., Wilmington, Mass.  
**DIGITAL AVIONICS INFORMATION SYSTEM (DAIS): LIFE CYCLE COST IMPACT MODELING SYSTEM RELIABILITY, MAINTAINABILITY, AND COST MODEL (RMCM): USER'S GUIDE Final Report**

John C. Goclowski, John M. Glasier, Robert H. Kistler, Marjorie A. Bristol, and H. Anthony Baran Aug. 1980 167 p refs (Contract F33615-75-C-5218; AF Proj. 2051) (AD-A089045; AFHRL-TR-79-65) Avail: - NTIS HC A08/MF A01 CSDL 14/1

This technical report provides guidance to the users of the Reliability, Maintainability, and Cost Model (RMCM). This report contains all information needed for users to interact with the RMCM computer program from a computer terminal. The RMCM and the Training Requirements Analysis Model (TRAMOD) described in AFHRL-TR-78-58(2) are the two computer programs that are part of the Life Cycle Cost Impact MODEL (LCCIM) modeling system. The LCCIM can be used to assess the impact of weapon system characteristics on human resource requirements and life cycle cost. It was developed to provide the Air Force with a better in-house capability to conduct trade-offs between competing design, manpower, and logistics alternatives. The initial application of LCCIM was directed at determining potential impacts of the Digital Avionics Information System (DAIS) concept on system support personnel requirements and life cycle cost. The modeling system is, however, applicable in the development of any new weapon system or the modification of an existing weapon system. The RMCM serves as a powerful tool within the LCCIM for conducting resource requirements, costing, and trade-off analyses. User-oriented, it accepts input data at varying levels of detail during all phases of the weapon system acquisition process. Also, the speed of the interactive RMCM computer program will encourage more trade-off analyses early in the design process, where cost avoidance actions are most effective. The RMCM data processing takes into account the interaction between support requirements and cost parameters. GRA

**N80-33581#** Committee on Science and Technology (U. S. House).

**OVERSIGHT: COST ESTIMATION TECHNIQUES FOR EMERGING SYNTHETIC FUELS TECHNOLOGY, VOLUME 9**

Washington GPO 1979 49 p Joint hearings before the Subcomm. on Energy Develop. and Appl. of the Comm. on Sci. and Technol., the Subcomm. on Oversight and Invest. and the Subcomm. on Energy and Power of the Comm. on Interstate and Foreign Com., 96th Congr., 1st Sess., no. 34, 16 Jul. 1979 (GPO-51-721) Avail: SOD

The inherent uncertainties surrounding a crash program to commercialize synthetic fuels are discussed. Statements concerning the energy and other opportunities which would be foregone by a massive open ended commitment of capital to this particular option are presented. E.D.K.

**N80-33612\*#** Public Technology, Inc., Washington, D. C.  
**IMPROVING BUILDING CONSTRUCTION SPECIFICATIONS IN STATE AND LOCAL GOVERNMENTS**

[1980] 51 p (Contract NASw-3133) (NASA-CR-163623) Avail: NTIS HC A04/MF A01 CSDL 13B

State and local governments can benefit from master specifications systems that centralize data on all types of building materials, products, and processes. Most of these systems are organized according to the MASTERFORMAT system, which, along with guide specifications that require the insertion or deletion of standardized information, resulted from the specific needs of users and providers. For jurisdictions preparing their own specifications, staff time and cost are reduced. For those subcontracting the preparation, master specifications provide a means of evaluating the specifications submitted. Current management specification systems described include SPECINTACT, OMSPEC, MASTERPEC, and the NAVFAC, Corps of Engineers, and GSA guide specifications. A.R.H.

**N80-33753** Texas A&M Univ., College Station.  
**ANALYSIS OF MARKOV RENEWAL PROCESSES WITH SOME NONREGENERATION POINTS AND THEIR APPLICATIONS TO RELIABILITY THEORY** Ph.D. Thesis

Po-Wen Hu 1980 97 p

Avail: Univ. Microfilms Order No. 8023036

Markov renewal theory, a branch of probability theory, is based on the properties of regeneration points. A regeneration point is a random time in a process at which the future development of the process is a probabilistic replica of the process itself, independent of the past history of the process. In industrial applications, Markov renewal theory is useful for modeling a repairable system because repairs are assumed to renew or upgrade the system so that the performance of the system is identical to that of a new one, independent of the past performance records. The number of spare parts needed, percentage of system down time, percentage of idle time of the repair facilities, etc., can be computed Markov renewal theory. However, there are multi-component systems in which the repair activities performed on a single component do not constitute regeneration points for the entire system because the history of the other components can not be disregarded. The Markov renewal theory is modified so that it can be applied to the nonregeneration points of a process. Dissert. Abstr.

**N80-34096\*** # National Aeronautics and Space Administration, Langley Research Center, Hampton, Va.  
**PASSENGER COMFORT TECHNOLOGY FOR SYSTEM DECISION MAKING**

D. William Conner Aug. 1980 11 p refs Presented at the Intern. Conf. on Ergonomics and Transportation, Swansea, England, 8-12 Sep. 1980  
 (NASA-TM-81875) Avail: NTIS HC A02/MF A01 CSDL 05E

Decisions requiring passenger comfort technology were shown to depend on: the relationship between comfort and other factors (e.g., cost, urgency, alternate modes) in traveler acceptance of the systems, serving a selected market require technology to quantify effects of comfort versus offsetting factors in system acceptance. Public predict the maximum percentage of travelers who willingly accept the overall comfort of any trip ride. One or the other of these technology requirements apply to decisions on system design, operation and maintenance. T.M.

**N80-34124** # Deutsche Versuchsanstalt fuer Luft- und Raumfahrt, Oberpfaffenhofen (West Germany). Inst. for Communication Engineering.

**THE USE OF PROINF IN THE RESEARCH PROJECT EBOSIPES**

Peter Unger *In* ESA Contrib. to the Symp.: Computer Sci. in Space Flight (ESA-TT-587) Feb. 1980 p 129-130 Transl. into ENGLISH of "Beitraege zum Symp.: Datentechnik in der Raumfahrt", Rept. DFVLR-Mitt-78-02 DFVLR Oberpfaffenhofen, West Germany, Oct. 1978

(DFVLR-Mitt-78-02) Avail: NTIS HC A07/MF A01; DFVLR, Cologne DM 53.50

The project information system PROINF has a modular structure and is used interactively in the research project EBOSIPES. The system makes it possible to obtain an immediate overall view of project relevant data such as costs incurred, working time employed, and project progress. The constituent modules of PROINF are described. Author (ESA)

**N80-34155** # Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. Dept. of Communication and Humanities.

**RESPONSIVENESS AND CONFIGURATION CONTROL FOR EMBEDDED COMPUTER SOFTWARE** M.S. Thesis

Gerald O. Wade Jun. 1980 179 p refs

(AD-A088723; AFIT-LSSR-39-80) Avail: NTIS HC A09/MF A01 CSDL 09/2

The purpose of this research effort was to (1) determine those factors contributing to the inability of the Air Force Logistics Command (AFLC) to provide responsive support to Embedded

Computer Software users which has the appropriate degree of control exercised and (2) determine the management systems structure and factors required to provide responsive support of controlled software. The research has three phases. The first is a discussion of software management principles essential to effective software management. The second is comprised of models of three distinct management systems and analyses of each in terms of benefits, deficiencies, operating policy, application of software management principles, and provides comparative conclusions on which aspects of a management system were the best. The third is an analysis of the results of the interaction of the software management principles of relative importance to a management system processing stage. Conclusions developed were that responsiveness problems experienced in AFLC were attributable to its utilization of change blocking, the GO26 management system, and its management system's structure. Recommendations were that ECS requirements should take priority, minimal management layering should exist, and explicit responsibility and authority delineation is defined. GRA

**N80-34280** Ohio State Univ., Columbus.  
**MANAGEMENT GUIDANCE FOR RESEARCH CLIMATE** Ph.D. Thesis

Richard K. Thatcher 1980 162 p

Avail: Univ. Microfilms Order No. 8022356

Effective management, particularly that of contract research and development, is based on a solid understanding of both the business and research processes involved. One part of these processes is research climate. Climate refers to a set of attributes about the system and/or its subsystems perceived by those participating in the system. These perceptions are multidimensional, psychologically meaningful wholistic descriptions by which people characterize a system's events, practices, and procedures. Climate perceptions function as frames of reference that are used in attaining congruity between individual behavior and the system's processes. While climate is responsive to many things, it is management practices which play the most dramatic role in its development. Those individual or group characteristics already captured by the research organization that would segregate high groups from low climate groups are examined. Dissert. Abstr.

**N80-34281** # National Research Inst. for Mathematical Sciences, Pretoria (South Africa).

**A DESCRIPTIVE APPROACH TO MULTIPLE-CRITERIA DECISION MAKING**

T. J. Stewart Nov. 1979 34 p refs

(CSIR-TWISK-128) Avail: NTIS HC A03/MF A01

Certain concepts from multivariate statistical analysis are applied to problems in multiple-criteria decision making. The aim of this approach is to identify basic relationships and conflicts between the available decision alternatives and between criteria. If these aspects can be clearly identified and conveyed to the responsible decision maker, he may well be in a position to make an intelligent selection of a course of action, without the need for formal utility analysis, computation of Pareto optimal sets, etc. Two appropriate multivariate statistical techniques are introduced to illustrate the approach, and each technique is applied to two sample problems. Author

**N80-34282** # Texas A&M Univ., College Station. Inst. of Statistics.

**EVALUATION OF PRECEDENCE CRITERIA FOR PROJECT SCHEDULING UNDER RESOURCE CONSTRAINTS**

Shi Min Chang and Robert L. Sielken, Jr. May 1980 52 p refs

(Contract N00014-78-C-0426; NR Proj. 047-179)

(AD-A089070; THEMIS-TR-63) Avail: NTIS HC A04/MF A01 CSDL 15/5

When more than one activity in a project requires the same indivisible resource, the project schedule can resolve this resource constraint by specifying the order in which these activities are to be performed. Several heuristic criteria for determining this order are considered. The minimum cost schedule for a given project deadline can often be found by determining the optimal schedule ignoring the resource constraints and then resolving

any resource usage conflicts by ordering the conflicting activities so as to minimize the project completion time. A simple procedure for determining this latter order is given. GRA

**N80-34284\*** National Aeronautics and Space Administration, Washington, D. C.

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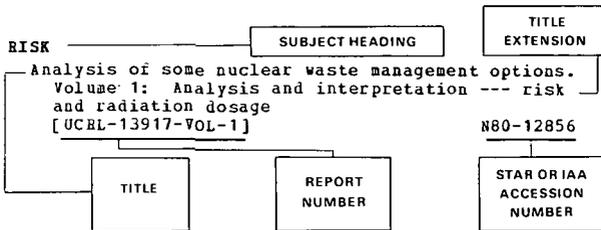
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Citations of 3860 patents and patent applications for the period May 1969 through June 1980 are indexed according to subject, invention, source, number, and accession number.A.R.H.

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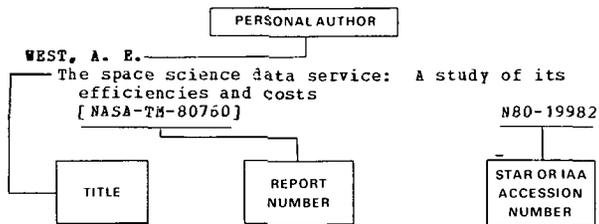
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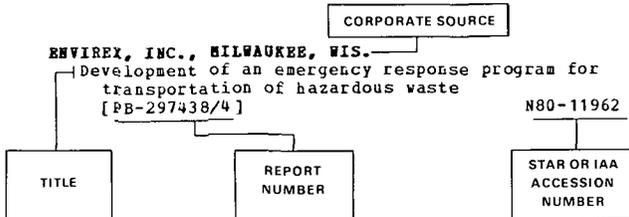
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