NASA

Management
A Bibliography for NASA Managers

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Management Management Management Management Management Management

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NASA SP-7500(18)

MANAGEMENT

A BIBLIOGRAPHY FOR NASA MANAGERS

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FOREWORD

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

Individual sections can be quickly browsed. Indexes will lead quickly to specific subjects or items.

HIGHLIGHTS, TRENDS, AND ITEMS OF INTEREST

Human Factors. Whatever else they may manage, it is how they manage people that is critical to success as a manager. NASA's high technology is a world of stress that has to be controlled and turned to advantage (N83-32659)*. Managing change -- on with the new and off with the old -- is a constantly confronted situation (N83-32658).

Techniques and Tools. Even the most "seat-of-the-pants" manager can profit from some of the approaches being developed (A83-41300, N83-11877). Some are highly specialized or rigorously mathematical (A83-45021, A83-10974) and are primarily for the manager with an analytical bent. Crystal-balling is required of all managers, so techniques are legion for forecasting (A83-29966). But decision-making (A83-18398) and priority setting (A83-41302) are required daily. If you really want to know what is coming, try expectancy theory (N83-14014).

Robotics, Automation, Artificial Intelligence. Space operations and industrialization serve as a focus for Robotics (N83-10848, A83-45851, N83-23083). A robotics bibliography supplies a quick picture of the state-of-the-art (N83-36682). Whether robots are intelligent or not, artificial intelligence is of increasing application (N83-31379, N83-23083). More down-to-earth and further along in development are computer-aided-design and computer-aided-manufacturing systems (CAD/CAM), and NASA's IPAD is a front runner here (N83-12073). Computer-aided-design (N83-17134), networking (N83-12914), and manufacturing systems (N83-31899) share the spotlight.

Resource Management. A concept surfacing frequently in 1983 was "resource management," with information management as a popular subcategory. Information as a national resource has been with us for quite a while, of course. A key document to better information management is *Managing Federal Information Resources: Report Under the Paperwork Reduction Act of 1980* (N83-13037). Others include: *NASA Administrative Data Base Management Systems* (N83-18559); *Greater Emphasis on Information Resource Management is Needed at the Federal Aviation Administration* (N83-20812); *Federal Information Collection: Agency Actions on Commission on Federal Paperwork Recommendations* (N83-11884).

Management of R&D. In this area of particular concern to NASA, we have a rich harvest. For a NASA management overview, there is *25 Years of NASA--Reflections, Projections, and Applications* (A83-43761). Many NASA super-projects require 10 to 20 years to complete (A83-45606, N83-11770). Overviews give the top manager the broad picture he needs, and help the middle and lower manager to see where their activities fit in: international and foreign (N83-17564, A83-46929), national (A83-32179), agency (N83-30302, N83-29807). Quality of R&D (N83-14015) and trends (N83-26785) are always of interest. Space station management (A83-24174) will present challenges for NASA for years to come, as will planetary exploration (A83-30021).

*For abstracts of the indicated items refer to the accession number index.

Costing and Budgeting, Commercialization, Economic Impact. Budgeting (A83-11154) and costing -- such as cost control (A83-23148) and buy vs. lease (A83-25120) -- are almost daily concerns of the manager. Space commercialization (A83-47820) and marketing (A83-42085) have become major concerns of the agency. Productivity (A83-30831) with aspects such as innovation (A83-21421), have become critical with skyrocketing costs of complex new technology. Longer-range costs are a problem *now*: inflation (A83-25120), life-cycle costs (N83-31519).

Logistics and Operations Management. Logistics in Space Shuttle (N83-32837), space flight (A83-47236), and satellite (N83-14820) operations comprise giant logistics problems. Procurement (N83-11119) is an integral activity, where you deal with tremendous amounts of hardware and a large number of contractors. Flight operations (A83-41713, A83-33767), air traffic management (A83-17728), transportation systems (A83-41418), and maintenance (N83-14074) constitute the more routine but vital logistics activities.

Reliability and Quality Control. Pressure is always on to do it quicker and cheaper, better and safer. Reliability is the key (N83-16776, N83-16774), so the best testing (N83-14793) under operational conditions is a must (A83-36297). Determining the fault tolerance of a system isn't easy (N83-20224, N83-20926). What ties it all together? -- reliability engineering (N83-20178).

Legal and Legislative, Regulatory and Policy. Aerospace law (A83-45826) -- property rights (A83-21386) national vs. international regulation (A83-30137) becomes a practical consideration. Insurance (A83-31808, A83-45816) and liability (A83-39693, A83-39696) requirements must be anticipated. Legislation makes serious impacts on an entire industry (A83-39043). Some pertinent areas include: law and security in space (A83-46309, A83-46311); policy -- space stations (N83-19765), aeronautical research and technology policy (N83-17452); authorizations and appropriations (N83-25622, N83-25623, N83-26753); freedom of information act (N83-37026), and privacy protection law (N83-14019); science policy (N83-33790), materials policy (N83-33791).

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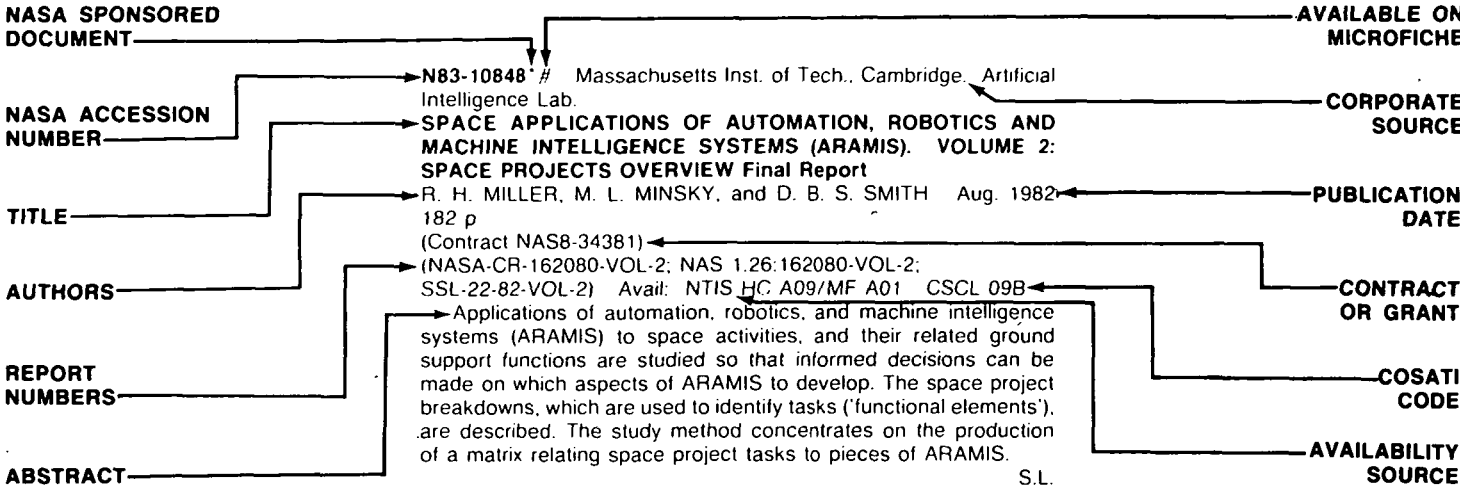

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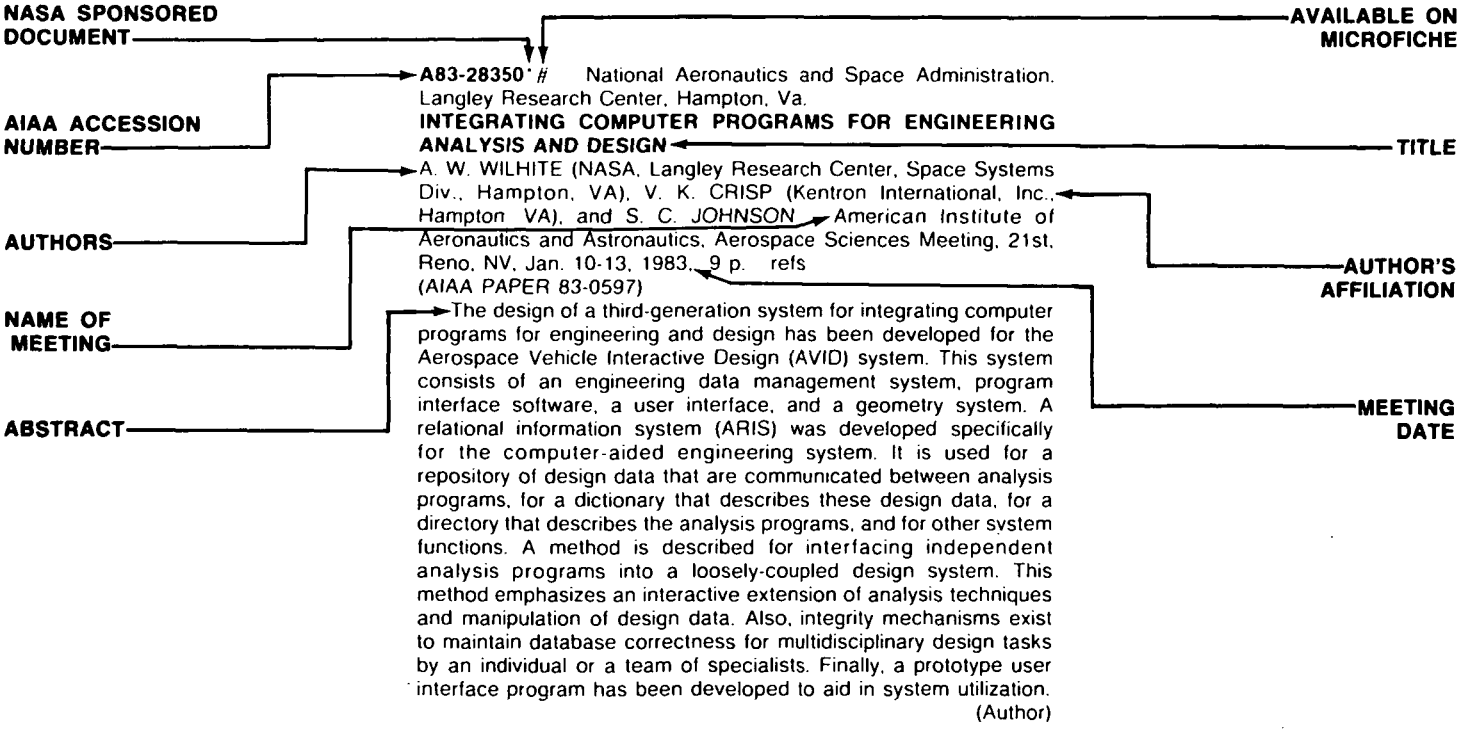

MANAGEMENT

A Bibliography for NASA Managers

MARCH 1984

01

HUMAN FACTORS IN MANAGEMENT

Includes computer-man interface, performance appraisal, employee awareness, and training.

A83-15423
HUMAN FACTORS DILEMMAS IN THE QUEST FOR AVIATION SAFETY
J. E. ROBINSON, JR. (Hughes Aircraft Co., Systems Div., Fullerton, CA) In: SAFE Association, Annual Symposium, 19th, Las Vegas, NV, December 6-10, 1981, Proceedings. Van Nuys, CA, SAFE Association, 1982, p. 139-143. refs

A human factors analysis of 220 Aircraft Accident Reports issued by the National Transportation Safety Board is considered. The purpose of the over-all analysis is to describe, by examples, the human factors problems which have drawn the attention of aviation safety experts over a recent 12-year period. Ten excerpts which illustrate an equal number of human factors dilemmas in the pursuit of aviation safety have been selected. The selected excerpts are related to cabin evacuation, excessive workload leading to fatigue, difficulties arising in connection with the division of tasks, difficulties encountered when control of an aircraft is shifted from one pilot to another during an emergency, and inappropriate management policies with respect to the operational dispatching functions. Other problems considered are concerned with fog, turbulence, icing, and cumulative events. It is pointed out that the nature of the accidental events reported can contribute to the development of remedial steps in design, operational procedures, and management or regulation. G.R.

A83-15785
THE OPTIMAL SHIFT SCHEDULE OF WORK IN INDUSTRY [K VOPROSU OB OPTIMAL'NOM SMENNOM REZHIME RABOTY NA PROIZVODSTVE]
A. A. AIDARALIEV and A. A. SOROKIN (Akademiia Nauk Kirgizskoi SSR, Institut Fiziologii i Eksperimental'noi Patologii Vysokogor'ia, Frunze, Kirgiz SSR) Fiziologiia Cheloveka, vol. 8, Nov.-Dec. 1982, p. 994-999. In Russian. refs

The changes in the amplitude of the circadian and noncircadian (8 and 12 hr) rhythmic components were investigated for broken shifts in industrial settings where the hours are changed at various intervals. Data for the daily changes in body temperature and pulse rate were collected for workers in a cement factory and a glass factory, which had different schedules for the changes in the shifts, while the hours for each shift were identical. Results show that for the cement factory workers, the greatest changes in the daily rhythms were detected when the hours of work occurred in periods which corresponded to the minimum levels of the physiological parameters studied. However, for workers at the glass factory, where the shift changes occurred more frequently, the significant changes in the daily rhythms occurred during various hours of the day in comparison with the phases of the daily pattern of the physiological functions. It is concluded that noncircadian rhythms (8 and 12 hr) can characterize the intensity of the reorientation of the daily rhythms. N.B.

A83-17958
AN INVESTIGATION OF MOTIVATIONAL FACTORS AMONG BASE-LEVEL AIR FORCE CIVIL ENGINEERS
H. A. RUMSEY (USAF, Washington, DC) and W. C. MOOR (Arizona State University, Tempe, AZ) Engineering Management International, vol. 1, Dec. 1982, p. 209-219. refs

An attempt to define the conditions required to encourage Air Force civil engineers to remain in the service and progress through management training is presented. Constraints on improving the conditions are noted to be lower-than-civilian pay scales, the willingness of marginal engineers to reenlist to take advantage of the 20-yr retirement terms, and the surveyed dissatisfaction with rank. A critical incident interview technique was employed with all 1844 engineers in the A.F. to determine if corrections could be made at the base level. The technique involved identification of subjective reactions to particular situations brought forth in the interview in which the officer felt motivated or demotivated about the job. Dissatisfaction was mostly keenly felt towards A.F. personnel and assignment policies, as well as the work assignments. Salary was not a daily concern, as were relations with the supervisor, but did have influence on the decision on whether or not to remain in the service. Elements of a training program for engineering managers, with particular emphasis of taking advantage of the dominating role of motivators, are discussed. M.S.K.

A83-26301
HUMAN FACTORS SOCIETY, ANNUAL MEETING, 25TH, ROCHESTER, NY, OCTOBER 12-16, 1981, PROCEEDINGS
R. C. SUGARMAN, (ED.) (Calspan Corp., Buffalo, NY) Santa Monica, CA, Human Factors Society, 1981. 796 p.

Various topics in human factors research are discussed, including human factors in nuclear power plant safety and operations, aerospace operations, management and organization, occupational environments, job and workplace design, industrial inspection, and the design of the living environment for older Americans. Also examined are visual performance, work physiology and biomechanics, the integration of human factors and industrial design, control room design and evaluation, methods for teaching human factors principles, control design and evaluation, industrial ergonometrics in Europe, target acquisition, and information processing and decision making. Other topics considered include medical human factors; approaches and methods in product design; training devices, strategies, and evaluation; testing and research methodologies; computer workplaces and equipment; the subjective assessment of mental workload; psychomotor performance and skill acquisition and retention; and driver behavior and safety. N.B.

A83-26328
PSYCHOMETRIC MEASURES OF TASK DIFFICULTY UNDER VARYING LEVELS OF INFORMATION LOAD
W. R. HELM (U.S. Navy, Naval Air Development Center, Warminster, PA) In: Human Factors Society, Annual Meeting, 25th, Rochester, NY, October 12-16, 1981, Proceedings. Santa Monica, CA, Human Factors Society, 1981, p. 518-521.

Aircraft design and integrated systems avionics have altered the role of pilots from that of skilled control operator to one of complex system manager, emphasizing the role of psychomotor control in such cognitive skills as perception, memory, information

processing, and decision making. The efficiency of male and female subjects in estimating task difficulty and performance relative to actual task performance has been determined by two experiments. In the first experiment, three groups used three types of scales to rate either task difficulty or task performance on a four-choice discrimination task varied across seven levels of information load. In the second experiment, two groups used either a ratio or category scale to rate task difficulty on each of four tasks: four-choice discrimination, Sternberg target identification, random presentation of the first two tasks, and simultaneous presentation of the first two tasks. No sex differences were noted in either task performance or task rating. O.C.

A83-34990
DEVELOPMENT OF AN OCCUPATIONAL HEALTH DATA BASE SYSTEM
B. J. DYE, R. A. LOMBARD, JR., and C. D. WORTHY, JR. (USAF, Occupational and Environmental Health Laboratory, Brooks AFB, TX) Aviation, Space, and Environmental Medicine (ISSN 0095-0562), vol. 54, June 1983, p. 557-559.

An automated system to store and manage worker and workplace exposure data is being developed by the U.S. Air Force as part of a new approach to occupational health data base management. Included in this system will be individual minicomputers at local Air Force bases and a central host computer for long-term storage and retrieval. The standardization of data entry and storage at base level in this system is examined. The Standardized Occupational Health Program has been developed to serve as the basic building block for the Computerized Occupational Health Program. This system will provide for the standardization and automation of all relevant industrial hygiene, occupational medicine, and environmental data and will enhance the flow of information needed by those charged with assuring a healthful work environment for Air Force personnel. N.B.

A83-35700#
A STUDY OF HUMAN BEHAVIOR IN ADVERSE STRESS
T. O. SARGENT (Sargent Group, Inc., Consultant Services Div., Hartford, CT) American Nuclear Society, Annual Meeting, Bal Harbour, FL, June 10, 1981, Paper. 47 p. refs

A bimodal concept is detailed for modelling individual response to the environment, particularly in stressful conditions. A rigid and a flexible mode of thinking are considered. Large amounts of information are processed by the rigid mode of thought, automatically and in a way that the person is unaware of, while in the flexible mode small amounts of information are processed in an inventive manner. Operators of complex devices require appropriate conditioned responses in order to handle emergencies that arise. The responses are part of the rigid mode, and the flexible mode may not be available for the actions that are needed. Stressful conditions can, however, shift flexible capabilities into the rigid mode, changing behavior without the individual being aware. The shift can cause a lack of differentiation and a high degree of conformity in stressful group situations, and result in a degraded performance of tasks. Maintenance of the flexible capability permits lateral and inventive thinking, with recourse to the conditioned, rigid response. Intellectual and experiential training techniques for developing the seemingly contradictory, but necessary, bimodal functional readiness are outlined. M.S.K.

A83-37096* National Aeronautics and Space Administration, Washington, D. C.
SPACE STATION AUTOMATION AND AUTONOMY - ADVANTAGES AND PROBLEMS
R. F. CARLISLE (NASA, Washington, DC) IN: American Control Conference, 1st, Arlington, VA, June 14-16, 1982, Proceedings. Volume 2 . New York, Institute of Electrical and Electronics Engineers, 1982, p. 450-458.

Design guidelines and functional systems being considered in the process of defining the configuration of the automated systems for a manned space station are outlined. The requirements are dependent on life-cycle costing and will set the necessary level of automation, as well as autonomy from outside commands. Fault protection routines have been largely devised according to successful programming on the Voyager spacecraft. An analysis is still needed of the housekeeping functions, including human necessities, machine functions, and mission objectives. A data base will result, defining the functions that have historically been delegated to either man or machine. Care must be taken to coordinate and document stationkeeping functions that might interface with mission functions. A data management system that is flexible with regards to changing mission objectives and to the MTBF factors, which will determine the level of technology to be used is required. Expert systems will be integrated into the automation to guide the machines in problem solving, including ensuring adequate management of the battery subsystem. M.S.K.

A83-44663
A PROGNOSTIC INVESTIGATION OF THE FUNCTINAL CONDITION OF ADMINISTRATION AND MANAGEMENT WORKERS [PROGNOSTICHESKIE ISSLEDOVANIIA FUNKTSIONAL'NOGO SOSTOIANIIA ORGANIZMA RABOTNIKOV ADMINISTRATIVNO-UPRAVLENCHESKOGO APPARATA]
B. M. STOLBUN, A. V. KOLESNIKOVA, L. A. KABALOVA, and N. P. KOZLOVA (Moskovskii Nauchno-Issledovatel'skii Institut Gigieny, Moscow, USSR) Problemy Umstvennogo Truda, no. 6, 1983, p. 61-67. In Russian. refs

The physiological functional condition of administrative and management workers in an industrial ministry in the USSR was evaluated. The subjecs were screened according to age, sex, type of work, and level of adaptation to work, in order to diagnose the level of functional stress of the conditions on the boundary between the normal and the pathological. Among other results, it was found that the hemodynamic indicators had a primarily sympathicotonic tendency which deepened the physical load. Disorders of the contractile function of the myocardium were exhibited by more than 1/3 of the subjects, while nearly 1/2 of the subjects exhibited changes in various EKG parameters. These changes were connected with atherosclerosis of the veins and arterial hypertension. Marked decreases in the summed parameters of the adaptiveness and the contractile capacity of the myocardium, along with an increase in systolic pressure, were found to be correlated with increasing age. N.B.

N83-11789# Virginia Polytechnic Inst. and State Univ., Blacksburg.
THE ROLE AND TOOLS OF A DIALOGUE AUTHOR IN CREATING HUMAN-COMPUTER INTERFACES
D. H. JOHNSON and H. R. HARTSON May 1982 84 p refs (Contract N00014-81-K0143)
(AD-A118146; CSIE-82-8) Avail: NTIS HC A05/MF A01 CSCL 05H

In order to facilitate the development of human-factored human-computer interfaces, a Dialogue Management System (DMS) is being created. Dialogue independence and internal and external dialogue have developed as underlying concepts of DMS, and are manifest in the separation of the dialogue components of a software system from the computational components. In a new system design role, a dialogue author is responsible for creating the dialogue which constitutes the human-computer interface of an application system. Author (GRA)

N83-11790# Virginia Polytechnic Inst. and State Univ., Blacksburg. Computer Science Industrial Engineering/Operations Research.
HUMAN-COMPUTER SYSTEM DEVELOPMENT METHODOLOGY FOR THE DIALOGUE MANAGEMENT SYSTEM
T. YUNTEN and H. R. HARTSON May 1982 103 p refs (Contract N00014-81-K-0143; RR0420901)
(AD-A118287; CSIE-82-7) Avail: NTIS HC A06/MF A01 CSCL 09B

In this report a system development methodology for human computer systems is constructed. The methodology views humans as functional elements of a system in addition to computer elements. The disciplined approach of the software engineer (SWE)

and the user oriented approach of the human factors engineer (HFE) are combined into a methodology which features a parallel and cooperative work environment. GRA

N83-11875# Physics Lab. RVO-TNO, The Hague (Netherlands). Research Group 9: Operations Research.
TWO MANPOWER PLANNING MODELS FOR THE ROYAL NETHERLANDS NAVY. PART 1: GENERAL DESCRIPTION
L. HOEDEMAKER, G. KONSTANTIS, and D. J. D. WIJNMALEN Jan. 1982 79 p refs In DUTCH; ENGLISH summary
(Contract A75/KM/018)
(PHL-1982-04; TDCK-76155) Avail: NTIS HC A05/MF A01

Two models were developed as tools for planning ratings and petty officers of the Royal Netherlands Navy. This planning was carried out over a number of discrete, equidistant time intervals. The models provide information as to strengths, recruitment, promotions, retirement, etc. The first model (LP2) is based on linear programming as a method to optimize an objective function under various restrictions. Four types of optimization were considered: minimization of costs; minimization of the absolute differences between computed and required strengths; and combinations of these two types. The model is designed to be flexible: changes in the Navy manpower structure could be incorporated without difficulty. The matrix-generator may be applied to any manpower structure. The second model, REKMO, is a rather simple model, consuming little computer time. It considers the Navy manpower structure in a more detailed way and over a longer time horizon than LP2. It shows the consequences of input policies rather than calculating an optimal strategy to achieve desired conditions. Calculations are carried out in a straightforward way in accordance with a set of (priority) rules specified by the user. A user manual is also presented. Author (ESA)

N83-16251# Oak Ridge Y-12 Plant, Tenn.
PRIDE: PRODUCTIVITY THROUGH RECOGNITION, INVOLVEMENT, AND DEVELOPMENT OF EMPLOYEES
B. J. WHITE 1981 8 p Presented at the AIIE Fall Ind. Eng. Conf., Washington, 6-9 Dec. 1981
(Contract W-7405-ENG-26)
(DE82-001826; Y-DN-139; CONF-811210-1) Avail: NTIS HC A02/MF A01

Improvements in productivity and quality of work life are being achieved in a non-profit environment through top management support, a specific functional organization, and a comprehensive plan of action focusing on employee awareness and involvement. Several improvement incentive techniques, including quality circles, were implemented, and a measurement program is being developed to evaluate improvement gains. DOE

N83-17491# School of Aerospace Medicine, Brooks AFB, Tex.
AN OVERVIEW OF HUMAN FACTORS IN AIRCRAFT ACCIDENTS AND INVESTIGATIVE TECHNIQUES
B. O. HARTMAN *In* AGARD Human Factors Aspects of Aircraft Accidents 4 p Oct. 1982 refs
Avail: NTIS HC A07/MF A01

Human factors in aircraft accidents and investigative techniques are reviewed. N.W.

N83-18192# Army Intelligence and Threat Analysis Center, Arlington, Va.
MEANS FOR INCREASING THE WORKING CAPACITY OF PERSONS SUBJECT TO EXTENDED SENSORY OVERLOADS
G. I. ALEKSEYEV, D. V. GUSAROV, and Y. A. SOBOLIN *In its* Mil. Med. J., No. 8, August 1982 56-60 Aug. 1982 refs Transl. into ENGLISH from Voyenno-Med. Zh. (Moscow), no. 8, 1982 p 38-40
Avail: NTIS HC A07/MF A01

Means for physiological stimulation of the activity of the nervous system in cases of sensory overload were studied. The influence of stimulus of the upper respiratory tract with ammonia on the function of the visual analyzer of man and on muscular fatigue was tested. The functional status of the visual analyzer was evaluated by determining the critical merging frequency of light flashes (CFLF) and the throughput capacity of the analyzer. Author

N83-18238*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
HUMAN FACTORS CONSIDERATIONS IN SYSTEM DESIGN
C. M. MITCHELL, ed. (George Mason Univ.), P. M. VANBALEN, ed. (George Mason Univ.), and K. L. MOE, ed. Jan. 1983 381 p refs Symp. held in Greenbelt, Md. and College Park, Md., 25-26 May 1982
(Contract NAS5-26952)
(NASA-CP-2246; NAS 1.55:2246) Avail: NTIS HC A17/MF A01 CSCL 05H

Human factors considerations in systems design was examined. Human factors in automated command and control, in the efficiency of the human computer interface and system effectiveness are outlined. The following topics are discussed: human factors aspects of control room design; design of interactive systems; human computer dialogue, interaction tasks and techniques; guidelines on ergonomic aspects of control rooms and highly automated environments; system engineering for control by humans; conceptual models of information processing; information display and interaction in real time environments.

N83-18239*# Johns Hopkins Univ., Baltimore, Md. Dept. of Psychology.
INTRODUCTION TO HUMAN FACTORS CONSIDERATIONS IN SYSTEM DESIGN
A. CHAPANIS *In* NASA. Goddard Space Flight Center Human Factors Considerations in System Design p 11-24 Jan. 1983 refs
Avail: NTIS HC A17/MF A01 CSCL 05H

A definition for human factors or ergonomics and its industrial and domestic application is presented. Human factors engineering, which discovers and applies information about human abilities, limitations, and other characteristics to the design of tools, machines, systems, tasks, jobs, and environments for safe, comfortable, and effective human use, is outlined. The origins of human factors and ergonomics, the philosophy of human factors, goals and objectives, systems development and design, are reviewed. E.A.K.

N83-18240*# Nuclear Regulatory Commission, Washington, D. C. Human Factors Branch.
HUMAN FACTORS ASPECTS OF CONTROL ROOM DESIGN
J. P. JENKINS *In* NASA. Goddard Space Flight Center Human Factors Considerations in System Design p 27-46 Jan. 1983 refs
Avail: NTIS HC A17/MF A01 CSCL 05H

A plan for the design and analysis of a multistation control room is reviewed. It is found that acceptance of the computer based information system by the uses in the control room is mandatory for mission and system success. Criteria to improve computer/user interface include: match of system input/output with user; reliability, compatibility and maintainability; easy to learn and little training needed; self descriptive system; system under user control; transparent language, format and organization; corresponds to user expectations; adaptable to user experience level; fault tolerant; dialog capability user communications needs reflected in flexibility, complexity, power and information load; integrated system; and documentation. E.A.K.

N83-18241*# George Washington Univ., Washington, D.C. Dept. of Electrical Engineering and Computer Science.
HUMAN-COMPUTER DIALOGUE: INTERACTION TASKS AND TECHNIQUES. SURVEY AND CATEGORIZATION
J. D. FOLEY *In* NASA. Goddard Space Flight Center Human Factors Considerations in System Design p 91-106 Jan. 1983 refs
Avail: NTIS HC A17/MF A01 CSCL 05H

Interaction techniques are described. Six basic interaction tasks, requirements for each task, requirements related to interaction

techniques, and a technique's hardware prerequisites affective device selection are discussed. E.A.K.

N83-18242*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
PRELIMINARY REPORT OF GODDARD/UNIVERSITY HUMAN FACTORS RESEARCH GROUP
W. TRUSZKOWSKI *In its* Human Factors Considerations in System Design p 109-126 Jan. 1983 refs
Avail: NTIS HC A17/MF A01 CSCL 05H

The three major concerns which greatly influence the initial efforts and priorities in the human factors arena are outlined. These concerns are an increased awareness of the: (1) over riding data driven aspects of current command/control systems; (2) complexity of existing man/system interface mechanisms; and (3) great extent of the manual intervention required in present systems. E.A.K.

N83-18245*# George Mason Univ., Fairfax, Va. Dept. of Psychology.
CONCEPTUAL MODELS OF INFORMATION PROCESSING
L. J. STEWART *In* NASA. Goddard Space Flight Center Human Factors Considerations in System Design p 217-238 Jan. 1983 refs
Avail: NTIS HC A17/MF A01 CSCL 05H

The conceptual information processing issues are examined. Human information processing is defined as an active cognitive process that is analogous to a system. It is the flow and transformation of information within a human. The human is viewed as an active information seeker who is constantly receiving, processing, and acting upon the surrounding environmental stimuli. Human information processing models are conceptual representations of cognitive behaviors. Models of information processing are useful in representing the different theoretical positions and in attempting to define the limits and capabilities of human memory. It is concluded that an understanding of conceptual human information processing models and their applications to systems design leads to a better human factors approach. E.A.K.

N83-18247*# George Mason Univ., Fairfax, Va. Decision Sciences Faculty.
THE HUMAN AS SUPERVISOR IN AUTOMATED SYSTEMS
C. M. MITCHELL *In* NASA. Goddard Space Flight Center Human Factors Considerations in System Design p 259-290 Jan. 1983 refs
Avail: NTIS HC A17/MF A01 CSCL 05H

This hierarchical approach to information display forces the development of a set of human oriented system models which will guide the design of the displays. If the appropriate information is provided at the appropriate time, it is likely that less information will be displayed at any given time, and the quality of the displayed information will require less operator effort to integrate into an assimilatable form. A problem with contemporary control rooms is that there is too much information for an operator to be able to assimilate quickly, easily, and accurately. It is suggested that necessary direction for research in the area of automated control room design is to develop displays which provide active decision aiding for the modern controller. Displays are needed which provide information compatible with the operator's current internal model, filter out irrelevant information, and summarize and condense lower level information. E.A.K.

N83-18250*# George Mason Univ., Fairfax, Va. Decision Sciences Faculty.
INFORMATION DISPLAY AND INTERACTION IN REAL-TIME ENVIRONMENTS
A. K. BOCAST *In* NASA. Goddard Space Flight Center Human Factors Considerations in System Design p 321-358 Jan. 1983 refs
Avail: NTIS HC A17/MF A01 CSCL 05H

The available information bandwidth as a funcion of system's complexity and time constraints in a real time control environment were examined. Modern interactive graphics techniques provide very high bandwidth data displays. In real time control environments, effective information interaction rates are a function not only of machine data technologies but of human information processing capabilities and the four dimensional resolution of available interaction techniques. The available information bandwidth as a function of system's complexity and time constraints in a real time control environment were examined. E.A.K.

N83-18257# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).
ADVANCED AVIONICS AND THE MILITARY AIRCRAFT MAN/MACHINE INTERFACE
Jul. 1982 341 p refs In ENGLISH and FRENCH Meeting held in Blackpool, England, 26-29 Apr. 1982
(AD-A119559; ISBN-92-835-0315-4; AGARD-CP-329) Avail: NTIS HC A15/MF A01

The interfacing of air crews of modern military aircrafts with advanced avionics equipment and systems were discussed. Topics include: (1) use of new advanced displays in aircraft, including multicolor displays, displays incorporating optical techniques, and more reliable display systems; (2) use of voice input/output systems for man machine interface, including speech synthesis; (3) complex avionics systems management; and (4) tactile control and their use.

N83-19773*# Jet Propulsion Lab., California Inst. of Tech., Pasadena. Deep Space Network Data Systems Section.
STAFFING IMPLICATIONS OF SOFTWARE PRODUCTIVITY MODELS
R. C. TAUSWORTHE *In its* The Telecommun. and Data Acquisition Rept. p 70-77 15 Feb. 1983 refs
Avail: NTIS HC A11/MF A01 CSCL 09B

The attributes of software project staffing and productivity implied by equating the effects of two popular software models in a small neighborhood of a given effort-duration point are investigated. The first model presupposes that organizational productivity decreases as a function of the project staff size due to interfacing and intercommunication. The second, the so-called software equation, relates the product size to effort and duration through a power law tradeoff formula. The conclusions that may be reached by assuming that both of these describe project behavior, the former as a global phenomenon and the latter as a localized effect in a small neighborhood of a given effort duration point, are that (1) there is a calculable maximum effective staff level, which, if exceeded, reduces the project production rate, (2) there is a calculable maximum extent to which effort and time may be traded effectively, (3) it becomes ineffective in a practical sense to expend more than an additional 25 to 50% of resources in order to reduce delivery time, and (4) the team production efficiency can be computed directly from the staff level, the slope of the intercommunication loss function, and the ratio of exponents in the software equation. S.L.

N83-20554# Committee on Science and Technology (U. S. House). Subcomm. on Science, Research and Technology.
THE HUMAN FACTOR IN INNOVATION AND PRODUCTIVITY INCLUDING AN ANALYSIS OF HEARINGS ON THE HUMAN FACTOR
W. H. SCHACHT Washington GPO 1982 43 p Presented to the Comm. on Sci. and Technol., 97th Congr., 2d Sess., Oct. 1982 Prepared by the Library of Congr., Congr., Res. Serv.
(GPO-99-557) Avail: US Capitol, House Document Room

The human factor in innovation and productivity is considered. Author

N83-20556# Naval Training Analysis and Evaluation Group, Orlando, Fla.
EVALUATION OF THE COMPUTER AIDED TRAINING EVALUATION AND SCHEDULING (CATES) DECISION MODEL FOR ASSESSING FLIGHT TASK PROFICIENCY
W. C. MCDANIEL, B. M. PEREYRA, W. C. RANKIN, and P. G. SCOTT Sep. 1982 58 p refs
(AD-A121800; TAEG-TR-130) Avail: NTIS HC A04/MF A01 CSCL 05I

Determining student performance level and subsequent decisions to either continue or stop training has posed a perplexing problem for instructors and training managers who provide pilot training. In flight pilot training involves both highly skilled human resources as well as sophisticated equipment. Therefore, training continued beyond established training objectives is costly. However, terminating training before the student pilot achieves the required skills is highly undesirable. A previous study (TAEG Report No. 94) proposed a Computer Aided Training Evaluation and scheduling (CATES) system to improve proficiency judgments during in flight training. This present study compared the efficacy of the CATES system with the present system of human judgment for assessing performance in flight training with regard to efficiency in reaching decisions and quality of decisions. The study also demonstrated that the CATES system can be used with some advantage in actual flight training program. Author (GRA)

N83-20559# Oklahoma Univ., Norman. Decision Processes Lab.
ACT GENERATION PERFORMANCE: THE EFFECTS OF INCENTIVE Technical Progress Report, Sep. 1981 - Aug. 1982
R. M. PLISKE, C. F. GETTYS, C. A. MANNING, and J. T. CASEY 15 Aug. 1982 36 p refs
(Contract N00014-80-C-0639; NR PROJ. 197-066)
(AD-A120715; TR-15-8-82) Avail: NTIS HC A03/MF A01 CSCL 05J

Two experiments explored the generalizability of earlier research which indicated that human act generation performance was impoverished. Subjects were given a realistic decision problem and were asked to generate actions which could be taken to solve the problem. Subjects in two incentive conditions were offered monetary rewards for generating additional actions. Subjects in one condition were rewarded for the sheer quantity of actions produced and subjects in the other condition were rewarded for the quality of the actions produced. In a second experiment, both expert and naive subjects judged the quality of the actions produced by subjects in the first experiment. The results replicate earlier research in that most subjects generated relatively few actions and they also failed to generate important actions as rated by both expert and naive judges. There were no significant differences between the performance of subjects in the incentive conditions and subjects in the control condition. Thus, even when subjects are given substantial monetary incentives to generate additional actions, their act generation performance is impoverished. Differences in the act generation performance of the quantity and quality incentive conditions are discussed. Author (GRA)

N83-20568# Navy Personnel Research and Development Center, San Diego, Calif.
ACCURACY, TIMELINESS, AND USABILITY OF EXPERIMENTAL SOURCE DATA MODULES Final Report, 1980 - 1981
J. S. MALONE, R. W. OBERMAYER, E. R. N. ROBINSON, and K. H. FUNK (Oregon State Univ.) Nov. 1982 45 p refs
(AD-A121788; NPRDC-TR-83-1) Avail: NTIS HC A03/MF A01 CSCL 05H

Three computer interface systems were developed and tested in a Navy Pay/Personnel Administrative Support System (PASS) office. These three systems were used to analyze personnel performance times, errors, and the effects of computer system parameters on error rates. This report describes the interface systems, discusses their advantages and limitations, and provides recommendations for the future development of a source data entry module for use in personnel office information systems. Author (GRA)

N83-22008# Institut fuer Sozialforschung und Sozialwirtschaft e.V., Saarbruecken (West Germany).
SOCIOLOGICAL ANALYSIS OF AN ORGANIZATIONAL DEVELOPMENT PROJECT CARRIED OUT AT INOVAN-STROEBE KG Final Report, May 1979
B. HERTEL, M. KNUTH, H. MITTLER, and G. SCHANK Bonn Bundesministerium fuer Forschung und Technologie Aug. 1982 516 p *refs* *In* GERMAN; ENGLISH summary
(BMFT-FB-HA-82-010; ISSN-0171-7618) Avail: NTIS HC A22/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 68

An organizational development (OD) project carried out under the sole responsibility of an industrial firm (metal working, supplier of the electronics, electrical and optical industry, about 300 employees) with regard to the preconditions, conditions and problems involved was evaluated and a possible application of the chosen OD approach for companies was investigated. At the same time parameters were developed parallel to the OD process by sociological analysis of the working situation and firm organization for the humanization of working conditions within the context of the OD project. The following methods were used: participatory observation, interviewing, and the social and analytical approaches of work science. The findings indicate that the OD approach is based on theoretical and methodological preconditions which cannot adequately take into consideration the problems of humanizing working conditions in industry. This applies especially in correlating these problems with the technical and organizational work structures and the cooperational relationships as well as the specific interests as they exist in the interactional system of an industrial firm. The OD approach, which focusses on changes of personal attitudes and behavior, has the characteristics of a reorganizational and motivational strategy for industrial management to which the OD preconditions are more likely to be applied. S.L.

N83-22490# Kraftfahrt-Bundesmat, Flensburg (West Germany).
HUMANIZATION OF WORK CIRCUMSTANCES IN DIALOG COMMUNICATION USING DATA DISPLAY DEVICES, VOLUME 1 Final Report, Sep. 1980
H. GRAUNKE, H. JULICH, H. C. PETERSEN, H. SCHAEFER, and K. STRUPP Bonn Bundesministerium fuer Forschung und Technologie Nov. 1982 328 p refs *In* GERMAN; ENGLISH summary 2 Vol.
(BMFT-FB-HA-82-037-VOL-1; ISSN-0171-7618) Avail: NTIS HC A15/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 68,50

The effects of data display on working places was investigated. Data processing by data display devices is not considered. Important criteria for job contentment is the integration into complex job structures. Corresponding to this principle of organization is team work with a flexible way of labor division which provides the chance and the motivation for a cooperative self controlled working process which give strain caused by data display devices. It is found that in public administration a team with an institutional leadership with primarily social integrative functions is appreciated most. E.A.K.

N83-22491# Kraftfahrt-Bundesmat, Flensburg (West Germany).
HUMANIZATION OF WORK CIRCUMSTANCES IN DIALOG COMMUNICATION USING DATA DISPLAY DEVICES, VOLUME 2 Final Report, Sep. 1980
H. GRAUNKE, H. JULICH, H. C. PETERSEN, H. SCHAEFER, and K. STRUPP Bonn Bundesministerium fuer Forschung und Technologie Nov. 1982 191 p refs *In* GERMAN; ENGLISH summary 2 Vol.
(BMFT-FB-HA-82-037-VOL-2; ISSN-0171-7618) Avail: NTIS HC A09/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 68,50

Human factors engineering in working conditions on data display devices communication in the automotive industry was studied. Work environments designs and areas with data display devices are outlined. The Psychosocial organization development project

for humanizing the data recording routine in the automotive industry is examined. E.A.K.

N83-23331# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Systems and Logistics.
A PROTOTYPE MODEL FOR THE DEVELOPMENT OF TRAINING SYSTEMS AND THE ACQUISITION OF AIRCREW TRAINING DEVICES FOR DEVELOPING WEAPON SYSTEMS M.S. Thesis
W. L. GOETZ and N. O. PEREZ-OTERO Sep. 1982 162 p refs
(AD-A123041; AFIT-LSSR-18-82) Avail: NTIS HC A08/MF A01 CSCL 05I

The authors review the current method used by the Air Force to develop Training Systems and to acquire Aircrew Training Devices (ATDs), and they identify six limitations or problem areas. A review of Army and Navy ATD acquisition systems, as well as current literature, found no existing system which addressed all problems in existing systems. The authors develop a prototype system model for training and ATD development with proposed changes in four areas: management and personnel which includes centralization of decision making, development and retention of training development expertise, team concept, and collocation; information availability which includes access to prime contractor information and Generic Data Base (GDB) technology; contracting and delivery strategies which include scenario development, Pre-Planned Product Improvement, and using actual equipment or reduced fidelity ATDs for early training; Training System (TS)/ATD Development Model which includes a graphic representation of the process to develop TS and ATD requirements. The authors validate the system model via expert opinion. Five of the six limitation areas were judged to be significantly improved by the system model. Author (GRA)

N83-25373# SRI International Corp., Menlo Park, Calif.
MAN-MACHINE COOPERATION FOR ACTION PLANNING Final Report
A. ROBINSON and D. WILKINS Nov. 1982 44 p refs
(Contract N00014-80-C-0300)
(AD-A124243) Avail: NTIS HC A03/MF A01 CSCL 05H

This is the final report which investigated the cooperative process that enables a computer to assist a decisionmaker in planning and scheduling sequences of actions. This involved the development of a new system for planning and scheduling actions, along with a human-engineered package for defining multimodal man-machine interfaces (i.e., interactions using different human senses) that can be readily intermingled. In addition to work on these two aspects of the general problem, we produced a demonstration system applying the techniques devised in the course of the project to a task of relevance to the Navy. As a representative application, we selected the problem of planning and monitoring aircraft movement on board a carrier. GRA

N83-25374# Center for Policy Research, Inc., New York.
ORGANIZATIONAL CONTEXT OF HUMAN FACTORS Final Report, May - Nov. 1982
C. PERROW Nov. 1982 68 p refs
(Contract N00014-82-C-0436; NSF SES-80-14723)
(AD-A123435; REPT-221-2) Avail: NTIS HC A04/MF A01 CSCL 05H

Organizational structure is analyzed for the impact it has on the human factors function in military and non-military organizations. The social structure's impact upon design engineers, the social role of the operator, and on the human factors engineer is detailed. The impact of equipment upon the operator and upon the social structure is detailed. Design philosophies are contrasted. The low status and power of the human factors engineer is contrasted to the status and power of the design engineer. Top management is seen as largely responsible for the low utilization of good human factors engineering. Recommendations for alleviating this include structural changes, accountability measures, documentation, and unobtrusive changes in socialization and culture in the organization. Examples from the literature and observations are provided.
Author (GRA)

N83-26494*# National Academy of Sciences - National Research Council, Washington, D. C. Committee on Aircrew-Vehicle System Interaction.
AIRCREW-VEHICLE SYSTEM INTERACTION. AN EVALUATION OF NASA'S PROGRAM IN HUMAN FACTORS RESEARCH Final Report
Oct. 1982 39 p refs
(Contract NASW-3455)
(NASA-CR-172662; NAS 1.26:172662) Avail: NTIS HC A03/MF A01 CSCL 01C

The review comprises an assessment of NASA's program in the study of human factors in aircraft flight management and evaluates an augmentation to the program proposed by NASA. NASA's goal is to improve the existing knowledge base of factors that tend to introduce human error. The committee concludes that NASA's effort should be concentrated on developing methods and techniques for analyzing man machine interactions, including human workload and prediction of performance and assessment of their effects on safety and reliability. GRA

N83-27602# *Edgerton, Germeshausen and Grier, Inc., Idaho* Falls, Idaho. Operational Safety Div.
OPERATIONAL READINESS AND THE HUMAN FACTORS ENVIRONMENT
L. R. KLINESTIVER 1982 5 p refs Presented at the SAFF Symp., Las Vegas, Nev., 5 Dec. 1982
(Contract DE-AC07-76ID-01570)
(DE83-005586; EGG-M-22082; CONF-821225-1) Avail: NTIS HC A02/MF A01

Personnel readiness as it applies to hardware, procedures, and management controls is defined. Task performance factors and interface factors that affect operational organizations and developmental programs are presented. Operational readiness, as far as personnel are concerned in the industrial and aerospace industry, is affected by human factors such as physiological, psychological, and environmental. Plant hardware, procedures, and management control are also indirectly involved. DOE

N83-27900# Navy Personnel Research and Development Center, San Diego, Calif.
IMPLEMENTATION OF PLANNED CHANGE: A REVIEW OF MAJOR ISSUES Final Report, 1980 - 1981
J. P. SHEPOSH, V. N. HULTON, and G. A. KNUDSEN Feb. 1983 52 p refs
(Contract ZF66512001)
(AD-A125193; NPRDC-TR-83-7) Avail: NTIS HC A04/MF A01 CSCL 05A

Pertinent literature was reviewed to provide a perspective for the study of change in organizations. This review focused primarily on the major issues identified in implementing organizational change with special emphasis on the role of management in this process. Based on a review of the findings, it was concluded that implementation can best be understood in functional terms. Several Recommendations are made to aid researchers and practitioners in the investigation, application, and understanding of change processes. Author (GRA)

N83-29247# French Air Force, Paris.
HANDLING COMBAT ENGINES: THE PILOTS VIEWPOINT [PILOTABILITE DES MOTEURS DE COMBAT: LE POINT DE VUE DU PILOTE]
M. ROUGEVIN-BAVILLE *In* AGARD Eng. Handling 8 p Feb. 1983 In FRENCH
Avail: NTIS HC A18/MF A01

To permit the combat pilot to devote himself to his mission, engine management must be made easier: suppression or simplification or briefings; improvement of the throttle level and control instruments; and operation of supplemental devices such as automatic throttle levers or computers for optimizing fuel consumption. These improvements come about by more powerful integration of the engine in the aircraft. The Mirage 2000 aircraft suggests simple and effective solution to the problem of thrust control. Transl. by A.R.H.

N83-30008# North Research, Inc., Anchorage, Alaska. Alaskan Aviation Safety Foundation.
THE BUSH PILOT SYNDROME: A CRITICAL INCIDENT ANALYSIS
M. K. MITCHELL Apr. 1983 13 p refs
Avail: NTIS HC A02/MF A01

The National Transportation Safety Board concluded in a 1980 study that the bush pilot syndrome was a major factor contributing to a non-fatal air taxi accident rate four times higher and a fatal rate more than double the rest of the United States. During 1981-1982, the Alaskan Aviation Safety Foundation completed and published a study titled Definition of Alaskan Aviation Training Requirements. The researchers used Flannigan's critical incident technique. The respondents reported that strict management supervision was the key to controlling the bush pilot syndrome. In addition, observations by the researchers revealed that air taxi operators who hired pilots using a careful screening process, provided thorough training, and remunerated pilots with a rewarding salary and benefit package seemed to have less turnover and fewer accidents. Author

N83-30304# Decision Science Consortium, Inc., Falls Church, Va. Technology Assessment and Risk Analysis.
TOWARDS A PRESCRIPTIVE ORGANIZATION THEORY OF DECISION AIDING FOR RISK MANAGEMENT. PHASE 1: CONCEPTUAL DEVELOPMENT
R. V. BROWN Nov. 1982 60 p refs
(Contract NSF PRA-82-12159)
(PB83-156109; NSF/PRA-83044) Avail: NTIS HC A04/MF A01
CSCL 05J

The analytical and empirical problems of prescribing actions in organizations, particularly actions designed to aid decision making are addressed. Other ways to enhance organizational decisions, such as manipulating reward and authority systems, are considered. The need for organizational prescription is emphasized, and attempts at generating specific organizational prescriptions are noted. Distinctions between internal and external action are examined and a conceptual model is proposed to analyze the probable consequence of internal actions. Ideas for further research are suggested. An example of how prescription organization ideas might apply in the design of combat control systems used by the commanding officer of an attack submarine is provided. GRA

N83-32311# Purdue Univ., Lafayette, Ind. Dept. of Psychological Sciences.
METHODOLOGICAL CONTRIBUTIONS OF PERSON PERCEPTION TO PERFORMANCE APPRAISAL Interim Report
D. R. ILGEN and J. L. FAVERO Mar. 1983 42 p refs
(Contract N00014-82-K-0449; NR PROJ. 170-940; RR0420801)
(AD-A128638; REPT-83-4) Avail: NTIS HC A03/MF A01
CSCL 05I

A process focus on performance appraisal represents the application of knowledge about the information processing capabilities of individuals to the problem of appraising the work performance of employees. Much of our attempt to understand the appraisal process has borrowed from social psychology in general and person perception in particular. Although the theoretical constructs of person perception have appeared to be very relevant to performance appraisal, the experimental methods from which the data related to the theoretical constructs have been generated may be less well suited for studying particular issues in performance appraisal. In this paper, we outline several of the methods used in person perception and then discuss the relevance of these methods for studying performance appraisal. In order to accomplish this final critique of the methods, we first outline the nature of the performance appraisal process with its conditions and constraints that affect the relevance of data collected with respect to the process. Author (GRA)

N83-32314# Naval Postgraduate School, Monterey, Calif. Dept. of Operations Research.
INTEGRATION ANALYSIS: A PROPOSED INTEGRATION OF TEST AND EVALUATION TECHNIQUES FOR EARLY ON DETECTION OF HUMAN FACTORS ENGINEERING DISCREPANCIES M.S. Thesis
D. L. CARLSON Mar. 1983 83 p refs
(AD-A127611) Avail: NTIS HC A05/MF A01 CSCL 05E

The objective of this thesis is to address the idea of implementing a viable T&E technique at the early stages of DT&E in order to reduce design discrepancies and minimize acquisition costs and time. This technique involves integration of Task Analysis, Operator Interviews and Link Analysis to evaluate a system's Functional Mock-up. The technique will, therefore, be referred to as Integration Analysis throughout the paper. In order to provide a measure of its contribution, it will be implemented on a recently procured system that experienced numerous HFE design discrepancies at its OT&E stage. The system in question, the Recovery Assist, Securing, and Traversing (RAST) System associated with the LAMPS MK III Acquisition, revealed HFE problems in relation to its LSO Control Station. The use of the subject technique could have discovered a majority of those problems much earlier in the Acquisition Process. GRA

N83-32658# Naval Postgraduate School, Monterey, Calif.
PROBLEMS ASSOCIATED WITH THE IMPLEMENTATION OF MANAGEMENT CONTROL SYSTEMS M.S. Thesis
J. M. BELL Dec. 1982 89 p refs
(AD-A127254) Avail: NTIS HC A05/MF A01 CSCL 05A

The objective of the study is to determine if the Navy is following sound implementation procedures when a new system is introduced into the organization. Case studies are employed to determine what problems occur in a specific implementation process and whether the problems which did appear could have been avoided by an improved implementation process. This objective is accomplished through a comparison of theoretical models of change and implementation procedures found in accounting and related literature to the actual implementation procedures employed by the Navy in the case studies. The conclusion of the thesis, although the sample size was limited, is that the Navy does have a sound process for implementing change in its management control systems and that the implementation process is used.
Author (GRA)

N83-32659# Leadership and Management Development Center, Maxwell AFB, Ala.
MANAGEMENT'S ROLE FOR REDUCING EMPLOYEE STRESS Final Report
C. M. PURINGTON, JR. Mar. 1983 38 p refs
(AD-A127126; LMDC-TR-83-1) Avail: NTIS HC A03/MF A01
CSCL 05A

This literature review on job related stress is based on several sets of findings from behavioral and medical research. Support is offered for the premise that job related factors are a primary cause of stress induced illness among people in today's work force. Whether or not a job actually provokes stress depends a great deal on how a person perceives the situation. This perception in turn is influenced by a variety of individual differences in people and by differences in the work environment. Medical researchers now believe that the chemical stress reaction within the human body is the most important causative factor in contemporary health breakdowns. The economic costs of stress in terms of health care in 1980 was on in every 14 dollars. Management is now realizing the related personnel costs associated with absenteeism, turnover, premature retirement, serious illness, alcoholism, and death will become an even bigger problem in the future. Authors generally agree that the responsibility for reducing employee stress belongs to management. However, since there is no single cause or effect of stress, a simple solution to correct the problem does not exist. Therefore, a combination of approaches need to be established to help people and organizations deal effectively with stress in the work force. The review concludes with some

discussion and recommendations to management for helping employees cope productively with job related stress. GRA

N83-32686# Committee on Science and Technology (U. S. House).
TECHNOLOGY AND HANDICAPPED PEOPLE
Washington GPO 1983 267 p refs Joint hearing before the Comm. on Sci. and Technol. and the Comm. on Labor and Human Resources, 97th Congr., 2d Sess., No. 163, 29 Sep. 1982 (GPO-12-921) Avail: Subcomm. on Sci., Res. and Technol.

Research, development, and evaluation of technologies, the degree of consumer participation in presently available methods, personnel issues, marketing and production, and financial barriers to the acquisition of technology and its use are discussed.
Author

N83-34585*# George Mason Univ., Fairfax, Va. Decision Sciences Faculty.
A HUMAN FACTORS METHODOLOGY FOR REAL-TIME SUPPORT APPLICATIONS
E. D. MURPHY, P. M. VANBALEN, and C. M. MITCHELL Jan. 1983 62 p refs
(Contract NAS5-26952)
(NASA-CR-170581; NAS 1.26:17081) Avail: NTIS HC A04/MF A01 CSCL 05H

A general approach to the human factors (HF) analysis of new or existing projects at NASA/Goddard is delineated. Because the methodology evolved from HF evaluations of the Mission Planning Terminal (MPT) and the Earth Radiation Budget Satellite Mission Operations Room (ERBS MOR), it is directed specifically to the HF analysis of real-time support applications. Major topics included for discussion are the process of establishing a working relationship between the Human Factors Group (HFG) and the project, orientation of HF analysts to the project, human factors analysis and review, and coordination with major cycles of system development. Sub-topics include specific areas for analysis and appropriate HF tools. Management support functions are outlined. References provide a guide to sources of further information.
Author

N83-36688# Naval Ship Research and Development Center, Bethesda, Md. Computation Mathematics/Logistics Dept.
SCIENTIFIC/ENGINEERING WORK STATIONS: A MARKET SURVEY *Final Report*
J. R. CARLBERG May 1983 94 p
(AD-A129394; DTNSRDC/CMLD-83/07) Avail: NTIS HC A05/MF A01 CSCL 05A

The David Taylor Naval Ship R&D Center (DTNSRDC), along with the white-collar segment of American business, is confronted with flat or declining productivity in the office, rising personnel costs, personnel ceilings and reductions, and a shortage of skilled workers, especially within the technical and scientific areas. Spurred by the development of powerful microprocessors and new software, designers of advanced intelligent workstations are developing a new class tool for technical personnel. These workstations are growing as tools to increase the productivity of scientists, engineers and managers. Five aspects go into making an efficient, productive workstation. These aspects are a flexible processor, general purpose and application oriented software, sophisticated graphics, local area network communications, and data base management. This report documents the results of a market survey to identify systems that can potentially meet the requirements for engineering workstations. Additionally, workstation application requirements for some of the Center's departments are discussed. System requirements are discussed and are presented as a functional description. Author (GRA)

02

MANAGEMENT TECHNIQUES

Includes operations research, systems engineering, mathematical approaches and modeling, planning, graphic analysis, and manufacturing.

A83-17957
THE MANAGEMENT OF ENGINEERING CHANGE PROCEDURE
B. G. DALE (University of Manchester Institute of Science and Technology, Manchester, England) Engineering Management International, vol. 1, Dec. 1982, p. 201-208.

The factors involved in implementing engineering design changes in a multinational engineering company manufacturing to stock, as part of a batch production system, a medium technology item are investigated. The changes are regarded as necessary to maintain the continuity of the company, and are to be effected with the least disturbances to nominal operations while simultaneously assuring accurate communication and control of the intended change. The various reasons for initiating the change are reviewed, together with the selection of application dates and points by a management committee acting in response to the proposal. The disposition of various responsibilities involved in the change among the company departments is described, with emphasis on the necessity of detailing the changes and assuring that they are understood. Finally, it is noted that engineering systems introduced should feature enough flexibility to accommodate future minor changes. M.S.K.

A83-18398#
HOW DECISIONS ARE MADE - MAJOR CONSIDERATIONS FOR AIRCRAFT PROGRAMS
J. E. STEINER (Boeing Co., Seattle, WA) International Council of the Aeronautical Sciences and American Institute of Aeronautics and Astronautics, Aircraft Systems and Technology Meeting, Seattle, WA, Aug. 24, 1982, Paper. 37 p.

Historical accounts are presented of project management experience gained in the course of civilian and military aircraft development since the end of World War Two. Emphasis is put on the financial risks faced by aircraft manufacturers as they proceed to make decisions concerning large scale, long term aircraft development and production schedules. After assessing the performance improvement trends from the 1940's to the present in such matters as fuel consumption, noise reduction, structural weight reduction and avionics, case histories are presented for the aircraft in which such performance gains were gradually achieved. The aircraft programs include the 377 Stratocruiser, the B-52 strategic bomber, the P-3 Orion naval patrol aircraft, the 707, 727 and 747 airliners, recent wide body airliners such as the A300, 767 and 757, and the turbofan engines whose development was essential to the design of recent, fuel-efficient airliners. O.C.

A83-29966
FORECASTING IN AIR TRANSPORT - A CRITICAL REVIEW OF THE TECHNIQUES AVAILABLE
A. N. HOFTON (Cranfield Institute of Technology, Cranfield, Beds., England) (Royal Aeronautical Society, Symposium on Planning Airline Fleet Composition, London, England, Jan. 19, 1983) Aeronautical Journal (ISSN 0001-9240), vol. 87, March 1983, p. 85-87.

Air transport forecasting is aimed at the provision of a qualitative and quantitative measure of likely levels of future market demand, with such components as marketing opportunities, company efforts, performance control, the determination and influence of business environment, and contingency planning. Forecasting methods employ market research, expert assessments, the projection of scenarios, mathematical 'curve fitting' projections, econometric and demographic models, and simulation techniques. Time scales for forecasting are divided in the present lecture into the categories

of 'short term', or one to 18 months, 'medium term', of 18 months to five years, and 'long term', of from five to 15 years. O.C.

A83-30525
SCIENTIFIC FOUNDATIONS OF ADVANCED TECHNOLOGY [NAUCHNYE OSNOVY PROGRESSIVNOI TEKHNOLOGII]
V. N. LYMZIN, ED. Moscow, Izdatel'stvo Mashinostroenie, 1982, 376 p. In Russian.

The objective of increasing the efficiency of production is viewed as a complex scientific and engineering problem which includes the development of advanced processes, materials, and machinery on the basis of fundamental scientific research. Particular attention is given to a systems approach to the design of complex engineering structures and the use of computer-aided design and manufacturing. Some applications of advanced technology are discussed, such as machining by a pulsed laser plasma, the use of laser analyzers for the monitoring and control of technological and physicochemical processes, and vibrational technology applications. Other topics discussed include the development of metallurgical engineering, and automation in engineering industry. V.L.

A83-31095
THE ROLE OF COMPUTER MODELING AND SIMULATION IN ELECTRIC AND HYBRID VEHICLE RESEARCH AND DEVELOPMENT
R. P. WOLFSON and J. H. GOWER (Aerospace Corp., Washington, DC) IEEE Transactions on Vehicular Technology (ISSN 0018-9545), vol. VT-32, Feb. 1983, p. 62-73. Research supported by the U.S. Department of Energy. refs
(Contract F04701-83-C-0083)

Computer modeling-assisted studies and assessments of electric and hybrid vehicle candidate technologies have been undertaken to provide data for management planning and research effort decisions, as well as for engineering activities such as preliminary and final design optimization. A discussion is presented concerning the range of programs which have been developed for these purposes, extending from small programs that can be run on hand-held calculators to lengthy programs running to more than 11,000 lines. It is noted that many of these programs exist in the public domain, and that two major programs are available on commercial time-sharing systems. O.C.

A83-33524
FUNCTIONAL MANAGEMENT IN MATRIX ORGANIZATIONS
W. JERKOVSKY (Aerospace Corp., Guidance, Navigation, and Control Div., Los Angeles, CA) IEEE Transactions on Engineering Management (ISSN 0018-9391), vol. EM-30, May 1983, p. 89-97. refs

Six roles of functional managers are defined by analysis of a role relationship diagram. A time allocation survey shows that the time spent on two of the roles (task management and employee development) is independent of the functional manager level; the time spent on two of the roles (knowledge updating and technical consulting) decreases with the manager level; and the time spent on the remaining two roles (technical administration and organization development) increases with the manager level. Pros and cons and problems of matrix organizations are discussed from the perspectives of a functional management practitioner and various techniques for maximizing engineering productivity are suggested. Further studies are recommended, and a series of questions, which are relevant in all matrix organizations, is presented. Author

A83-40277
THE NEXT STEP IN GETTING THE COMPOSITE STORY RIGHT INDUSTRIALISATION OF MANUFACTURING SYSTEMS
C. R. W. BROWN (Ingersoll Engineers France, Seynod, Haute-Savoie, France) IN: Progress in science and engineering of composites; Proceedings of the Fourth International Conference on Composite Materials, Tokyo, Japan, October 25-28, 1982. Volume 2 . Tokyo/Amsterdam, Japan Society for Composite Materials/North-Holland, 1982, p. 1559-1563.

Industrial management techniques necessary for introducing composites manufacturing equipment and processes for mass-production of parts and materials are discussed. Switching production from fiberglass components or running two types of product streams can involve the risk that the plant brought in to produce advanced composites can be obsolete within two years of operation. It is suggested that this must be accepted as a nominal operating condition and that the systems purchased be selected for flexibility and dynamics. The systems can be implemented only through planning that includes all support systems upstream and downstream of the new technologies. The identification of checkpoints is also necessary for monitoring the progress with the new production mechanisms. It is also necessary to integrate the new technologies into the company operations, particularly as a cost factor. Finally, the necessity that management be willing to accommodate the upheavals and conflicts accompanying any initiation of new projects is stressed, as adaptation and preparation for new circumstances is an unavoidable adjunct to survival and growth of a company. M.S.K.

A83-40331
B-1B MANUFACTURING - ROCKWELL MANAGEMENT PLAN SAVING COSTS, TIME
W. B. SCOTT Aviation Week and Space Technology (ISSN 0005-2175), vol. 119, Aug. 1, 1983, p. 40-43.

Rockwell International, the prime contractor for the U.S. Air Force's B-1B bomber program, has together with its subcontractors instituted a management system which employs weekly reviews, highlighting problem areas and thereby enabling program officials to formulate solutions that will maintain the established schedule. Many of the management personnel involved in the B-1B program have had experience with the development of the original B-1 aircraft. As of July 1983, all engineering drawings have been completed, together with 99 percent of manufacturing and tool orders, and 94 percent of the planned aircraft tooling has been constructed. By using a set of interim milestones to monitor overall program progress, managers can quickly identify potential problem areas. Milestones are monitored at each level of the organization through a series of information centers which display schedules, cost data, and status reports. O.C.

A83-41294
NORMATIVE PREDICATES OF NEXT-GENERATION MANAGEMENT SUPPORT SYSTEMS
J. W. SUTHERLAND (Virginia Commonwealth University, Richmond, VA) IEEE Transactions on Systems, Man, and Cybernetics (ISSN 0018-9472), vol. SMC-13, May-June 1983, p. 279-297. DARPA-supported research. refs

Popular literature on the design of management systems is dominated by those arguing the case for decision support systems (DSS). The DSS approach is notable chiefly for its promise to accommodate information technology to the interests of particular organizations and ultimately to the preferences of individual decisionmakers. The problems with this approach, as well as the need for an alternative design methodology, the normative protocol, are discussed. This is distinct from the DSS platform in three major respects: (1) its employment of 'structured' as opposed to casual design procedures; (2) its emphasis on universalistic as opposed to locally defined system requirements; and (3) its adoption of a compensatory (viz. accommodative) posture towards clients, such that decisionmaking procedures are made consistent with rationality criteria derived from modern management and decision science. Author

A83-41299
A PARTICIPATIVE APPROACH TO PROGRAM EVALUATION
D. F. KOCAOGLU (Pittsburgh, University, Pittsburgh, PA) (Institute of Electrical and Electronics Engineers, National Engineering Management Conference, Washington, DC, June 13, 1982) IEEE Transactions on Engineering Management (ISSN 0018-9391), vol. EM-30, Aug. 1983, p. 112-118. Sponsorship: U.S. Department of Agriculture. refs
(Contract USDA-OS-78-07)

This paper discusses the methodology for the measurement of subjective values via constant-sum comparisons, the development of a Hierarchical Decision Model (HDM), and the formation of expert consensus through the hierarchical decision process. Its focus is on post-program evaluation, but the methodology is equally applicable to pre-program evaluation, ongoing program evaluation, goal formation, capital expenditures, resource allocations, project selection, project performance evaluation, and many other similar decisions in a wide range of management situations. Author

A83-41300
THE EVALUATION CYCLE - IN RES EVALUATION APPROACHES FOR THE EIGHTIES
N. S. LEVINSON (American University, Washington, DC) IEEE Transactions on Engineering Management (ISSN 0018-9391), vol. EM-30, Aug. 1983, p. 119-122. refs

The problems inherent in R&D-program evaluation are discussed, with a focus on the project-implementation phase. The factors considered include systems-oriented versus project-oriented decision making, top versus project-management involvement, individual versus unit quantification, and a group of general or contextual influences such as technology, personnel, organizational structure, politics, and competition. It is shown that the less readily quantifiable factors are of great importance in the evaluation of ongoing projects. The use of carefully chosen case studies and modified ethnographic techniques such as progressive interviewing and information-needs inventories is suggested as a means of providing easily comprehensible and applicable qualitative data. T.K.

A83-41301
A PROPOSED PROJECT TERMINATION AUDIT MODEL
D. D. ROMAN (George Washington University, Washington, DC) (Institute of Electrical and Electronics Engineers, National Engineering Management Conference, Washington, DC, June 13, 1982) IEEE Transactions on Engineering Management (ISSN 0018-9391), vol. EM-30, Aug. 1983, p. 123-127.

Project postmortem analysis, if conducted at all, is generally cursory. Often organizational pressures preclude an independent and comprehensive examination of completed projects. A project audit or outcome evaluation can be extremely constructive and a valuable tool for both the technical and managerial organization. Not only can it help focus on objectives and the accomplishment of those objectives, but it can also provide guidance to the conceptual, formative, and operational phases of future projects. Author

A83-41302
PRIORITY SETTING IN COMPLEX PROBLEMS
T. L. SAATY (Pittsburgh, University, Pittsburgh, PA) (Institute of Electrical and Electronics Engineers, National Engineering Management Conference, Washington, DC, June 13, 1982) IEEE Transactions on Engineering Management (ISSN 0018-9391), vol. EM-30, Aug. 1983, p. 140-155. refs

There are three principles which one can recognize in problem solving. They are the principles of decomposition, comparative judgments, and synthesis of priorities. The Analytic Hierarchy Process (AHP) provides a comprehensive framework to cope with the intuitive, the rational, and the irrational in us all at the same time when we make decisions. It is a method we can use to integrate our perceptions and purposes into an overall synthesis. The AHP does not require that judgments be consistent or even transitive. The degree of consistency (or inconsistency) of the judgments is revealed at the end of the AHP process. Author

A83-41304* George Washington Univ., Washington, D.C.
AD HOC MODELING, EXPERT PROBLEM SOLVING, AND R&T PROGRAM EVALUATION
B. G. SILVERMAN (George Washington University, Washington, DC), J. LIEBOWITZ, and V. S. MOUSTAKIS (Institute of Electrical and Electronics Engineers, National Engineering Management Conference, Washington, DC, June 13, 1982) IEEE Transactions on Engineering Management (ISSN 0018-9391), vol. EM-30, Aug. 1983, p. 169-176. refs
(Contract NAS5-27200; NGT-09-010-800)

A simplified cost and time (SCAT) analysis program utilizing personal-computer technology is presented and demonstrated in the case of the NASA-Goddard end-to-end data system. The difficulties encountered in implementing complex program-selection and evaluation models in the research and technology field are outlined. The prototype SCAT system described here is designed to allow user-friendly ad hoc modeling in real time and at low cost. A worksheet constructed on the computer screen displays the critical parameters and shows how each is affected when one is altered experimentally. In the NASA case, satellite data-output and control requirements, ground-facility data-handling capabilities, and project priorities are intricately interrelated. Scenario studies of the effects of spacecraft phaseout or new spacecraft on throughput and delay parameters are shown. The use of a network of personal computers for higher-level coordination of decision-making processes is suggested, as a complement or alternative to complex large-scale modeling. T.K.

A83-43399
PROGRESS MEASUREMENT DURING PROJECT EXECUTION
M. P. BUDDHDEO (Engineers India, Ltd., New Delhi, India) and S. K. GUPTA Engineering Management International (ISSN 0167-5419), vol. 1, July 1983, p. 281-285.

This paper gives a method to measure the progress in different phases of project life. The system proposed in this paper awards progress at the completion of job steps/milestones which are physically measurable. The approach implicitly takes into account the efficiency of the people involved in the system under consideration. Author

A83-43951* Jet Propulsion Lab., California Inst. of Tech., Pasadena.
PLANNING IN TIME - WINDOWS AND DURATIONS FOR ACTIVITIES AND GOALS
S. A. VERE (California Institute of Technology, Jet Propulsion Laboratory, Information Systems Research Section, Pasadena, CA) IEEE Transactions on Pattern Analysis and Machine Intelligence (ISSN 0162-8828), vol. PAMI-5, May 1983, p. 246-267. refs
(Contract NAS7-100)

The present general purpose automated planner/scheduler generates parallel plans aimed at the achievement of goals having imposed time constraints, with both durations and start time windows being specifiable for sets of goal conditions. Deterministic durations of such parallel plan activities as actions, events triggered by circumstances, inferences, and scheduled events entirely outside the actor's control, are explicitly modeled and may be any computable function of the activity variables. The final plan network resembles a PERT chart. Examples are given from the traditional 'blocksworld', and from a realistic 'Spaceworld' in which an autonomous spacecraft photographs objects in deep space and transmits the information to earth. O.C.

A83-45021
PRINCIPLES FOR SYNTHESIZING THE STRUCTURE OF COMPLEX SYSTEMS [OSNOVY SINTEZA STRUKTURY SLOZHNYKH SISTEM]
A. D. TSVIRKUN Moscow, Izdatel'stvo Nauka, 1982, 200 p. In Russian. refs

Fundamental problems in analyzing and synthesizing the structure of complex systems are considered. Methods for obtaining a formalized description of the system elements and their structural interrelationships are outlined, as are methods for optimizing the structural arrangement of automated information management systems. Also presented are methods for optimizing control over the development of the structure of production and organization systems and methods for optimizing the use of imitation modeling in synthesizing the structure of a system. C.R.

N83-10974# Purdue Univ., Lafayette, Ind.
MULTI ATTRIBUTE AND MULTIPLE CRITERIA APPROACHES FOR DETERMINING BAYESIAN ACCEPTANCE PLANS IN QUALITY CONTROL AND AUDITING Technical Report, 1 Sep. 1980 - 30 Nov. 1981
A. RAVINDRAN and H. M. MOSKOWITZ Nov. 1981 113 p refs
(Contract NSF ECS-80-07103)
(PB82-203100; NSF/ECS-81014) Avail: NTIS HC A06/MF A01 CSCL 05A

The development of a bicriterion model for acceptance sampling in quality control is discussed. Such a model allows explicit consideration of conflicting goals that are not considered in existing acceptance sampling schemes. A quality measure and a cost measure are used as the conflicting criteria. Two optimization procedures for solving the model are explored, the first of which involves the measurement of a decisionmaker's utility function and subsequent optimization viA an implicit enumeration algorith. The second method employs an interactive procedure. Also presented is a laboratory study that compares the interactive process to utility function management methods in a quality control setting. Claims that interactive procedures are easier to use and achieve a more satisfactory solution are supported. The claim that interactive procedures provide more insight into the relationships of the criteria is refuted. An interactive procedure under uncertainty is developed and illustrated for the bicriterion case. Efficiency under uncertainty is defined, and conditions that guarantee efficiency are proven. Author

N83-10976# Technical Research Centre of Finland, Espoo. Textile Lab.
APPRAISAL OF THE COMAX CONCEPTION
B. MALMSTROEM Jan. 1981 72 p refs
(PB82-204413; TIEDONANTO-22; ISBN-951-38-1137-9; ISSN-0355-3639) Avail: NTIS HC A04/MF A01 CSCL 05A

The conceptual development of the projected account or Comax conception, a unifying model of the real business system to support the managing process of plan, execute, and review and with the capacity to adapt common management techniques of applied mathematics is reviewed. The review is given a formal structure and is followed by a formalistic proof of evidence of efficacy, and a discussion of general features and development of the Comax conception. GRA

N83-11367# Stihl (Andreas), Waiblingen (West Germany).
INTEGRATED JOB STRUCTURING USING THE EXAMPLE OF SMALL ENGINE ASSEMBLY IN A MEDIUM-SIZED COMPANY, PRELIMINARY PHASE Final Report, May 1979
W. MOELLER Bonn Bundesministerium fuer Forschung und Technologie Aug. 1982 84 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-HA-82-011; ISSN-0171-7618) Avail: NTIS HC A05/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 17,50

In chain saw assembly, nine different models in up to sixteen versions were produced on nine assembly lines, using a job cycling cycle of 1.5 minutes. The existing layout permitted nonflexibility from a technical point of view and no latitude from the workers point of view. It was decided to make changes and planning was undertaken. This included planning of graduated assembly structures, higher on-the-job qualifications of workers, technological studies, production control and material logistics, variable work time, and integration of older and ailing workers. The planned assembly structures are graduated to include currently used systems, intermediate structures with varying work place and section buffers, and a structure with a job content of 6 minutes and a work place buffer of 60 minutes. A test cubicle reducing the noise level and a multiple screwdrivers station, reducing the workers arm load, were developed. With regard to variable time working, it is proved that in a two shift system this work method can only be applied where work place capacity is higher than the number of workers. Author (ESA)

N83-11821# Naval Postgraduate School, Monterey, Calif. Dept. of Operations Research.
A GRAPHICAL TEST BED FOR ANALYZING AND REPORTING THE RESULTS OF A SIMULATION EXPERIMENT M.S. Thesis
D. G. LINNEBUR Mar. 1982 113 p refs
(AD-A118214) Avail: NTIS HC A06/MF A01 CSCL 12A

A graphical test bed in which the results of a simulation experiment can be reported and analyzed is described. The test bed is based on the regression adjusted graphics and estimation (RAGE) methodology developed by Heidelberger and Lewis for regenerative simulations. From the graphics and the associated numerics the experimenter can summarize and see simultaneously relative properties, such as bias, normality and standard deviation, of several estimators of a characteristic of a population for up to eight sample sizes. The graphics is supported on a line printer to make it and the program portable. Author (GRA)

N83-11822# Naval Postgraduate School, Monterey, Calif.
AN APPLICATION OF RAYLEIGH CURVE THEORY TO CONTRACT COST ESTIMATES AND CONTROL M.S. Thesis
H. WATKINS, III Mar. 1982 84 p refs
(AD-A118213) Avail: NTIS HC A05/MF A01 CSCL 15E

Cost growth is a major problem in defense systems acquisition. Since 1969 the DoD has underestimated the ultimate costs of major systems by more than 50 percent. Consequently, the importance of contract costs has risen greatly in recent years to the point that costs are now officially equated to technical performance in importance. A body of knowledge of the structure and models of the behavior of contract costs and contract performance within DoD is desired. This paper develops a simplified methodology for the systematic analysis and prediction of cost and schedule variables from an existing data base. The methodology is applied to actual DOD contract data using the interactive computing system MINITAB. Author (GRA)

N83-11871# National Inst. for Aeronautics and Systems Technology, Pretoria (South Africa).
GRAPHICAL STATUS MONITORING SYSTEM FOR PROJECT MANAGERS
M. P. ESPENSCHIED Jan. 1981 33 p refs
(CSIR-NIAST-81/7) Avail: NTIS HC A03/MF A01

A graphical project monitoring system is described, using mechanistic and analytical forecasting techniqus to present an overall visual picture (including future trends) of progress to project managers. The mechanistic technique is used when data over a period of time are reasonably linear; while the analytical technique is required when sharp cost changes are encountered on entering a new project phase. Author

N83-11873# California Univ., Los Angeles. Graduate School of Management.
PROGRAM FOR RESEARCH ON ORGANIZATIONS AND MANAGEMENT: THE UNITED STATES-JAPANESE ELECTRONIC INDUSTRIES STUDY Interim Technical Report
W. G. OUCHI, J. B. BARNEY, and D. ULRICH Aug. 1981 35 p refs
(Contract N00014-81-K-0035; NR PROJ. 170-920)
(AD-A118106; TR-ONR-5) Avail: NTIS HC A03/MF A01 CSCL 05C

This paper reviews a long term research project which describes and analyzes the U.S. and Japanese electronics industries. The research is based on an organization theory application of an efficiency model. The project's long range purpose is to describe and understand firm's strategic relations with other firms so that more efficient, equitable, and effective transactions can be determined and implemented. This paper reviews 6 components of this project with preliminary results that indicate structural differences between the U.S. and Japanese electronics industries. Author (GRA)

N83-11874# California Univ., Los Angeles. Graduate School of Management.
PERSPECTIVES IN ORGANIZATION THEORY: RESOURCE DEPENDENCE, EFFICIENCY, AND ECOLOGY Interim Technical Report
J. B. BARNEY and D. ULRICH Jun. 1981 39 p refs
(Contract N00014-81-K-0035; NR PROJ. 170-920)
(AD-A118107; TR-ONR-4) Avail: NTIS HC A03/MF A01 CSCL 05A

Development of alternative models of organizations plays an important role in the development of organization theory. While many views on organizations have received varying degrees of attention, three perspectives have recently been the object of increasing interest, the resource dependence, efficiency, and ecological perspectives. This paper reviews the assumptions, theories and research of each perspective. It then integrates them by showing . that a population perspective provides a meta-theoretical framework within which the other perspectives can be interpreted as guidelines. Author (GRA)

N83-11877# Technical Research Centre of Finland, Tampere. Textile Lab.
COMMON CONCEPT OF MANAGING PROCESS AND TECHNIQUES
B. MALMSTROEM Jan. 1981 122 p refs
(PB82-204728; TIEDONANTO-20; ISBN-951-38-1129-8;
ISSN-0355-3639) Avail: NTIS HC A06/MF A01 CSCL 05A

The question whether there is to be found a feasible formalization of the managing process, and a common denominator to bring closer together the managing process and common management techniques of applied mathematics. First, some aspects are discussed concerning administrative and organizational theory, as well as the managing process the purpose of which is to master and control the complex interactions of activity programs and time series of them. Second, a number of techniques of applied mathematics are discussed whereby the common ability of producing programs of activities along the time axis is emphasized. Attention is brought to the fact that time series of activities and operations interacting with each other seem to be the common feature and connecting link of the managing process and common techniques. The study forms the background for the development of a deductive conception common for managing process and techniques which is presented in three consecutive publications. Author

N83-11878# Technical Research Centre of Finland, Espoo. Textile Lab.
COMAX HIERACHY PLANNING PROCEDURES
B. MALMSTROEM Jun. 1981 51 p refs
(PB82-207242; TIEDONANTO-26; ISBN-951-38-1291-1;
ISSN-0355-3739) Avail: NTIS HC A04/MF A01 CSCL 05A

The comax negotiation or negodet principle was conceptionally developed toward the control of the parallel, sequential and time hierarchy dimensions. The three dimensional hierarchical negodet application enables a systematic simulation of the hierarchical behavior of the real system. The methodology opens the way to develop the inventoriables and noninventoriables comax toward a policy rule and automatic decision level of managerial decisions refinement as applied to a real system hierarchy. The hierarchical comax control system developed forms a basis for an analogue simulation of a managing process of plan, execute, and review. GRA

N83-11879# Technical Research Centre of Finland, Espoo. Textile Lab.
THE PROJECTED ACCOUNT CONCEPTION
B. MALMSTROEM 28 Oct. 1982 47 p refs
(PB82-204421; TIEDONANTO-21; ISBN-951-38-1130-1;
ISSN-0355-3639) Avail: NTIS HC A03/MF A01 CSCL 05A

The managing process to a large extent means master and control of the multitude of programs or time series of activities and their interaction on all hierarchy levels. The time series are planned, reviewed for feasibility, executed, and reviewed for performance continuously in consecutive cycles by the managing process. The development of a basic building block or model unit is considered for the deduction of a conceptual analogue model of the real business system with the purpose to support and formalize the managing process of plan, execute, and review, and with the requirement of being able to adapt common management techniques of applied mathematics. Author

N83-12958# Stanford Univ., Calif. Dept. of Statistics.
SMOOTHING OF SCATTERPLOTS
J. H. FRIEDMAN and W. STUETZLE Jul. 1982 50 p refs
(Contract DE-AC03-76SF-00515; DE-AT03-81ER-10843;
N00014-81-K-0340; DAAG-29-K-0056; PROJ. ORION)
(ORION-003; AD-A119814) Avail: NTIS HC 03/MF A01

A variable span scatterplot smoother based on local linear fits is described. Local cross-validation is used to estimate the optimal span as a function of abscissa value. A rejection rule is suggested to make the smoother resistant against outliers. Computationally efficient algorithms making use of updating formulas and corresponding FORTRAN subroutines are presented. M.G.

N83-12965# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
SYSTEMS ENGINEERING: A PROJECT PLANNING AND CONTROL METHODOLOGY [ENGENHARIA DE SISTEMAS: UMA METODOLOGIA DE PLANEJAMENTO E CONTROLE DE PROJETOS]
J. R. REIS Aug. 1982 10 p refs In PORTUGUESE; ENGLISH summary Presented at the 5th Semana de Engenharia de Sistemas, de Mogi das Cruzes, Brazil, 6 May 1982
(INPE-2496-PRE/179) Avail: NTIS HC A02/MF A01

The methodology of Systems Engineering used for planning and controlling projects is presented. Subjects discussed include: planning approach, the phases of the Systems Engineering process, planning techniques and the characterization of systems, and comments on the use of systems analysis as a decision process when various alternatives are confronted. Author

N83-13025# Desmatics, Inc., State College, Pa.
DATA INTEGRATION: COMBINING REAL-WORLD AND SIMULATION DATA
D. E. SMITH Aug. 1982 19 p refs
(Contract N00014-75-C-1054; N00014-79-C-0650; NR PROJ. 042-334; NR PROJ. 277-291)
(AD-A118245; TR-106-12) Avail: NTIS HC A02/MF A01 CSCL 05J

In any form of scientific research or decision making, it is desirable to draw upon all relevant data which is available. Unfortunately, data derived from different sources often takes on forms which are incompatible. Consequently, much of the information not used and is thereby effectively "lost." Simulation users frequently find themselves in this situation when observations have been obtained from a computer model and from the corresponding real-world situation it simulates. Although the real-world observations comprise the most valid of the two data sets, the other set may also contain useful information.
Author (GRA)

N83-13028# Forecasting International Ltd., Arlington, Va.
EVALUATION OF TECHNOLOGY ASSESSMENTS AND DEVELOPMENT OF EVALUATION PROTOCOLS Executive Summary
M. J. CETRON, E. F. BISHOP, and J. J. HENDRY Feb. 1982 53 p
(Contract NSF PRA-80-22613)
(PB82-197385; NSF/PRA-82007) Avail: NTIS HC A04/MF A01 CSCL 05A

A group to technology assessments (TA's) were studied to determine whether there were any consistent patterns in the analysis, policy option identification, or other elements which could provide useful guidance in the efficient management of TA's. Some of the topics outlined in this summary are: the project methodology and experience; analysis and comparison of the elements of the TA's considered; TA goals established and achieved; policy and technology options; problematic issues; the unique nature of the problem-oriented TA; terms of reference of risk; the technology assessment synopsis format; and the evaluation protocol. The major conclusion of the research was that there are features among previously performed TA's which can be rearranged into consistent patterns of analysis which cut across differing technologies. Distilling the elements of the TA permits design of a number of patterns of analysis, depending upon intended use. Two examples are the synopsis format and policy format. The synopsis format is the more refined and successful of the analyses. GRA

N83-13816# Army Research Inst. for the Behavioral and Social Sciences, Alexandria, Va. Training Research Lab.
TRAINING SIMULATOR FIDELITY GUIDANCE: THE ITERATIVE DATA BASE APPROACH
R. T. HAYS Sep. 1981 37 p refs
(Contract DA PROJ. 2Q1-62717-A-790)
(AD-A119159; ARI-TR-545) Avail: NTIS HC A03/MF A01 CSCL 05A

This paper provides a preliminary organizational framework for a training simulator fidelity data base. Such a data base can provide a starting point for the development of a formal training simulator fidelity decision-making package and can also be the basis for the determination of future research. The organizational structure of the data base is developed in three stages. First, the issue of determining the minimum required fidelity for a training simulator is located in its place within the context of the ISD process. Second, the necessary informational inputs to the fidelity decision process from task analyses are discussed with the goal of obtaining more useful information for making fidelity decisions. Finally, a proposed structure for making fidelity decisions and for conducting future research is presented. This structure is derived from the use of a proposed iterative data base of empirically derived data on the relationship between simulator fidelity and training effectiveness.
GRA

N83-13834# RAND Corp., Santa Monica, Calif.
AN INVESTIGATION OF TOOLS FOR BUILDING EXPERT SYSTEMS
D. A. WATERMAN and F. HAYES-ROTH 14 Dec. 1982 84 p refs
(Contract NSF MCS-79-26532)
(RAND/R-2818-NSF) Avail: NTIS HC A05/MF A01

An investigation into the comparative merits of eight very high-level programming languages designed for building expert systems is described. In the investigation, all eight languages were applied to the same environmental crisis management problem, which involved the creation of an on-line assistant to aid in locating and containing an oil or hazardous chemical spill at the Oak Ridge National Laboratory. L.F.M.

N83-14013# Leadership and Management Development Center, Maxwell AFB, Ala. Directorate of Research and Analysis.
FACTOR STABILITY OF THE ORGANIZATIONAL ASSESSMENT PACKAGE Final Report
J. M. HIGHTOWER and L. O. SHORT Aug. 1982 139 p refs
(AD-A119122; LMDC-TR-82-1) Avail: NTIS HC A07/MF A01 CSCL 05A

The Organizational Assessment Package (OAP) is currently undergoing a complete factor-by-factor revision. A part of this effort is reexamining the validity of the survey instrument in the light of data and experience gained from two years of field use. Specifically, this study concerned the consistency of OAP factorial validity across both functional area and demographic groupings. Three measures of factor consistency were used: congruence coefficient, s-index, and root mean square. Results showed excellent and consistent factor solutions across groups and methods of measurement. Author (GRA)

N83-14014# Naval Personnel Research and Development Center, San Diego, Calif.
EXPECTANCY THEORY MODELING
P. HORST Aug. 1982 255 p refs
(Contract NR PROJ. 040-110; ZR00001042)
(AD-A119128; NPRDC-TR-82-56) Avail: NTIS HC A12/MF A01 CSCL 12B

An objective of this effort was to reformulate expectancy theory in organizational behavior in objective terms and measurable concepts, employing sound multivariate models. Although a vast amount of literature in organizational behavior has been generated by expectancy theory since 1964, this literature has not been substantially influenced by the traditional models of multivariate analysis. Further development and application of expectancy theory requires a better methodological and mathematical foundation than is currently provided. The history, terms, and concepts of expectancy theory are examined. The basic concepts of multivariate analysis models are discussed and applied to develop a more adequate expectancy theory model. Criticisms of present models and their postulates and assumptions are addressed. Measurement problems are solved by the development of analytical models that will accept data more easily obtained from subjects. Recommendations are made regarding empirical tests of the models. Author (GRA)

N83-14018# Alpha Omega Group, Inc., Silver Spring, Md.
DEVELOPMENT OF A USER-ORIENTED DATA CLASSIFICATION FOR INFORMATION SYSTEM DESIGN METHODOLOGY Final Report, 1 Jan. - 30 Jun; 1982
30 Jun. 1982 130 p refs
(Contract N00014-82-C-0129)
(AD-A118879; AOG82-ONR-1) Avail: NTIS HC A07/MF A01 CSCL 05B

A comprehensive review of information system design methodologies demonstrates that there is a need for new and improved approaches, particularly in the early stages of system design. Specifically, a methodology is needed that will collect and organize data from and about the information environment in order to present a coherent, systematic, and dynamic picture of an enterprise and its activities that will support the development of

requirements statements, and later, database and data dictionary design and/or use. GRA

N83-14970# Council for Scientific and Industrial Research, Pretoria (South Africa).
APL AS A MATHEMATICAL LANGUAGE IN OPERATIONS RESEARCH AND STATISTICS
D. C. CURRIN *In its* 1st South African APL Symp. 12 p 1982 refs
Avail: NTIS HC A08/MF A01

The application of APL in the development of algorithms, which is an important facet of Operations Research and Statistics is discussed. The APL can be used in the implementation phase, and also as a tool to facilitate the entire development process. This aspect of APL is illustrated by using examples from project management and forecasting. E.A.K.

N83-15172# Oak Ridge National Lab., Tenn.
PRODUCTIVITY MONITORING AND ANALYSIS IN THE PUBLICATIONS OFFICE: TECHNIQUES FOR THE NONSTATISTICIAN
T. W. ROBINSON 1981 15 p Presented at the Practical Conf. on Commun., Knoxville, Tenn., 23 Oct. 1981
(Contract W-7405-ENG-26)
(DE82-002892; CONF-81110100-2) Avail: NTIS HC A02/MF A01

Several analytical methods are described that are based on common mathematical functions and, depending on the size of the organization, normally do not require computer support. Examples of the uses of time, cost, and volume data for assessing the operating effectivenesses of various publications-related functons are presented and explained, and inherent limitations of the statistical approach are identified. DOE

N83-16108# Decision Research Corp., Eugene, Oreg.
HYPOTHESIS TESTING FROM A BAYESIAN PERSPECTIVE
B. FISCHHOFF (UK Medical Research Council, Cambridge) and R. BEYTH-MAROM Jul. 1982 60 p refs Sponsored in part by UK Medical Research Council
(Contract N00014-80-C-0150; NR PROJ. 197-064)
(AD-A120574; PTR-1092-82-6) Avail: NTIS HC A04/MF A01 CSCL 12A

The descriptive potential of Bayesian inference is exploited. A set of logically possible forms of non-Bayesian behavior is identified. Second, it reviews existing research in a variety of areas in order to see whether these possibilities are ever realized. The analysis shows that in some situations, several apparently distinct phenomena are usefully viewed and previous investigations have conferred a common label (e.g., confirmation bias) to several distinct phenomena. It also calls into question a number of attributions of judgmental bias, suggesting that in some cases the bias is different than what has previously been claimed, whereas in others, there may be no bias at all. Author

N83-18552# Technical Research Centre of Finland, Espoo. Textile Lab.
AN APPROACH TO A COORDINATING MODEL OF THE MANAGING PROCESS AND TECHNIQUES OF APPLIED MATHEMATICS Ph.D. Thesis - Helsinki Univ. of Technol.
B. MALMSTROEM Apr. 1982 180 p refs
(VTT-RR-82; ISBN-951-38-1496-3; ISSN-0358-5077) Avail: NTIS HC A09/MF A01

The theoretical deduction of a concept or model with the ability to represent the formal managing process and, on the other hand, to adapt common management techniques of applied mathematics is considered. The business firm is considered an open system where activities are thought of as outputs from and inputs to primary elements forming the real system structure and hierarchy. The operations form interacting activity programs, and it is found that these time series constitute a common denominator on the basis of which a comprehensive model can be built. The projected double entry account conception is developed as a deduction which has the ability to picture the activity and structure of the real business system, to represent the effect of the formal managing process, and to adapt common management techniques of applied mathematics. The projected account for industrial transformation processes seems to be the key invention which allows a consistent build-up of the theoretical model. Finally some features and further developments of the theoretical concept are discussed. Author

N83-18553# Massachusetts Inst. of Tech., Cambridge. Lab. for Information and Decision Systems.
DECISIONMAKING ORGANIZATIONS WITH ACYCLICAL INFORMATION STRUCTURES
A. H. LEVIS and K. L. BOETTCHER Aug. 1982 11 p refs
(Contract AF-AFOSR-0229-80; AF PROJ. 2304)
(AD-A121185; LIDS-P-1225; AFOSR-82-0950TR) Avail: NTIS HC A02/MF A01 CSCL 05J

An analytical model of a team of well-trained human decisionmakers executing a well-defined decisionmaking task is presented. Each team member is described by a two-stage model consisting of a situation assessment and a response selection stage. An information theoretic framework is used in which bounded rationality is modeled as a constraint on the total rate of internal processing by each decisionmaker. Optimizing and satisfying strategies are derived and their properties analyzed in terms of organizational performance and individual workload. The results are applied to the analysis and evaluation of two three-person organizational designs. GRA

N83-20239# Societe Generale de Travaux Electriques, Puteaux (France). Dept. Fiabilite.
ADVANCED METHODS FOR THE CALCULATION OF THE RELIABILITY OF COMPLEX STRUCTURES [METHODES AVANCEES DE CALCUL DE LA FIABILITE DES STRUCTURES COMPLEXES]
J. C. LIGERON and A. DELAGE *In* ESA Reliability and Maintainability p 437-445 Sep. 1982 refs In FRENCH
Avail: NTIS HC A99/MF A01

A method proposed for assessing the reliability of complex systems is justified by reason of the fact that the systems studied were subjected to objective calculations of safety, reliability, and life duration. The application of the proposed approach is demonstrated in different examples: (1) the fatigue life of the vehicle bodies for the CARACAS metro; (2) the safety of a management deck in a factor at Hague; and (3) cracking of reservoirs under pressure. The problem of how to verify that the measurement of a mechanical system permits obtaining safety and reliability objectives is addressed. Various tools used to specific objectives when studying fracture mechanics are discussed. A.R.H.

N83-20690# Army War Coll., Carlisle Barracks, Pa. Strategic Studies Inst.
THE RELATIONSHIP OF FORECASTING TO LONG-RANGE PLANNING
C. W. TAYLOR 15 Nov. 1982 33 p Presented at the DARCOM Strategic Long-Range Planning Workshop, Chantilly, Va., 24-26 Aug. 1982
(AD-A121984; ACN-82020) Avail: NTIS HC A03/MF A01 CSCL 05A

Attention is directed to the coherent and essential linkage between long-range forecasting and long-range planning with their focus on the management of the future. It also clearly distinguishes between these two activities. Finally, the need for an Army capability to provide comprehensive, alternative long-range forecasts as foundations for Army long-range planning is emphasized. Author

N83-21843 National Physical Lab., Teddington (England).
PROBLEMS IN THE STATEMENT OF UNCERTAINTIES
P. J. CAMPION Nov. 1982 8 p
(NPL-DPMA-1) Avail: Issuing Activity

For convenience, the metrological problems discussed are listed: The demarcation problems associated with several differing but compatible procedures, the need for an agreed conceptual framework suitable for all procedures, a procedure for combining systematic uncertainties, a procedure for combining random and

systematic uncertainties, and the confidence level to be adopted.
Author

N83-22006* National Aeronautics and Space Administration, Washington, D. C.
MANAGEMENT: A CONTINUING BIBLIOGRAPHY WITH INDEXES, MARCH 1983
Mar. 1983 225 p
(NASA-SP-7500(17); NAS 1.21:7500(17)) Avail: NTIS HC $20.50 CSCL 05A

This bibliography lists 960 reports, articles, and other documents introduced into the NASA scientific and technical information system in 1982. A.R.H.

N83-22118# British Aerospace Aircraft Group, Warton (England).
PRACTICAL CONSIDERATIONS IN THE INTRODUCTION OF REQUIREMENTS ANALYSIS TECHNIQUE
C. P. PRICE and D. Y. FORSYTH *In* AGARD Software for Avionics 12 p Jan. 1983 refs
Avail: NTIS HC A19/MF A01

A wider use of requirements analysis techniques in the development of avionic systems is probable. They may be employed in the production of software requirements in particular or the development of higher level system requirements. Such approaches are said to consist of a methodology used in the production process, software tools to assist in analysis, and the existence of a specific target software design interface such as language and architecture. The predicted quality and productivity improvements will only be attained if the election of tools and techniques is tempered by practical considerations. The main issues any organization contemplating the use of requirements analysis techniques will have to consider are discussed. They include the scope of application, system or software, the special needs of users, attributes of the methodology, the level of automation and the means by which they can be introduced to a project. Semi-Automated Functional Requirements Analysis (SAFRA) is briefly described. In SAFRA, Controlled Requirements Expression (CORE) is the method of production embracing data collection, system analysis and notation. Storage and validation of the description is achieved using the Problems Statement Language and Problem Statement Analyser (PSL/PSA) including a system description language, database management system and a suite of apropriate reports. B.G.

N83-23499*# Jet Propulsion Lab., California Inst. of Tech., Pasadena. Information Processing Research Group.
INTRODUCTION TO THE CONCEPTS OF TELEDEMO AND TELEDIMS
R. F. RICE and A. P. SCHLUTSMEYER 15 Dec. 1982 24 p refs
(NASA-CR-170294; NAS 1.26:170294; JPL-PUB-82-108) Avail: NTIS HC A02/MF A01 CSCL 17B

An introduction to the system concepts: TELEDEMO and TELEDIMS is provided. TELEDEMO is derived primarily from computer graphics and, via incorporation of sophisticated image data compression, enables effective low cost teleconferencing at data rates as low as 1K bit/second using dial-up phone lines. Combining TELEDEMO's powerful capabilities for the development of presentation material with microprocessor-based Information Management Systems (IMS) yields a truly all electronic IMS called TELEDIMS. S.L.

N83-24405# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Systems and Logistics.
ANALYSIS OF DOD TRAVEL MANAGEMENT: AN APPLICATION OF LEARNING CURVE THEORY M.S. Thesis
S. S. ANDERSON and R. F. MCCAULEY Sep. 1982 241 p refs
(AD-A122865; AFIT-LSSR-72-82) Avail: NTIS HC A11/MF A01 CSCL 12A

The recent Congressional interest in the DOD travel management program mandates improved methods of managerial control. This thesis applies learning curve theory, a traditional production planning tool, in forecasting 1983 discount fare usage at selected Scheduled Airline Traffic Office (SATO) locations. These projections may serve as criteria for comparison of future Travel Management Services Program (TMSP) test data. The authors cite the following potential benefits in learning curve applications to travel management: (1) improved cost control; (2) realistic goal establishment; (3) accurate cost prediction; and (4) improved budget estimation. The authors also provide a comparative analysis of the service differences between the enhanced SATO and the TMSP. Author (GRA)

N83-24406# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Systems and Logistics.
A DECISION SUPPORT SYSTEM FOR ACQUISITION OF F-16 AVIONICS INTERMEDIATE SHOP TEST SETS USING THE SYSTEM SCIENCE PARADIGM AND Q-GERT M.S. Thesis
G. C. BRYSON, D. J. HUSBY, and M. E. WEBB Sep. 1982 165 p refs
(AD-A123051; AFIT-LSSR-11-82) Avail: NTIS HC A08/MF A01 CSCL 01C

Acquisition of support equipment is an integral part of initial logistics support for new weapons systems. However, uncertainty exists as to determining how much support equipment should be acquired to effectively and efficiently support a weapons system. Although many quantitative decision support tools have been developed to assist DOD logistics managers in determining the amount of support equipment required, the authors conclude that a modified F-111 test set utilization model, with contractor-provided *engineering estimated parameters, was used to determine support* equipment requirements for the F-16 aircraft. Using systems theory and queueing modeling to represent the F-16 LRU repair cycle process, the authors developed a Q-GERT simulation model to act as a decision support system for use in experimenting with varying quantities of F-16 AIS test sets. After statistical analysis of F-16 real world data and simulation results, the authors conclude that a Q-GERT simulation model can be used to represent the real world F-16 LRU repair cycle. In addition, two AIS test sets will statistically significantly reduce LRU awaiting maintenance times, but three will not. GRA

N83-25490# Southwest Research Inst., San Antonio, Tex.
A VALUE-ASSESSMENT AID TO COMPLEX DECISION MAKING Final Report
G. HUMPHRESS and E. LEWIS Jul. 1982 113 p refs
(Contract EPRI PROJ. 1391-4)
(DE82-905815; EPRI-NP-2507) Avail: NTIS HC A06/MF A01

Value assessment (VA) is a new decision aid that can improve the performance of decision makers confronted with multiple attributes and conflicting objectives. Managers who are not supported by formal decision aids turn to various effort reducing biases that can lead to serious errors in the decisionmaking process. Value assessment, on the other hand, is an optimizing approach to problem solving behavior. VA helps decision makers overcome the tendency to turn to effort reducing biases by reducing the complexity of making tradeoffs and weighing all available information. Many of the issues which confront modern electric utility managements are complex, multiple attribute problems which must be viewed from engineering, financial and socio-political perspectives simultaneously. Added to this are the complications contributed by factors like uncertainty, risk, incomplete information and conflicting objectives among the public it serves. This is the complex decisionmaking arena which VA is intended to support.
DOE

N83-25614# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
AN INTERACTIVE SYSTEM FOR PROJECT CONTROL AND PLANNING M.S. Thesis - Apr. 1982 [UM SISTEMA INTERATIVO PARA CONTROLE E PLANEJAMENTO DE PROJETOS]
A. F. NETO Jan. 1983 138 p refs *In* PORTUGUESE; ENGLISH summary
(INPE-2620-TDL/107) Avail: NTIS HC A07/MF A01

The design, development and test of an interactive interface, conceived to simplify the computer used in creating, updating, and consulting a network data base, are described. Author

N83-25615# Defense Systems Management School, Fort Belvoir, Va. Dept. of Policy and Organizational Management.
MULTI-DIMENSIONAL PROGRAM MANAGEMENT Progress Report, 26 Jul. - 10 Dec. 1982
P. E. HAMILTON Dec. 1982 84 p refs
(AD-A123635) Avail: NTIS HC A05/MF A01 CSCL 05A

This is a student research project with the following objectives: (1) To model a generic program management office and the system of which it is an element. This model systematically illustrates the integration and necessary interface of the human, organizational, and technical aspects of program management; (2) To use the model as a baseline to identify or develop skills and methodologies the PM might use to manage this integration; and (3) To identify resources as they apply to the skills and methodologies that have been identified. Author (GRA)

N83-25621# Little (Arthur D.), Inc., Cambridge, Mass.
DEVELOPMENT, APPLICATION, AND EVALUATION OF A VALUE-IMPACT METHODOLOGY FOR PRIORITIZATION OF REACTOR-SAFETY R AND D PROJECTS Final Report
J. FIKSEL, A. L. COX, and D. L. RICHARDSON Aug. 1982 158 p refs
(Contract EPRI PROJ. 1810-2)
(DE82-906466; EPRI-NP-2530) Avail: NTIS HC A09/MF A01

A practical methodology was developed for describing alternative R and D projects, for eliminating inferior projects, for evaluating the remaining projects, and for ranking them for selection purposes. This approach was demonstrated by applying it to four sample projects dealing with improvements in residual heat removal systems. It was found that the conventional value impact analysis approach is inadequate for the purposes of R and D project selection. A number of modifications are suggested to permit more explicit treatment of the risk and uncertainty inherent in R and D projects and to clarify the basis for choice among them. DOE

N83-26638# Research Inst. of National Defence, Stockholm (Sweden).
FACTS, METHODS, PROGRAMS AND PARADIGMS
P. AGRELL Jul. 1982 18 p refs
(FOA-C-10210-M8) Avail: NTIS HC A02/MF A01

A methodological taxonomy of concepts for use by operations research analysts is described. The yin-yang form is proposed with intuition, interaction, creativity and subject in the maternal yin column; rationality, advice, analysis and object in the male, yang column; and paradigms, programs, methods and facts in the first column. Author (ESA)

N83-27609# Georgia Inst. of Tech., Atlanta. Production and Distribution Research Center.
MATCHING BASED INTERACTIVE FACILITY LAYOUT
B. MONTREUIL (Univ. du Quebec a Trois-Rivieres), H. D. RATLIFF, and M. GOETSCHALCKX Jun. 1982 41 p refs
(Contract N00014-80-K-0709)
(AD-A124958; PDRC-82-02) Avail: NTIS HC A03/MF A01 CSCL 05H

The problem of laying out facilities is very difficult from a practical as well as a methodological point of view. As a result the layout process generally involves a block layout phase and a detailed layout phase. During the block layout phase the various elements of the facility are aggregated into areas or blocks. Each block represents a department, office, or some other major work area. An attempt is then made to optimally position these blocks within the facility. Once the block layout is determined, a detailed layout is performed. This involves specifying the exact position of equipment and work areas within each block as well as the necessary support such as electric outlets, water, etc. Except for imposing certain restrictions on the size and shape of the blocks to insure that everything will fit, these details are essentially ignored in the block layout phase. We develop here an interactive approach to the block layout problem. The approach has three major components: an optimization model, a colorgraphics computer interface, and a human decision maker. The output from the model is displayed in network form on a colorgraphics terminal. The human decision maker utilizes this information together with his knowledge of the layout problem to selectively impose additional constraints on the model or to relax previously imposed constraints. The procedure iterates between the human decision maker and the optimization model, via the colorgraphics interface, until an acceptable layout is obtained. GRA

N83-27901# Georgia Inst. of Tech., Atlanta. Production and Distribution Research Center.
PROJECT SCHEDULING WITH RESOURCE CONSIDERATIONS
L. F. MCGINNIS May 1982 14 p refs
(Contract N00014-80-K-0709)
(AD-A124938; PDRC-82-16) Avail: NTIS HC A02/MF A01 CSCL 05A

A great deal of research in activity network based project resource management seems not to have found wide spread adoption. We briefly consider why this is true and pose some new research problems. Based on a broad look at research in project resource management, one fact seems certain. All previous research has focused on a problem paradigm abstracted from its original source. Thus, no consideration is given to the problem environment. This seems to be a fundamental error. Without considering some aspects of the problem environment, how can we develop problem specific tools? Or, how can we develop general tools that will allow the manager or analyst to gain access to the general models and results in a useful and meaningful way? The abstraction from problem environment also has lead us to focus on analysis to the exclusion of synthesis. We've taken the relatively easy analysis problem and solved it in great detail, without any thought to the difficult design problem. GRA

N83-28472# Rolls-Royce Ltd., Derby (England).
CONFIGURATION MANAGEMENT IN PRACTICE
T. W. CROWE *In* Defence Quality Assurance Board Sem. on Quality Assurance in Design and Develop. p 37-50 1982
Avail: NTIS HC A04/MF A01

Configuration management is discussed in relation to the development of Rolls Royce aircraft engines. The physical rather than the functional description of the product is emphasized. The Rolls Royce design scheme is introduced. The scheme is a way of portraying an engineering idea which may affect many items at a less detailed level than is implied by manufacturing detail drawings. The scheme contains sufficient information to provide, when coupled with defined drafting, material, process and other standards, the requisite engineering control over the content of the detail drawing and the parts made to that drawing.
Author (ESA)

N83-31522# Little (Arthur D.) International, Inc., Wiesbaden (West Germany).
COMPARATIVE STUDY ON PROJECT REVIEW TECHNIQUES Final Report
S. SHEKAR and I. S. WALSH Paris ESA 31 Dec. 1982 100 p refs
(Contract ESA-4846/81/NL-PP(SC))
(ADL-87345; ESA-CR(P)-1739) Avail: NTIS HC A05/MF A01

Improvements to ESA's project reviewing methodology, based on a survey of companies which perform project reviews, are proposed. Greater standardization of review terminology, check lists, and documentation is urged. Increased cooperation with the aerospace industry on project review and management is

recommended. Trade-offs should be studied in more detail before board and management decisions are made. Author (ESA)

N83-32256# National Center for Atmospheric Research, Boulder, Colo. Atmospheric Analysis and Prediction Div.
INTERACTION BETWEEN OBJECTIVE ANALYSIS AND INITIALIZATION. PROCEEDINGS OF THE 14TH STANSTEAD SEMINAR
R. DALEY, J. DEROME, and D. WILLIAMSON, ed. Dec. 1982 205 p refs In ENGLISH; FRENCH summary Seminar held in Lennoxville, Quebec, 12-16 Jul. 1982 Prepared in cooperation with McGill Univ., Montreal
(PB83-186890; NCAR/TN-204) Avail: NTIS HC A10/MF A01 CSCL 04B

The document contains a collection of summaries of lectures presented at the Fourteenth Stanstead Seminar on the interaction between objective analysis and initialization. The lectures both reviewed the fundamentals of commonly used analysis and initialization techniques and presented recent work, with emphasis on current problems. Author (GRA)

N83-32477# Stanford Univ., Calif. Inst. for Mathematical Studies in the Social Sciences.
AGGREGATES, ACTIVITIES AND OVERHEADS
W. M. GORMAN Oct. 1982 35 p refs
(Contract N00014-79-C-0685; NR PROJ. 047-619)
(AD-A127830; TR-390) Avail: NTIS HC A03/MF A01 CSCL 12B

This report will take, asking what the operational technology should be like to make such a procedure economic. It will not model the central office itself. It will be assumed throughout that the operational sector is made up of technologically independent factories between which there are no external economies or diseconomies. This will focus on ease of control as the explanation of their being grouped in one organization, and to bring some simple, but powerful, mathematical arguments to bear. GRA

N83-36726# Corps of Engineers, St. Paul, Minn.
PROJECT SCHEDULING USING CRITICAL PATH METHOD AND CHARTING TECHNIQUES FOR HARRIS COMPUTERS (CPM) CRITICAL PATH METHOD. USER'S MANUAL
D. D. GRANSBERG and R. C. STACKOWIAK 9 May 1983 69 p refs
(AD-A129688) Avail: NTIS HC A04/MF A01 CSCL 09B

The user's manual is designed for the CPM system to provide non-ADP personnel with the information necessary to use the system effectively. A brief overview of critical path method (CPM) theory is provided, and illustrates the computations made by the program. The purpose of the program is to perform CPM calculations and provide an automated system for integrated multiple project scheduling and resource evaluation.
Author (GRA)

03

ROBOTICS AND AUTOMATION

Includes artificial intelligence, automated manufacturing, CAD/CAM, IPAD, and space automation.

A83-28350*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
INTEGRATING COMPUTER PROGRAMS FOR ENGINEERING ANALYSIS AND DESIGN
A. W. WILHITE (NASA, Langley Research Center, Space Systems Div., Hampton, VA), V. K. CRISP (Kentron International, Inc., Hampton, VA), and S. C. JOHNSON American Institute of Aeronautics and Astronautics, Aerospace Sciences Meeting, 21st, Reno, NV, Jan. 10-13, 1983, 9 p. refs
(AIAA PAPER 83-0597)

The design of a third-generation system for integrating computer programs for engineering and design has been developed for the Aerospace Vehicle Interactive Design (AVID) system. This system consists of an engineering data management system, program interface software, a user interface, and a geometry system. A relational information system (ARIS) was developed specifically for the computer-aided engineering system. It is used for a repository of design data that are communicated between analysis programs, for a dictionary that describes these design data, for a directory that describes the analysis programs, and for other system functions. A method is described for interfacing independent analysis programs into a loosely-coupled design system. This method emphasizes an interactive extension of analysis techniques and manipulation of design data. Also, integrity mechanisms exist to maintain database correctness for multidisciplinary design tasks by an individual or a team of specialists. Finally, a prototype user interface program has been developed to aid in system utilization. (Author)

A83-45851
SPACE INDUSTRIALIZATION. VOLUMES 1 & 2
B. OLEARY, ED. Boca Raton, FL, CRC Press, Inc., 1982, Vol. 1, 174 p.; vol. 2, 233 p.

Detailed analyses of the political, economic, and technical requirements, benefits, and difficulties involved in the industrialization of space are presented. Near-term products and services that can be accomplished before the end of the century in information dissemination and handling, manufacturing, and scientific activities are identified. In-depth analyses are directed toward the acquisition, extraction, and processing-refining of extraterrestrial material to build space factories and habitats in high, stable orbits. The materials could come from the moon, earth-approaching asteroids, or the Martian moon Phobos. Consideration is given to the relative economics of manufacturing various materials in space or on the earth, the economic benefits accruing because of the development of space activities, and the types of products that could be manufactured in space. M.S.K.

A83-47189#
APPLICATION OF ADVANCED CAD/CAM PROCEDURES IN AREAS OTHER THAN AIR TRANSPORT TECHNOLOGY [DIE ANWENDUNG VON WEITERENTWICKELTEN CAD/CAM-VERFAHREN AUF BEREICHE AUSSERHALB DER LUFTFAHRTTECHNIK]
J. NAGEL (Dornier GmbH, Friedrichshafen, West Germany) Bundesministerium fuer Forschung und Technologie, Statusseminar ueber Luftfahrtforschung und Luftfahrttechnologie, 3rd, Hamburg, West Germany, May 2-4, 1983, Paper. 37 p. In German. refs

Current applications of CAD/CAM in various branches of industry other than aircraft technology, including production of gear wheels, ship drives, automobiles, machines, and electric parts are described. Problems of training personnel in the use of this technology are briefly considered. C.D.

N83-10848*# Massachusetts Inst. of Tech., Cambridge. Artificial Intelligence Lab.
SPACE APPLICATIONS OF AUTOMATION, ROBOTICS AND MACHINE INTELLIGENCE SYSTEMS (ARAMIS). VOLUME 2: SPACE PROJECTS OVERVIEW Final Report
R. H. MILLER, M. L. MINSKY, and D. B. S. SMITH Aug. 1982 182 p
(Contract NAS8-34381)
(NASA-CR-162080-VOL-2; NAS 1.26:162080-VOL-2; SSL-22-82-VOL-2) Avail: NTIS HC A09/MF A01 CSCL 09B

Applications of automation, robotics, and machine intelligence systems (ARAMIS) to space activities, and their related ground support functions are studied so that informed decisions can be made on which aspects of ARAMIS to develop. The space project breakdowns, which are used to identify tasks ('functional elements'), are described. The study method concentrates on the production of a matrix relating space project tasks to pieces of ARAMIS. S.L.

N83-10849*# Massachusetts Inst. of Tech., Cambridge. Artificial Intelligence Lab.
SPACE APPLICATIONS OF AUTOMATION, ROBOTICS AND MACHINE INTELLIGENCE SYSTEMS (ARAMIS). VOLUME 4: APPLICATION OF ARAMIS CAPABILITIES TO SPACE PROJECT FUNCTIONAL ELEMENTS Final Report
R. H. MILLER, M. L. MINSKY, and D. B. S. SMITH Aug. 1982 288 p
(NASA-CR-162082-V0L-4; NAS 1.26:162082-VOL-4; SSL-24-82-VOL-4) Avail: NTIS HC A13/MF A01 CSCL 09B

Applications of automation, robotics, and machine intelligence systems (ARAMIS) to space activities and their related ground support functions are studied, so that informed decisions can be made on which aspects of ARAMIS to develop. The specific tasks which will be required by future space project tasks are identified and the relative merits of these options are evaluated. The ARAMIS options defined and researched span the range from fully human to fully machine, including a number of intermediate options (e.g., humans assisted by computers, and various levels of teleoperation). By including this spectrum, the study searches for the optimum mix of humans and machines for space project tasks. S.L.

N83-10982# Sandia Labs., Albuquerque, N. Mex. Engineering Information Systems Div.
DESCRIPTION OF THE SNLA AUTOMATED DESIGN DATA SYSTEM (ADDS)
K. J. SHUMWAY Jun. 1982 71 p
(Contract DE-AC04-76DP-00789)
(DE82-018347; SAND-82-0322) Avail: NTIS HC A04/MF A01

Much of the collecting, storing, processing, and reporting of administrative data associated with engineering drawings was automated. Techniques and processes used include data base, source document automation, interagency data messages and file audits, and use of computer terminals for data entry and retrieval. Programs now produce computerized material lists, engineering structured reports; drawing and vault management reports; engineering release and change documents; and other specialized reports. As a result of this massive automation effort, quality and timeliness of data files were enhanced. Although this automation effort, known collectively as the Automated Design Data System (ADDS), is broad in its present scope, it is far from complete. Anticipated future projects are listed. DOE

N83-12073*# Boeing Commercial Airplane Co., Seattle, Wash.
DEVELOPMENT OF INTEGRATED PROGRAMS FOR AEROSPACE-VEHICLE DESIGN (IPAD): INTEGRATED INFORMATION PROCESSING REQUIREMENTS
J. W. SOUTHALL Washington NASA Mar. 1979 177 p refs
(Contract NAS1-14700)
(NASA-CR-2984; NAS 1.26:2984; D6-IPAD-70012-D) Avail: NTIS HC A09/MF A01 CSCL 01C

The engineering-specified requirements for integrated information processing by means of the Integrated Programs for Aerospace-Vehicle Design (IPAD) system are presented. A data model is described and is based on the design process of a typical aerospace vehicle. General data management requirements are specified for data storage, retrieval, generation, communication, and maintenance. Information management requirements are specified for a two-component data model. In the general portion, data sets are managed as entities, and in the specific portion, data elements and the relationships between elements are managed by the system, allowing user access to individual elements for the purpose of query. Computer program management requirements are specified for support of a computer program library, control of computer programs, and installation of computer programs into IPAD. Author

N83-12914# Brookhaven National Lab., Upton, N. Y.
TRADITIONAL COMPUTING CENTER AS A MODERN NETWORK NODE
S. HELLER and A. M. PESKIN Nov. 1981 17 p refs
(Contract DE-AC02-76CH-00016)
(DE82-006935; BNL-30609) Avail: NTIS HC A02/MF A01

There is an obvious trend toward decentralization of computing power from the traditional, large computing center. Even so there remains a generous, but changing role for such centers to play. Their capabilities would then be complimentary to smaller, individualized facilities, so the user would benefit greatly from a general purpose, local network on which the large center represented a node. There is no network currently available that exhibits all the attributes of the ideal local for this environment. It can be approached, however, by combining several diverse products as network segments, which are interconnected via processor gateways. The attributes of the ideal network are presented. A brief discussion of the current state-of-the-art in networking is then given. Finally, the particulars of the Brookhaven implementation are offered as a case history. DOE

N83-15352*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
REPLICATING SYSTEMS CONCEPTS: SELF-REPLICATING LUNAR FACTORY AND DEMONSTRATION
In its Advan. Automation for Space Missions p 189-335 Nov. 1982 refs
Avail: NTIS HC A17/MF A01 CSCL 22B

Automation of lunar mining and manufacturing facility maintenance and repair is addressed. Designing the factory as an automated, multiproduct, remotely controlled, reprogrammable Lunar Manufacturing Facility capable of constructing duplicates of itself which would themselves be capable of further replication is proposed. Author

N83-15354*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
CONCLUSIONS AND IMPLICATIONS OF AUTOMATION IN SPACE
In its Advan. Automation for Space Missions p 373-381 Nov. 1982 refs
Avail: NTIS HC A17/MF A01 CSCL 22B

Space facilities and programs are reviewed. Space program planning is discussed. Author

N83-17115*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
IPAD: INTEGRATED PROGRAMS FOR AEROSPACE-VEHICLE DESIGN
Sep. 1980 398 p refs Proc. of Symp. held in Denver, 17-19 Sep. 1980 Sponsored in cooperation with Industry Technical Advisory Board
(NASA-CP-2143; L-13916; NAS 1.55:2143) Avail: NTIS HC A17/MF A01 CSCL 09B

The conference was organized to promote wider awareness of the IPAD program and its coming impact on American industry. The program focuses on technology issues that are critical to computer aided design manufacturing. Included is a description of a representative aerospace design process and its interface with

manufacturing, the design of a future IPAD integrated computer aided design system, results to date in developing IPAD products and associated technology, and industry experiences and plans to exploit these products.

N83-17116*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
IPAD PROJECT OVERVIEW
R. E. FULTON *In its* IPAD: Integrated Programs for Aerospace-Vehicle Design p 1-20 Sep. 1980 refs
Avail: NTIS HC A17/MF A01 CSCL 09B

To respond to national needs for improved productivity in engineering design and manufacturing, a NASA supported joint industry/government project is underway denoted Integrated Programs for Aerospace-Vehicle Design (IPAD). The objective is to improve engineering productivity through better use of computer technology. It focuses on development of technology and associated software for integrated company-wide management of engineering information. The project has been underway since 1976 under the guidance of an Industry Technical Advisory Board (ITAB) composed of representatives of major engineering and computer companies and in close collaboration with the Air Force Integrated Computer-Aided Manufacturing (ICAM) program. Results to date on the IPAD project include an in-depth documentation of a representative design process for a large engineering project, the definition and design of computer-aided design software needed to support that process, and the release of prototype software to integrate selected design functions. Ongoing work concentrates on development of prototype software to manage engineering information, and initial software is nearing release. Author

N83-17117*# North American Rockwell Corp., El Segundo, Calif.
INDUSTRY INVOLVEMENT IN IPAD THROUGH THE INDUSTRY TECHNICAL ADVISORY BOARD
W. E. SWANSON *In* NASA. Langley Research Center IPAD: Integrated Programs for Aerospace-Vehicle Design p 21-26 Sep. 1980
Avail: NTIS HC A17/MF A01 CSCL 09B

In 1976 NASA awarded The Boeing Company a contract to develop IPAD (Integrated Programs for Aerospace-Vehicle Design). This contract included a requirement for Boeing to form an Industrial Technical Advisory Board (ITAB), with members representing major aerospace and computer companies. The purpose of this board was to guide the development of IPAD. The specific goal of IPAD is to increase United States aerospace industry productivity through the application of computers to manage engineering data. This goal clearly is attainable; in fact, IPAD's influence can reach beyond the aerospace industry to many businesses where product development is based on the design-building process. An enhanced IPAD, therefore, is a national asset of significance. The role of ITAB in guiding the development of this system is described. Author

N83-17119*# Boeing Commercial Airplane Co., Seattle, Wash.
FUTURE INTEGRATED DESIGN PROCESS
D. D. MEYER *In* NASA. Langley Research Center IPAD: Integrated Programs for Aerospace-Vehicle Design p 43-58 Sep. 1980 refs
Avail: NTIS HC A17/MF A01 CSCL 09B

The design process is one of the sources used to produce requirements for a computer system to integrate and manage product design data, program management information, and technical computation and engineering data management activities of the aerospace design process. Design activities were grouped chronologically and explored for activity type, activity interface, data quantity, and data flow. The work was based on analysis of the design process of several typical aerospace products, including both conventional and supersonic airplanes and a hydrofoil design. Activities examined included research, preliminary design, detail design, manufacturing interface, product verification, and product support. The design process was then described in an IPAD environment--the future. Author

N83-17121*# Boeing Computer Services, Inc., Seattle, Wash.
PRELIMINARY DESIGN OF A FUTURE INTEGRATED DESIGN SYSTEM
R. M. DIGGINS *In* NASA. Langley Research Center IPAD: Integrated Programs for Aerospace-Vehicle Design p 75-94 Sep. 1980 refs
(Contract NAS1-14700)
Avail: NTIS HC A17/MF A01 CSCL 09B

IPAD is a system of computer programs and data supporting the aerospace-vehicle design process by providing a set of services to aid in the management of a design project, project technical work, and project support work. Its purpose is to integrate people, programs, and data into a unified aerospace-vehicle design system. All project-management and technical data, together with certain standard data, are stored in a data base. The IPAD functions allow project personnel to query the data base and to perform operations on the data. This permits the orderly sequencing of the task elements of a complex operation and provides common access to a single data base by various participating groups who otherwise would require many separate files. These capabilities will be provided on a single host computer or across multiple heterogeneous computers on a distributed progress basis. Author

N83-17122*# Boeing Computer Services, Inc., Seattle, Wash.
EXECUTIVE AND COMMUNICATIONS SERVICES TO SUPPORT THE IPAD ENVIRONMENT
J. G. TANNER, D. M. KIRKWOOD, and F. M. IVES *In* NASA. Langley Research Center IPAD: Integrated Programs for Aerospace-Vehicle Design p 95-144 Sep. 1980 refs
Avail: NTIS HC A17/MF A01 CSCL 09B

The principal purposes of the prototype executive software are to provide a system independent interface to the underlying host system and to allow for extension to full IPAD executive services as described in the preliminary design. A basic set of functions is included in the prototype to meet the requirements of the other components of the prototype, principally IPID, the IPAD data management system. The functions were chosen so that they would be readily built on any of the proposed host systems with minimal redesign and execution overhead. The functions fall into five categories: access to host data, access to data files, access to communication services, data transformation, and instrumentation for performance measurement. Communication services provide message delivery between processes in a network of heterogeneous computers. Data transformation services and communication services ensure data type validity and data integrity of messages exchanged between processes. Author

N83-17123*# Boeing Computer Services, Inc., Seattle, Wash.
AN ENGINEERING DATA MANAGEMENT SYSTEM FOR IPAD
H. R. JOHNSON, D. L. COMFORT, and D. D. SHULL *In* NASA. Langley Research Center IPAD: Integrated Programs for Aerospace-Vehicle Design p 145-178 Sep. 1980 refs
Avail: NTIS HC A17/MF A01 CSCL 09B

An overview of the capabilities and software architecture of the IPAD information processor (IPIP) is presented. IPIP is a state-of-the-art data base management system that satisfies engineering requirements not addressed by present day commercial systems. It also significantly advances a number of capabilities that are offered commercially. IPIP capabilities range from support for multiple schemas and data models to support for distributed processing, configuration control, and data inventory management. IPIP exploits semantic commonality in features offered in various forms at different user interfaces in today's commercial systems. An integrated software architecture supports all user interfaces: programming languages, interactive data manipulation, and schema languages. This approach promotes simplicity and compactness in software and permits features to be offered symmetrically across all appropriate user interfaces. Author

N83-17124*# Boeing Computer Services, Inc., Seattle, Wash.
AN APPROACH FOR MANAGEMENT OF GEOMETRY DATA
R. P. DUBE, G. J. HERRON, J. E. SCHWEITZER, and E. R. WARKENTINE *In* NASA. Langley Research Center IPAD: Integrated Programs for Aerospace-Vehicle Design p 179-202 Sep. 1980 refs
Avail: NTIS HC A17/MF A01 CSCL 09B

The strategies for managing Integrated Programs for Aerospace Design (IPAD) computer-based geometry are described. The computer model of geometry is the basis for communication, manipulation, and analysis of shape information. IPAD's data base system makes this information available to all authorized departments in a company. A discussion of the data structures and algorithms required to support geometry in IPIP (IPAD's data base management system) is presented. Through the use of IPIP's data definition language, the structure of the geometry components is defined. The data manipulation language is the vehicle by which a user defines an instance of the geometry. The manipulation language also allows a user to edit, query, and manage the geometry. The selection of canonical forms is a very important part of the IPAD geometry. IPAD has a canonical form for each entity and provides transformations to alternate forms; in particular, IPAD will provide a transformation to the ANSI standard. The DBMS schemas required to support IPAD geometry are explained. Author

N83-17125*# Boeing Co., Seattle, Wash.
USER INVOLVEMENT IN IPAD SOFTWARE DEVELOPMENT
W. A. BRYANT and H. A. CROWELL *In* NASA. Langley Research Center IPAD: Integrated Programs for Aerospace-Vehicle Design Sep. 1980
Avail: NTIS HC A17/MF A01 CSCL 09B

The extensive user involvement in the software development of IPAD and the functionality of the IPAD prototype as viewed by the user are addressed. Although not a production system that can support an ongoing design process, the IPAD prototype is useful for the potential user as well as the interested system designer and is an essential tool for the companies committed to the use of the IPAD system. User refers to the engineer or manager responsible for the design, manufacture, or maintenance of a product, together with those supporting these functions. Author

N83-17126*# Boeing Commercial Airplane Co., Seattle, Wash.
IPAD PRODUCTS AND IMPLICATIONS FOR THE FUTURE
R. E. MILLER, JR. *In* NASA. Langley Research Center IPAD: Integrated Programs for Aerospace-Vehicle Design p 219-234 Sep. 1980 refs
Avail: NTIS HC A17/MF A01 CSCL 09B

The betterment of productivity through the improvement of product quality and the reduction of cost is addressed. Productivity improvement is sought through (1) reduction of required resources, (2) improved ask results through the management of such saved resources, (3) reduced downstream costs through manufacturing-oriented engineering, and (4) lowered risks in the making of product design decisions. The IPAD products are both hardware architecture and software distributed over a number of heterogeneous computers in this architecture. These IPAD products are described in terms of capability and engineering usefulness. The future implications of state-of-the-art IPAD hardware and software architectures are discussed in terms of their impact on the functions and on structures of organizations concerned with creating products. Author

N83-17130*# Control Data Corp., Minneapolis, Minn.
IPAD: A COMPUTER VENDOR'S PERSPECTIVE
H. D. FELDMAN *In* NASA. Langley Research Center IPAD: Integrated Programs for Aerospace-Vehicle Design p 179-284 Sep. 1980 refs
Avail: NTIS HC A17/MF A01 CSCL 09B

The current IPAD technology and the state-of-the-art in computer technology are compared from the point of view of a computer vendor. Issues of engineering data management, distributed architectures, and user interfaces are covered. Author

N83-17133*# Cessna Aircraft Co., Vandalia, Ohio.
TURNKEY CAD/CAM SELECTION AND EVALUATION
T. MOODY *In* NASA. Langley Research Center IPAD: Integrated Programs for Aerospace-Vehicle Design p 299-304 Sep. 1980
Avail: NTIS HC A17/MF A01 CSCL 09B

The methodology to be followed in evaluating and selecting a computer system for manufacturing applications is discussed. Main frames and minicomputers are considered. Benchmark evaluations, demonstrations, and contract negotiations are discussed. R.J.F.

N83-17134*# Vought Corp., Dallas, Tex.
OBSERVATIONS BASED ON DEVELOPMENT OF A COMPUTER AIDED DESIGN SYSTEM
H. BEST *In* NASA. Langley Research Center IPAD: Integrated Programs for Aerospace-Vehicle Design p 305-310 Sep. 1980 refs
Avail: NTIS HC A17/MF A01 CSCL 09B

The impact of computer aided design for manufacturing is discussed. Productivity improvements, the effects on organizational structure, user training, procurement, and data bases are discussed. R.J.F.

N83-17136*# Tektronix, Inc., Beaverton, Oreg.
DATA BASE SYSTEMS IN ELECTRONIC DESIGN ENGINEERING
D. WILLIAMS *In* NASA. Langley Research Center IPAD: Integrated Programs for Aerospace-Vehicle Design p 317-324 Sep. 1980 refs
Avail: NTIS HC A17/MF A01 CSCL 09B

The concepts of an integrated design data base system (DBMS) as it might apply to an electronic design company are discussed. Data elements of documentation, project specifications, project tracking, firmware, software, electronic and mechanical design can be integrated and managed through a single DBMS. Combining the attributes of a DBMS data handler with specialized systems and functional data can provide users with maximum flexibility, reduced redundancy, and increased overall systems performance. Although some system overhead is lost due to redundancy in transitory data, it is believed the combination of the two data types is advisable rather than trying to do all data handling through a single DBMS. R.J.F.

N83-18569*# National Aeronautics and Space Administration, Washington, D. C.
OVERVIEW OF THE INTEGRATED PROGRAMS FOR AEROSPACE VEHICLE DESIGN (IPAD) PROJECT
S. L. VENNERI *In its* NASA Admin. Data Base Management Systems p 1910203 Jan. 1983
Avail: NTIS HC A13/MF A01 CSCL 05B

To respond to national needs for improved productivity in engineering design and manufacturing, a NASA supported joint industry/government project is underway denoted Integrated Programs for Aerospace Vehicle Design (IPAD). The objective is to improve engineering productivity through better use of computer technology. It focuses on development of data base management technology and associated software for integrated company wide management of engineering and manufacturing information. Results to date on the IPAD project include an in depth documentation of a representative design process for a large engineering project, the definition and design of computer aided design software needed to support that process, and the release of prototype software to manage engineering information. This paper provides an overview of the IPAD project and summarizes progress to date and future plans. B.W.

N83-20368# Committee on Science and Technology (U. S. House).
ROBOTICS
Washington GPO 1983 453 p refs Hearings before the Subcomm. on Invest. and Oversight of the Comm. on Sci. and Technol., 97th Congr., 2d Sess., 2, 23 Jun. 1982
(GPO-99-916) Avail: Subcommittee on Investigations and Oversight

The current state of the art of robot technology, both internationally and in the United States is assessed. Current areas of research are examined. Author

N83-21197# Army Industrial Base Engineering Activity, Rock Island, Ill. Manufacturing Technology Div.
MANUFACTURING METHODS AND TECHNOLOGY (MMT) PROJECT EXECUTION REPORT Semiannual Report, 1 Jan. - 30 Jun. 1982
P. A. SWIM Oct. 1982 174 p
(AD-A122352; SAR-1) Avail: NTIS HC A08/MF A01 CSCL 13H

This document is a summary compilation of the manufacturing methods and technology program project status reports (RCS DRCMT-301) submitted to IBEA from DARCOM major Army subcommands and project managers. Each page of the computerized section lists project number, title, status, funding, and projected completion date. Summary pages give information relating to the overall DARCOM program. Author (GRA)

N83-23006# Carnegie-Mellon Univ., Pittsburgh, Pa. Robotics Inst.
SPACE ROBOTICS Interim Report
R. E. KORF Aug. 1982 59 p refs
(Contract ARPA ORDER 3597)
(AD-A121484; CMU-RI-TR-82-10) Avail: NTIS HC A04/MF A01 CSCL 22B

This report surveys the possible applications and technical feasibility of robots in space. The future space program in the time frame of 1980-2000 is first assessed, including space exploration, global information services and space utilization. The critical technologies needed to support the projected space program are then considered, including the need for general purpose, remote intelligence and manipulation. Teleoperators are discussed as a possible means of meeting this requirement and are found not to be satisfactory due to communication time delays and bandwidth limitations, and human costs and performance limits. Autonomous space robots are proposed as a solution and several detailed scenarios for their use are presented. The technical feasibility of space robotics is evaluated by examining the requirements, state of the art, and research needed for each of the subsystems of a space robot. These include manipulators, sensors, navigation, guidance, propulsion, surface locomotion, computing and control, communications, electrical power, and spacecraft structure. Finally, a research program is outlined for the development of autonomous space robots. Author (GRA)

N83-23047# Institut National des Sciences Appliquees, Lyon (France).
COMPUTER AIDED DESIGN. A CONTRIBUTION TO THE TECHNICAL AND ECONOMIC EVALUATION OF STRUCTURES AND INTERIOR EQUIPMENT Ph.D. Thesis [CONCEPTION ASSISTEE PAR ORDINATEUR: CONTRIBUTION A L'EVALUATION TECHNIQUE ET ECONOMIQUE DE STRUCTURE ET SECOND OEUVRE D'AVANT PROJETS DE BATIMENTS]
J. DUFAU 1981 295 p refs
(I-DE-81-07) Avail: NTIS HC A13/MF A01

A methodology of building cost analysis was developed, and the associate programs were elaborated. Based upon quantity estimation from few data, these programs allow to check technical parameters and to make an economic evaluation of envelopes, structure elements and interior equipment. Author

N83-23083# Army Science Board, Washington, D.C.
ARTIFICIAL INTELLIGENCE AND ROBOTICS Final Report
I. C. PEDEN, J. V. BRADDOCK, W. BROWN, R. M. LANGENDORF, and S. W. LEIBHOLZ 20 Sep. 1982 43 p
(AD-A122414) Avail: NTIS HC A03/MF A01 CSCL 15C

This report examines the state-of-the-art in artificial intelligence and robotics technologies and their potential in terms of Army needs. Assessment includes battlefield technology, research and technology insertions, management considerations and recommendations related to research and development personnel, and recommendations regarding the Army's involvement in the automated plant. Author (GRA)

N83-24180# Stuttgart Univ. (West Germany). Inst. fuer Steuerungstechnik der Werkzeugmaschinen und Fertigungseinrichtungen.
ROBOT CONTROL WITH SENSORY FEEDBACK Final Report, Nov. 1980
G. STUTE, H. ERNE, KLEINWAECHTER (Forschungs - und Entwicklungslabor KLERA, Loerrach, West Germany), and K. H. DROEGE (Forschungs - und Entwicklungslabor KERA, Loerrach, West Germany) Bonn Bundesministerium fuer Forschung und Technologie Nov. 1982 116 p refs *In* GERMAN; ENGLISH summary
(BMFT-FB-HA-82-040; ISSN-0171-7618) Avail: NTIS HC A06/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 24,50

The development of a CP-robot control system with sensory feedback to automize an industrial machining task is discussed. The grinding of welding beads on car bodies by a five axis robot control system was developed to accomodate additional functions. Software modules for the processing of tactile sensor data are integrated into the control system. It is shown that the CP-control with sensory feedback is able to create motion programs which optimally fit a given workpiece surface that has to be machined. It is concluded that the developed control system increases the robots' adaptivity to curved surfaces and allows for quality control during the work process. Minimal prorammning is required because of algorithms for automatic pathe generation in the control.
E.A.K.

N83-25417# Army Industrial Base Engineering Activity, Rock Island, Ill.
CAM HIGHLIGHTS, FY 82 Final Biennial Report
T. N. LOCKE Nov. 1982 113 p
(AD-A123395) Avail: NTIS HC A06/MF A01 CSCL 13H

This Document contains summaries of 39 Army Computer Aided Manufacturing (CAM) efforts that are either completed or on-going. The Army CAM Program funds efforts through manufacturing technology, facilities or major systems contracts. Significant information contained in this document was obtained from various management documents submitted to IBEA during the life cycle of the efforts. DARCOM Subordinate Major Commands, Installations, Activities, and Program Offices are the sources for this management data. The summaries highlight the integration of computers in manufacturing and are organized into eleven sections for this document. These eleven sections correspond to system technology areas which are listed with their numerical classification number. GRA

N83-25427# Bendix Corp., Kansas City, Mo. Operations Dept.
BENDIX CAD-CAM SITE PLAN
M. L. SMITH Dec. 1982 45 p
(Contract DE-AC04-76DP-00613)
(DE83-005327; BDX-613-2886) Avail: NTIS HC A03/MF A01

The development and integration of interactive graphics systems, factory data management systems, robotics, direct numerical control, automated inspection, factory automation, and shared data bases to achieve significant plant wide gains in productivity is analyzed. A summary of planning proposals and rationale is presented in the following paragraphs. Interactive Graphics System (TGS) capability presently consists of two Applicon CAD systems and the CD-2000 software program

processing on a time shared CYBER 174 computer and a dedicated CYBER 173. Proposed plans include phased procurement through FY 85 of additional computers and sufficient graphics terminals to support projected needs in drafting, tool/gage design, N/C programming, and process engineering. Planned procurement of additional computer equipment in FY 86 and FY 87 will provide the capacity necessary for a comprehensive graphics data base management system, computer aided process planning graphics, and special graphics requirements in facilities and test equipment design. DOE

N83-27069# Rolls-Royce Ltd., Derby (England).
THE SERVICING OF COMPLEX NC MANUFACTURING SYSTEMS
P. KNAUER 16 Aug. 1982 26 p Transl. into ENGLISH of Rept. VDI-440 Friedrichshafen, West Ger., 1982 p 67-77 In ENGLISH and GERMAN
(PNR-90153; TRANS-16404/TLT-00904) Avail: NTIS HC A03/MF A01

A servicing-management plan for numerically controlled manufacturing systems is presented. Servicing activities are divided into those with a periodicity 4 weeks and those with periodicity 4 weeks. Maintenance and inspection lists, manually compiled from manufacturers' documentation are fed into a computer. Procedures to be completed the following month are produced as printouts annotated with inventory numbers. Author (ESA)

N83-27070# Rolls-Royce Ltd., Derby (England).
EXAMPLE OF A PLANNED AND IMPLEMENTED FLEXIBLE MANUFACTURING SYSTEM SUITABLE FOR DEVELOPMENT IN STAGES
M. ZICK 16 Aug. 1982 28 p Transl. into ENGLISH of Rept. VDI-440 Stuttgart, 1982 p 33-44 In ENGLISH and GERMAN
(PNR-90154; TRANS-16403/TLT-00903; VDI-440) Avail: NTIS HC A03/MF A01

The development of a system for machining cubic parts is described. Definition of the overall manufacturing and planning requirement for all the capital equipment to the order stage, taking into account available buildings and further automation is outlined. Planning of the subsequent automation stages to ensure that the technical specifications which were not comprehensively defined at the time the orders were placed could still be submitted and corrected during the delivery time is summarized. Commissioning the production facilities in their basic configuration and consolidation of further automation steps in the data and material flow are treated. Author (ESA)

N83-27071# Rolls-Royce Ltd., Derby (England).
TIME CHARACTERISTIC, CAPACITY AND CONDITIONS FOR THE ADOPTION OF FLEXIBLE PRODUCTION SYSTEMS
R. KLAUS 8 Jul. 1982 17 p refs Transl. into ENGLISH of Z. fuer Ind. Fertigung (West Ger.), v. 69, 1979 p 97-102
(PNR-90156; TRANS-16325/TLT-00896) Avail: NTIS HC A02/MF A01

Assessment criteria for the adoption of flexible production systems are presented. Workpiece-related times, times related to technological positions, and times related to the production system are considered. Flexibility is divided into external (number of different parts which the system can produce economically) and internal (capacity to manufacture a given assortment of parts economically). Short throughput times require high internal flexibility. Operating experience of 55,000 hr reveals that computer-assisted process control is 40% more efficient than manual control. Author (ESA)

N83-27227# Merrick Engineering, Inc., Nashville, Tenn.
ROBOTICS IN WELDING
J. R. DWYER *In* ORNL Intern. Conf. on Welding Technol. for Energy Appl. p 302-312 Sep. 1982
Avail: NTIS HC A99/MF A01

The use of industrial robots is discussed. The advantages of robots over human workers is emphasized. Recommendations are given to ensure minimum worker resistance to the introduction of robots. Diagrams and photographs of a typical connection between a robot and a welding system are given. R.J.F.

N83-31379*# National Aeronautics and Space Administration, Washington, D. C.
AN OVERVIEW OF ARTIFICIAL INTELLIGENCE AND ROBOTICS. VOLUME 1: ARTIFICIAL INTELLIGENCE. PART A: THE CORE INGREDIENTS
W. B. GEVARTER Jun. 1983 74 p refs Sponsored in part by NBS
(NASA-TM-85836; NAS 1.15:85836; RTC-6) Avail: NTIS HC A04/MF A01 CSCL 09B

Artificial Intelligence (AI) is an emerging technology that has recently attracted considerable attention. Many applications are now under development. The goal of Artificial Intelligence is focused on developing computational approaches to intelligent behavior. This goal is so broad - covering virtually all aspects of human cognitive activity - that substantial confusion has arisen as to the actual nature of AI, its current status and its future capability. This volume, the first in a series of NBS/NASA reports on the subject, attempts to address these concerns. Thus, this report endeavors to clarify what AI is, the foundations on which it rests, the techniques utilized, applications, the participants and, finally, AI's state-of-the-art and future trends. It is anticipated that this report will prove useful to government and private engineering and research managers, potential users, and others who will be affected by this field as it unfolds. Author

N83-31518# Logistics Management Inst., Washington, D. C.
MANUFACTURING TECHNOLOGY PROGRAM INFORMATION SYSTEM: *FUNCTIONAL DESCRIPTION Final Report*
K. J. WRIGHT and W. P. HAMILTON, III Feb. 1983 114 p
(Contract MDA903-81-C-0166)
(AD-A127293; LMI-RE104) Avail: NTIS HC A06/MF A01 CSCL 05B

This document contains a functional description of the manufacturing technology program information system (MTPIS). This MTPIS will provide OSD and service staff members a tool to strengthen program management's performance in planning, programming, budgeting, execution, documenting benefits and diffusing technology throughout the industrial base. The proposed MTPIS is an automated data processing system to replace most of the existing manual procedures used by OSD and Service staff members. The system will provide automated storage of and access to program-related data. These data will reside in a central computer's data base and will be accessed by the DBMS and related applications software. Author (GRA)

N83-31899# Draper (Charles Stark) Lab., Inc., Cambridge, Mass.
FLEXIBLE MANUFACTURING SYSTEM HANDBOOK. VOLUME 1: EXECUTIVE SUMMARY Final Technical Report
Warren, Mich. Army Tank-Automotive Command Research and Development Center Feb. 1983 21 p
(Contract DAAE07-82-C-4040)
(AD-A127927; TACOM-TR-12703-VOL-1; CSDL-R-1599-VOL-1)
Avail: NTIS HC A02/MF A01 CSCL 13H

Flexible Manufacturing Systems (FMSs) represent a relatively new strategy to increase productivity. The technology is especially attractive for manufacturers who produce in the middle ranges of production volumes, neither mass production nor one of a kind. Today's unpredictable market environment demands low-cost solutions that provide quick product start-up, adaptability and responsiveness to changes in demand, and the capacity to easily resurrect out-of-production designs. In many instances, FMSs provide a direct hardware/software solution to this threefold management challenge. The adoption of FMS technology requires that one address many questions beforehand. This handbook provides a methodical approach to answering these questions. But it is not a cookbook; it cannot be. Each application of FMS technology is unique, therefore, the guidelines presented are fairly general. Author (GRA)

N83-31901# Draper (Charles Stark) Lab., Inc., Cambridge, Mass.
FLEXIBLE MANUFACTURING SYSTEM HANDBOOK. VOLUME 3: BUYER/USER'S GUIDE Final Technical Report
Feb. 1983 114 p 5 Vol.
(Contract DAAE07-82-C-4040)
(AD-A127929; TACOM-TR-12703-VOL-3; CSDL-R-1599-VOL-3)
Avail: NTIS HC A06/MF A01 CSCL 13H

This is the third volume in a five-volume series designed to serve as a more detailed guide to planners at corporate and plant levels closer to the manufacturing environment. It shows how to specify and purchase an FMS and then deals with installation and operation. Volume 4 contains a sample request-for-proposal, a proposal, a glossary of FMS terms, a bibliography, and other technical material. Volume 5 contains user's manuals for various software packages. Author (GRA)

N83-31902# Draper (Charles Stark) Lab., Inc., Cambridge, Mass.
FLEXIBLE MANUFACTURING SYSTEM HANDBOOK. VOLUME 4. APPENDICES Final Technical Report
Feb. 1983 244 p refs 5 Vol.
(Contract DAAE07-82-C-4040)
(AD-A127930; TACOM-TR-12703-Vol-4; CSDL-R-1599-Vol-4)
Avail: NTIS HC A12/MF A01 CSCL 13H

This is the fourth volume in a five-volume series of appendices contains a sample request for proposal, a proposal, a glossary of FMS terms, a bibliography, and other technical material. Volume V contains user's manuals for various software packages. Author (GRA)

N83-33577# California Univ., Livermore. Lawrence Livermore Lab.
COMPUTER-AIDED ENGINEERING IN NESD
H. S. AMES 13 Apr. 1983 28 p refs
(Contract W-7405-ENG-48)
(DE83-011260; UCID-19779) Avail: NTIS HC A03/MF A01

The present capabilities of the NESD computer aided engineering (CAE) system are described and immediate and long range development plans are discussed. The goal of CAE is to help engineers improve their productivity by using computers. The use of computers in engineering is certainly not new, but the widespread availability of computer resources will allow engineers to utilize computers for all facts of their work, including modeling and analyses, design, documentation, project management, software development, and communications. DOE

N83-34645# Bendix Corp., Kansas City, Mo.
CAD-CAM AT BENDIX KANSAS CITY: THE BICAM SYSTEM
D. R. WITTE Apr. 1983 21 p Presented at the Appl. and Graphics Products Conf., Savannah, 11-14 Apr. 1983
(Contract DE-AC04-76DP-00613)
(DE83-011122; BDX-613-2887R; CONF-830473-1) Avail: NTIS HC A02/MF A01

Bendix Kansas City Division (BBKC) has been involved in Computer Aided Manufacturing (CAM) technology since the late 1950's when the numerical control (N/C) analysts installed computers to aid in N/C tape preparation for numerically controlled machines. Computer Aided Design (CAD) technology was introduced in 1976, when a number of 2D turnkey drafting stations were procured for printed wiring board (PWB) drawing definition and maintenance. In June, 1980, CAD-CAM Operations was formed to incorporate an integrated CAD-CAM capability into Bendix operations. In March 1982, a ninth division was added to the existing eight divisions at Bendix. Computer Integrated Manufacturing (CIM) is a small organization, reporting directly to the general manager, who has responsibility to coordinate the overall integration of computer aided systems at Bendix. As a long range plan, CIM had adopted a National Bureau of Standards (NBS) architecture titled Factory of the Future. Conceptually, the bendix CAD-CAM system has a centrally located data base which can be accessed by both CAD and CAM tools, processes, and personnel thus forming an integrated Computer Aided Engineering (CAE) System. This is a key requirement of the Bendix CAD-CAM system that will be presented in more detail. DOE

N83-35648# California Univ., Livermore. Lawrence Livermore Lab. Dept. of Electrical and Computer Engineering.
ROBOTICS RESEARCH PROJECTS REPORT
T. C. HSIA, ed. Jun. 1983 59 p refs
(Contract W-7405-ENG-48)
(DE83-013619; UCID-19816; RRL-82-1) Avail: NTIS HC A04/MF A01

The research results of the robotics research laboratory are summarized. Areas of research include robotic control, a stand alone vision system for industrial robots, and sensors other than vision that would be useful for image ranging, including ultrasonic and infrared devices. One particular project involves RHINO, a 6-axis robotic arm that can be manipulated by serial transmission of ASCII command strings to its interfaced controller. DOE

N83-35694# Sandia Labs., Albuquerque, N. Mex. Buildings and Facilities Design Div.
COMPUTER-AIDED DRAFTING AND DESIGN (CAD) IN THE PLANT ENGINEERING ORGANIZATION AT SANDIA NATIONAL LABORATORIES
J. T. HALL, D. D. KNOTT, and M. B. MOORE Mar. 1983 61 p
(Contract DE-AC04-76DP-00789)
(DE83-011375; SAND-82-1985) Avail: NTIS HC A04/MF A01

The Plant Engineering organization at Sandia National Laboratories, Albuquerque (SNLA), has been working with a CAD system for approximately 2 1/2 yr, and finds itself at a crossroads. CAD has not been panacea to workload problems to data, and Plant Engineering commissioned a study to try to determine why and to make recommendations to management on what steps might be taken in the future. Recommendations range from making the current system more productive to enhancing it significantly with newer and more powerful graphics technology. DOE

N83-35938# Carnegie-Mellon Univ., Pittsburgh, Pa. Intelligent Systems Lab.
THE INTELLIGENT MANAGEMENT SYSTEM: AN OVERVIEW
M. S. FOX 7 Dec. 1982 41 p refs
(AD-A126345; CMU-RI-TH-81-4) Avail: NTIS HC A03/MF A01 CSCL 05B

The intelligent management system (MS) project, which is part of the factory of the future project is described. The IMS is a long term project concerned with applying artificial intelligence techniques in aiding professionals and managers in their day to day tasks. The long term goals of IMS, and current research are discussed. Research in the modeling of organizations, constraint-based job shop scheduling, organization simulation, user interfaces, and system architecture are described. Examples of working systems are provided. GRA

N83-36682# Naval Ocean Systems Center, San Diego, Calif.
NOSC/ONR ROBOTICS BIBLIOGRAPHY, 1961 - 1981
S. Y. HARMON, G. R. MCDEVITT, M. THOMPSON, R. ARGO, S. FERRONE, D. BRUBAKER, and D. GRACE Sep. 1982 97 p
(Contract RR0140901)
(AD-A130591; NOSC/TD-539) Avail: NTIS HC A05/MF A01 CSCL 05B

This document contains a bibliography of the literature directly related to robotics published in the period from 1961 to 1981. This bibliography contains 1066 references. These references are organized into ten topical categories including: general and historical topics; modelling, simulation, design, testing and evaluation, sensors and sensor data processing: operating systems, software development, programming languages and computer architectures, knowledge management; communications and direct robot/human interactions; dynamics and control; effectors; systems and applications, and safety, human factors, standards, management, social, economic and political issues. GRA

N83-37029# Committee on Education and Labor (U. S. House).
NEW TECHNOLOGY IN THE AMERICAN WORKPLACE
Washington GPO 1983 260 p Hearing before the Subcomm. on Labor Std. of the Comm. on Educ. and Labor, 97th Congr., 2d Sess., 23 Jun. 1982
(GPO-11-510) Avail: Subcommittee on Labor Standards

The impact of automation on employment and the workplace is discussed to provide insight into the role of the Federal Government in encouraging productivity growth through technological change while protecting the rights and interests of workers. Major issues considered include automation and robotry; education and job training; occupational health concerns; income and retirement policies; job security; the effects of tax incentives; and the impact of technological change on women workers. Implications for labor management relations are included. A.R.H.

04

RESOURCE MANAGEMENT

Includes information resource management, materials management, R&D resources, manpower resources, and office automation.

A83-14269#
OFFICE AUTOMATION IN RESOURCE-MANAGEMENT - THE FUTURE IS NOW
J. P. HESSION (Canada Centre for Remote Sensing, Ottawa, Canada) In: Canadian Symposium on Remote Sensing, 7th, Winnipeg, Canada, September 8-11, 1981, Proceedings. Ottawa, Canadian Aeronautics and Space Institute, 1982, p. 364-368. refs

During the summer of 1981, the Canada Center for Remote Sensing participated in a commercial Telidon project in southwestern Manitoba. In this project (called 'GRASSROOTS') CCRS provided thematic images showing agricultural land use derived from Landsat data for distribution in a network that included terminals installed in ag rep offices, crop insurance offices, grain elevator offices and in the homes of private farmers. Remote sensing information on estimated acreages of rapeseed and fallow fields were transmitted along with current weather maps and commodity prices. Early user experiences indicate that low cost Canadian videotex technology may be a feasible tool for disseminating text and graphic information to improve decision-making and productivity in the primary and resource industry sectors. (Author)

A83-40308*# National Aeronautics and Space Administration, Washington, D. C.
PRODUCTIVITY GOALS DRIVE OFFICE AUTOMATION
A. P. BRADLEY (NASA, Washington, DC) and P. R. KURZHALS (NASA, Goddard Space Flight Center, Greenbelt, MD) Astronautics and Aeronautics (ISSN 0004-6213), vol. 21, July-Aug. 1983, p. 60-65.

Office automation (OA) steps being taken by NASA to improve efficiency in communications between centers and personnel are outlined. NASA centers are currently linked by satellite for electronic mail and scheduling through dumb and intelligent terminals. The implementation of teleconferencing with interactive graphics transmitted between dial-up terminals is being examined in a pilot program, and interactive data bases are already in operation, with an on-line summary data base being planned for NASA headquarters. The NASA Recon on-line service is operating with citations of over 2,200,000 aeronautics and astronautics research documents and 300,000 scientific books accessed by over 250 terminals around the U.S. The emphasis for all the OA systems is on user-friendly design and minimizing the required input for entry and access. M.S.K.

A83-45080
THE ROLE OF INFORMATION SYSTEMS IN AIRLINE MANAGEMENT FUNCTIONS
A. ELIAS (MIT, Cambridge, MA) IN: SITELCOM-82 - Telecommunications and data processing in the air transport industry; Proceedings of the Conference, Monte Carlo, Monaco, March 2-4, 1982 . Neuilly-sur-Seine, Hauts-de-Seine, France, Societe Internationale de Telecommunications Aeronautiques, 1983, p. 223-233.

Management activities in an airline have many different aspects and involve a great number of persons who have a decision-making role. It is pointed out, however, that in almost all cases the decision-making process can be improved by the appropriate utilization of modern information systems. The need for an employment of such information systems is particularly urgent in connection with the appropriate conduction of the planning operations of management. The requirements for the use of new information systems technology is found to be especially important in the area of medium to short-term planning. Attention is given to an establishment of the need for the 'decision support systems', certain problems related to a use of management information systems, the role of operations research, the aid provided by computers, and questions of software development. G.R.

A83-47282*# National Aeronautics and Space Administration, Washington, D. C.
NASA/NOAA IMPLEMENTATION OF THE USAID-SPONSORED SATELLITE GROUND STATION AND DATA PROCESSING FACILITY FOR BANGLADESH
J. C. DODGE (NASA, Washington, DC) and C. H. VERMILLION (NASA, Goddard Space Flight Center, Greenbelt, MD) International Astronautical Federation, International Astronautical Congress, 34th, Budapest, Hungary, Oct. 10-15, 1983. 7 p. refs
(IAF PAPER 83-127)

A description is given of a project to transfer multiple environmental satellite data reception, processing, and interpretation capabilities from the U.S. to Bangladesh. The goal of the project is to improve the management of resources related primarily to agriculture, water development, forestry, and fisheries. It is also hoped to improve the existing cyclone/storm surge warning system. An account is given of the interagency and international cooperation underlying the project. The remote-sensing installation in Dhaka, Bangladesh, is described, and the most likely system applications are summarized. Attention is also given to the special requirements concerning this type of technology transfer, and an assessment is made of the project's practical value to Bangladesh. C.R.

N83-10638# Louisiana State Univ., Baton Rouge. Energy Program Office.
THE DEVELOPMENT OF A GEOPRESSURED ENERGY MANAGEMENT INFORMATION SYSTEM IN SUPPORT OF RESEARCH PLANNING, PHASE 1 Annual Report, Mar. 1980 - Oct. 1981
A. L. BACHMAN and F. M. WRIGHTON Oct. 1981 55 p Sponsored by Gas Research Inst.
(PB82-207366; GRI-81/0005) Avail: NTIS HC A04/MF A01 CSCL 10A

The development of an information system on the problems and potential of geopressured gas containing aquifers as well as what is known about unconventional gas production in the Gulf Coast, and the use of this information to formulate a research program to prove economic and technical feasibility is discussed. This work led to the conclusion that of six major conventional gas resource options in the Gulf Coast, the one involving gas recovery from reservoirs watered out due to prior production offers the greatest potential in the short term. In these water drive reservoirs, gas is trapped in the pore space as water invades the reservoir (due to gas production). This gas can be recovered by reducing the pressure in the reservoir and thereby causing the trapped gas to expand and become mobile. The reduction in reservoir pressure is achieved by high rate water production. The conclusions drawn from analyses of the potential for gas recovery from unconventional

sources in the Gulf Coast as well as research and testing already completed are the basis for the proposed research program. The process by which the research program was formulated, intermediate results and the program itself are summarized.
Author

N83-10747# National Advisory Committee on Oceans and Atmosphere, Washington, D.C.
A REPORT TO THE PRESIDENT AND THE CONGRESS BY THE NATIONAL ADVISORY COMMITTEE ON OCEANS AND ATMOSPHERE Annual Report
V. J. JONES, ed. 30 Jun. 1981 52 p
(PB82-182882; NACOA-21; AR-10) Avail: NTIS HC A04/MF A01 CSCL 08J

The National Advisory Committee on Oceans and Atmosphere (NACOA) reviewed the impact of changes being made by the Administration on ocean programs. Key aspects of the national ocean effort are reviewed and reevaluated. These range from the present review of the U.S. position in the Law of the Sea to questions about relative roles of the Federal Government, States, and private industry in important programs such as Sea Grant, Coastal Zone Management, fisheries development, and Ocean Thermal Energy Conversion (OTEC). Further, some actions postpone for later consideration important technology developments such as the National Oceanic Satellite System (NOSS). There is concern that actions are being taken piecemeal without adequate regard for the interdependence of many ocean programs and without recognition of the need for a comprehensive approach to ensure that the resources of the ocean be developed fully in the national interest while protecting it as an environment. Therefore, it is urged that the Federal Ocean Program be reviewed as a whole before further changes are made to ensure national ocean policies will be consistent with the objectives.
Author (GRA)

N83-10975# Auburn Univ., Ala. Dept. of Economics.
ALLOCATING R AND D RESOURCES: A STUDY OF THE DETERMINANTS OF R AND D BY CHARACTER OF USE Final Report
A. W. LINK Aug. 1982 105 p refs
(Contract NSF PRA-80-09552)
(PB82-209800; NSF/PRA-81019) Avail: NTIS HC A06/MF A01 CSCL 05A

An empirical analysis is presented of firm and industry characteristics important in determining a firm's allocation of its research and development (R&D). It was found that a set of firm characteristics can be identified as influencing the firm's allocation of its R&D. Factors important in determining the allocation were found to be unimportant in determining the overall level of R&D spending. The statistical analysis illustrates that profitability and the receipt of Federal R&D are significant determinants of the firm's level of R&D spending, holding constant characteristics of the industry in which the firm produces. In the regression analysis, three industry characteristics are held constant: market concentration, indexes of technological opportunity, and product complexity. The report includes primary data used in the analysis, development of a model of the R&D allocation among its alternative uses, testing of several propositions related to determinants of the R&D allocation; and a discussion of policy considerations. The analysis attempts to illustrate that R&D is a heterogeneous category of activities and that no one set of factors influences the firm's decision to allocate R&D funds to any particular use category.
Author

N83-10984# California Univ., Livermore. Lawrence Livermore Lab. Electronics Engineering Dept.
WORD PROCESSING/OFFICE INFORMATION SYSTEMS: MANAGERS PERSPECTIVE, A MANAGEMENT TOOL
M. B. HAMILTON 27 May 1982 74 p
(Contract W-7405-ENG-48)
(DE82-016000; UCID-19393) Avail: NTIS HC A04/MF A01

An overview of word processing systems and office information systems is presented. Emphasis is on the equipment that makes up such systems, how the systems function in the office workflow, the varying capabilities of the systems, the required maintenance and housekeeping of the systems, and the support resources available.
DOE

N83-11883# Battelle Inst., Frankfurt am Main (West Germany).
REMOTE OFFICE WORK: INFORMATION ENGINEERING FEASIBILITY AND IMPLICATION Final Report, Mar. 1982
E. BALLERSTEDT, M. DIPPER, C. KREBSBACH-GNATH, R. MANDRELLA, H. MARCHAND, W. HEILMANN (Integrata GmbH), and B. KROMAR (Integrata GmbH) Bonn Bundesministerium fuer Forschung und Technologie Aug. 1982 368 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-DV-82-002; ISSN-0170-9011) Avail: NTIS HC A16/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 53,50

Feasibility and consequences of remote office work are studied. Remote office work is not practiced in the Federal Republic of Germany; in the US it is being introduced only hesitantly. With certain reservations, telecommuting is technologically feasible, but there are economic and organizational obstacles to its introduction on a large scale. Text processing and programming functions might be performed outside normal offices. Remote office work would have both positive and negative consequences for the telecommuters themselves, for the organizations involved, and for society as a whole. There is no obvious need for public safeguards; an innovative policy is required, however, to overcome technological/organizational problems.
Author (ESA)

N83-11884# Office of Management and Budget, Washington, D. C.
FEDERAL INFORMATION COLLECTION: AGENCY ACTIONS ON COMMISSION ON FEDERAL PAPERWORK RECOMMENDATIONS. VOLUME 2: RECOMMENDATIONS TO DEPARTMENTS
Mar. 1982 205 p refs
(PB82-193673) Avail: NTIS HC A01/MF A01 CSCL 05B

The oversight and reporting requirements of the Paperwork Reduction Act and intensified monitoring and evaluation activities are reviewed. Specific actions taken or planned for reach recommendation and projects completion dates for executive branch actions on those recommendations accepted but not yet fully implemented are described.
Author (GRA)

N83-12154*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
CONSERVATION OF STRATEGIC METALS
J. R. STEPHENS *In* NASA. Langley Research Center Advan. Mater. Technol. p 141-164 Nov. 1982 refs
Avail: NTIS HC A19/MF A01 CSCL 11F

A long-range program in support of the aerospace industry aimed at reducing the use of strategic materials in gas turbine engines is discussed. The program, which is called COSAM (Conservation of Strategic Aerospace Materials), has three general objectives. The first objective is to contribute basic scientific understanding to the turbine engine technology bank so that our national security is not jeopardized if our strategic material supply lines are disrupted. The second objective is to help reduce the dependence of United States military and civilian gas turbine engines on worldwide supply and price fluctuations in regard to strategic materials. The third objective is, through research, to contribute to the United States position of preeminence in the world gas turbine engine markets by minimizing the acquisition costs and optimizing the performance of gas turbine engines. Three major research thrusts are planned: strategic element substitution; advanced processing concepts; and alternate material identification. Results from research and any required supporting technology will give industry the materials technology options it needs to make tradeoffs in material properties for critical components against the cost and availability impacts related to their strategic metal content.
R.J.F.

N83-13026# Auburn Univ., Ala. Dept. of Economics.
ALLOCATING R&D RESOURCES: A STUDY OF THE DETERMINANTS OF R&D BY CHARACTER OF USE Executive Summary
A. N. LINK Aug. 1981 9 p
(Contract NSF PRA-8009552)
(PB82-193343; NSF/PRA-81020) Avail: NTIS HC A02/MF A01 CSCL 05A

An empirical analysis of firm and industry characteristics important in determining the firm's allocation of its research and development (R&D) is summarized. It is found that a set of firm characteristics can be identified as influencing the firm's allocation of its R&D. The statistical analysis illustrates that profitability and the receipt of Federal R&D are significant determinants of the firm's level of R&D spending, holding constant characteristics of the industry in which the firm produces. In the regression analysis, three industry characteristics are held constant: market concentration, indexes of technological opportunity, and product complexity. It is shown that R&D is a heterogeneous category of activities and that no one set of factors influences the firm's decision to allocate R&D funds to any particular use category.
GRA

N83-13035# National Academy of Sciences - National Research Council, Washington, D. C. Committee on Data Management and Computation.
DATA MANAGEMENT AND COMPUTATION. VOLUME 1: ISSUES AND RECOMMENDATIONS Final Report
1982 186 p refs
(PB82-188113) Avail: NTIS HC A09/MF A01 CSCL 05B

The problems that users have encountered relating to acquisitions, analysis, and distribution of space science data are summarized, and ways to improve NASA data management systems are recommended. Author (GRA)

N83-13037# Office of Management and Budget, Washington, D. C.
MANAGING FEDERAL INFORMATION RESOURCES: REPORT UNDER THE PAPERWORK REDUCTION ACT OF 1980 Annual Report
1 Apr. 1982 79 p refs
(PB82-194473; AR-1) Avail: NTIS HC A05/MF A01 CSCL 05B

The objectives of the Paperwork Reduction Act are to: (1) reduce the information burden imposed on the public by the Federal government; (2) reduce the cost of collecting, managing, and disseminating information by Federal agencies; (3) ensure that Federal agencies collect only as much information as they need and can use effectively; (4) eliminate inconsistencies among Federal information policies by ensuring uniformity wherever possible; (5) improve the efficiency of government programs through the effective use of information technology; and (6) establish safeguards to protect the legitimate privacy and confidentiality concerns of individuals and enterprises. To accomplish these objectives, the Act sets in place several major organizational requirements and enforcement mechanisms.
Author (GRA)

N83-14017# Naval Ship Research and Development Center, Bethesda, Md.
INFORMATION SYSTEMS DESIGN METHODOLOGY: GLOBAL LOGICAL DATA BASE DESIGN Final Report, Jun 1981 - May 1982
D. K. JEFFERSON Aug. 1982 63 p refs
(AD-A119089; DTNSRDC-82/057) Avail: NTIS HC A04/MF A01 CSCL 09B

The methodology includes a detailed notation and procedures for developing a data base design that satisfies many applications, is adaptable to changes in applications, and is independent of specific hardware and software. The methodology is supported by the problem statement language/problem statement analyzer, a computer-based tool for developing information systems.
Author (GRA)

N83-15170# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio.
PROCEEDINGS OF THE UNITED STATES AIR FORCE STINFO OFFICERS POLICY CONFERENCE
J. G. JOHNSON Aug. 1982 225 p refs Conf. held at Wright-Patterson AFB, Ohio, 1981
(AD-A118935; AFWAL-TR-82-0002) Avail: NTIS HC A10/MF A01 CSCL 05A

Approximately 100 technical information specialists participated in the conference at Wright-Patterson AFB, Ohio. As a result of the conference, the following principal issues will be pursued to improve the USAF STINFO program; (1) more emphasis on STINFO in major commands (SAC, MAC, TAC, etc.); (2) resurrection of a STINFO training program; (3) more emphasis on getting information to the scientist/engineer/manager; and (4) improvement of the communications between and within the STINFO program.
Author (GRA)

N83-15171# National Academy of Sciences - National Research Council, Washington, D. C. Numerical Data Advisory Board.
NUMERICAL DATA ADVISORY BOARD REPORT OF ACTIVITIES PERFORMED FOR THE PERIOD 1 JULY 1980 - 30 JUNE 1981
30 Jun. 1981 30 p
(Contract NB80-NADA-1036; DE-FG02-80ER-10760; NSF IST-80-1960)
(DE82-002168; DOE/ER-10760/1) Avail: NTIS HC A03/MF A01

The improvement in quality, reliability, availability, accessibility, dissemination, utilization, and management of data is discussed. NDAB seeks to promote an appreciation of the importance of evaluated data to scientists, engineers, regulators, and others who require reliable numerical data for research and for decision making. NDAB is an interdisciplinary body with representation from physical, chemical, engineering, biological, and geological sciences. Selected sociotechnical, socioeconomic, and transient, or soft data topics are also covered. An effective path of communication with international data activities is maintained by scheduling NDAB meetings jointly with the US National Committee for CODATA, the Committee on Data for Science and Technology of the International Council for Scientific Unions (ICSU). An active government liason relationship is maintained to facilitate input from, and discussion with branches of agencies that deal with technical data and information programs. DOE

N83-15565# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
CONCEPT UTILIZING TELEX NETWORK FOR OPERATIONAL MANAGEMENT REQUIREMENTS
E. KOWALCZYK 15 Sep. 1982 17 p Transl. into ENGLISH of Wiadomosci Telekomunikacyjne (Poland), v. 17, no. 1, Jan. 1978 p 1-4
(AD-A119867; FTD-ID(RS)T-1038-82) Avail: NTIS HC A02/MF A01 CSCL 17B

The simplest and least expensive means ensuring fast transmission of documented (recorded) information on a country-wide scale for all kinds of users is the telex network, which is fully automated in Poland at this time (except for foreign message traffic) with more than 17,000 subscribers. As a digital network, the telex network constitutes, in principle, a base network that is ready for use to transmit information as part of remote data transmission systems. A.R.H.

N83-18559*# National Aeronautics and Space Administration, Washington, D. C.
NASA ADMINISTRATIVE DATA BASE MANAGEMENT SYSTEMS
Jan. 1983 285 p refs Conf. held in Pasadena, Calif., 26-27 May 1982
(NASA-CP-2254; NAS 1.55:2254) Avail: NTIS HC A13/MF A01 CSCL 05B

Various issues concerning administrative data base

management systems are discussed. The procurement and operation of several systems are discussed.

N83-18560*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
DATABASES AS AN INFORMATION SERVICE
D. A. VINCENT *In* NASA, Washington NASA Admin. Data Base Management Systems p 3-10 Jan. 1983
Avail: NTIS HC A13/MF A01 CSCL 05B

The relationship of databases to information services, and the range of information services users and their needs for information is explored and discussed. It is argued that for database information to be valuable to a broad range of users, it is essential that access methods be provided that are relatively unstructured and natural to information services users who are interested in the information contained in databases, but who are not willing to learn and use traditional structured query languages. Unless this ease of use of databases is considered in the design and application process, the potential benefits from using database systems may not be realized. R.J.F.

N83-18561*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
COMPARISON OF SCIENTIFIC AND ADMINISTRATIVE DATABASE MANAGEMENT SYSTEMS
J. C. STOLTZFUS *In* NASA, Washington NASA Admin. Data Base Management Systems p 11-15 Jan. 1983
Avail: NTIS HC A13/MF A01 CSCL 05B

Some characteristics found to be different for scientific and administrative data bases are identified and some of the corresponding generic requirements for data base management systems (DBMS) are discussed. The requirements discussed are especially stringent for either the scientific or administrative data bases. For some, no commercial DBMS is fully satisfactory, and the data base designer must invent a suitable approach. For others, commercial systems are available with elegant solutions, and a wrong choice would mean an expensive work-around to provide the missing features. It is concluded that selection of a DBMS must be based on the requirements for the information system. There is no unique distinction between scientific and administrative data bases or DBMS. The distinction comes from the logical structure of the data, and understanding the data and their relationships is the key to defining the requirements and selecting an appropriate DBMS for a given set of applications. R.J.F.

N83-18564*# Mitre Corp., Bedford, Mass.
DBMS UTILIZATION: A CORPORATE INFORMATION SYSTEM (CIS) DEVELOPMENT APPROACH
P. ROZETT *In* NASA, Washington NASA Admin. Data Base Management Systems p 51-76 Jan. 1983
Avail: NTIS HC A13/MF A01 CSCL 05B

The Corporate Information System (CIS), an integrated information system intended to tie the corporation together as a functioning entity, is described. In addition to being a major upgraded automated data processing system, the CIS is a management philosophy which recognizes data as a valuable corporate resource and which distinguishes between data and selected data, or information. It further recognizes that different users need different kinds of information. Plans for CIS development are discussed. It will offer its users not just after-the-fact data, but timely information in a format that is meaningful and useful to the particular user, so that the information can be applied in planning, controlling, and decision making by all levels of management. In effect, CIS will help the corporation itself to function as a total, integrated system by typing together administrative activities through information exchange. The CIS supports the operational, tactical control, and strategic planning functions of the corporation. Operational functions are the day-to-day processing necessary to support the corporation's work, such as purchasing and payroll. R.J.F.

N83-18570*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
PLANNING THE FUTURE OF JPL'S MANAGEMENT AND ADMINISTRATIVE SUPPORT SYSTEMS AROUND AN INTEGRATED DATABASE
M. M. EBERSOLE *In* NASA, Washington NASA Admin. Data Base Management Systems p 204-215 Jan. 1983 refs
Avail: NTIS HC A13/MF A01 CSCL 05B

JPL's management and administrative support systems have been developed piece meal and without consistency in design approach over the past twenty years. These systems are now proving to be inadequate to support effective management of tasks and administration of the Laboratory. New approaches are needed. Modern database management technology has the potential for providing the foundation for more effective administrative tools for JPL managers and administrators. Plans for upgrading JPL's management and administrative systems over a six year period evolving around the development of an integrated management and administrative data base are discussed. Author

N83-18572*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
DESCRIPTION OF DATA BASE MANAGEMENT SYSTEMS ACTIVITIES
In NASA, Washington NASA Admin. Data Base Management Systems p 251-254 Jan. 1983
Avail: NTIS HC A13/MF A01 CSCL 05B

One of the major responsibilities of the JPL Computing and Information Services Office is to develop and maintain a JPL plan for providing computing services to the JPL management and administrative community that will lead to improved productivity. The CISO plan to accomplish this objective has been titled 'Management and Administrative Support Systems' (MASS). The MASS plan is based on the continued use of JPL's IBM 3032 Computer system for administrative computing and for the MASS functions. The current candidate administrative Data Base Management Systems required to support the MASS include ADABASE, Cullinane IDMS and TOTAL. Previous uses of administrative Data Base Systems have been applied to specific local functions rather than in a centralized manner with elements common to the many user groups. Limited capacity data base systems have been installed in microprocessor based office automation systems in a few Project and Management Offices using Ashton-Tate dBASE II. These experiences plus some other localized in house DBMS uses have provided an excellent background for developing user and system requirements for a single DBMS to support the MASS program. B.W.

N83-18573*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
SHUTTLE PROGRAM INFORMATION MANAGEMENT SYSTEM (SPIMS) DATA BASE
In NASA, Washington NASA Admin. Data Base Management Systems p 255-257 Jan. 1983
Avail: NTIS HC A13/MF A01 CSCL 05B

The Shuttle Program Information Management System (SPIMS) is a computerized data base operations system. The central computer is the CDC 170-730 located at Johnson Space Center (JSC), Houston, Texas. There are several applications which have been developed and supported by SPIMS. A brief description is given. B.W.

N83-20812# Comptroller General of the United States, Washington, D.C.
GREATER EMPHASIS ON INFORMATION RESOURCE MANAGEMENT IS NEEDED AT THE FEDERAL AVIATION ADMINISTRATION
24 Nov. 1982 71 p
(GAO/RCED-83-60) Avail: NTIS HC A04/MF A01

Centralization of FAA management of information resources is recommended. Development of a DOT computer capacity and workload management program is also recommended. Author

N83-21809# National Center of Scientific and Technological Information, Tel Aviv (Israel).
DEVELOPMENT OF MINICOMPUTERS IN AN ENVIRONMENT OF SCIENTIFIC AND TECHNOLOGICAL INFORMATION CENTERS (DOMESTIC): A MINICOMPUTER-BASED INFORMATION HANDLING SOFTWARE PACKAGE Final Report, Dec. 1981
Y. OMER and H. E. SEELBACH (KTS Informations-Systeme GmbH) Bonn Bundesministerium fuer Forschung und Technologie Oct. 1982 160 p refs
(BMFT-FB-ID-82-005; ISSN-0170-8996) Avail: NTIS HC A08/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 32,50

DOMESTIC (Development of Minicomputers in an Environment of Scientific and Technological Information Centers) is a joint Israeli-German project for the application of minicomputers in information storage and retrieval. The DOMESTIC software package includes functions for online creation and updating of inhouse databases; assimilation of external databases; setting up, running and reformulating online database searches; viewing search results; printing the output in selected formats; and various tasks associated with the acquisition, cataloging and circulation phases of information center activities. The DOMESTIC system comprises at present programs for database management, online input of documents and thesaurus creation and maintenance, search and interactive dialog modules, a print generator, a library management module and various batach input modules. Author (ESA)

N83-21838# California Univ., Berkeley. Lawrence Berkeley Lab. Dept. of Computer Science and Mathematics.
DCN/SEEDIS: THE DISTRIBUTED COMPUTER NETWORK (DCN) AND SOCIO-ECONOMIC-ENVIRONMENTAL DEMOGRAPHIC INFORMATION SYSTEM (SEEDIS). AN INTRODUCTION TO THE DISTRIBUTED COMPUTER NETWORK
V. A. SVENTEK Sep. 1982 130 p
(Contract DE-AC03-76SF-00098)
(DE83-003541; LBL-PUB-3022) Avail: NTIS HC A07/MF A01

This introduction was designed to serve as support documentation for a five day course presented to DOL/ETA at Regional Offices by LBL staff. At these presentations, new users of the DCN receive instruction on the basic components of the VAX 11/780 minicomputers of which the DCN is comprised, including VMS (the VAX 11/780 Operating System), use of interactive terminals with VMS, an overview of the VMS directory structure, introduction to a text editor, and an introduction to Datatrieve (a data entry and retrieval system developed by Digital Equipment Corporation). Specific topics presented include: use of the terminal keyboard; logging on to VMS (the VAX 11/780 operating system); VMS directory structure; files manipulation; and introduction to datatrieve. DOE

N83-23203# Interior Dept., Washington, D.C. Office of Information Resources Management.
IRM (INFORMATION RESOURCES MANAGEMENT) LONG RANGE PLAN FY 1983-1987. VOLUME 1: EXECUTIVE SUMMARY Final Report
Aug. 1982 13 p
(PB83-113449) Avail: NTIS HC A02/MF A01; also available in set of 3 reports HC E99 as PB83-113431 CSCL 05B

A roadmap and strategy for improving information resources in support of the natural resources and other assets management responsibilities is outlined. GRA

N83-23204# Interior Dept., Washington, D.C. Office of Information Resources Management.
IRM (INFORMATION RESOURCES MANAGEMENT) LONG RANGE PLAN FY 1983-1987. VOLUME 2: PLAN OVERVIEW AND ENVIRONMENT Final Report
Aug. 1982 126 p 3 Vol.
(PB83-113456) Avail: NTIS HC A07/MF A01; also available in set of 3 reports HC E99 as PB83-113431 CSCL 05B

The goals and objectives, the planning process, and the planning environment are described for improving the Department of the Interior's information resources in support of departmental responsibilities for managing natural resources and other national assets. GRA

N83-23205# Interior Dept., Washington, D.C. Office of Information Resources Management.
IRM (INFORMATION RESOURCES MANAGEMENT) LONG RANGE PLAN FY 1983-1987. VOLUME 3: IRM PROJECTS AND FUNCTIONAL PLANS Final Report
Aug. 1982 316 p 3 Vol.
(PB83-113464) Avail: NTIS HC A14/MF A01; also available in set of 3 reports HC E99 as PB83-113431 CSCL 05B

The plan lays out the roadmap and strategy for improving the Department's information resources in support of the natural resources and other assets management responsibilities of the Interior Department. Bureau estimates of personnel and dollar resources to carry out the selected projects during each of the five years in the 1983-1987 planning period are presented. GRA

N83-25620# Pacific Northwest Lab., Richland, Wash.
A DECISION MAKING MODEL FOR THE RECOVERY OF USEFUL MATERIAL RESOURCES FROM WASTES
K. H. RISING, G. A. JENSEN, and V. F. FITZPATRICK Jun. 1982 14 p Presented at the 1982 Intern. Conf. of the Intern. Assoc. of Energy Econ., London, 28-30 Jun. 1982
(Contract DE-AC06-76RL-01830)
(DE82-019204; PNL-SA-10310; CONF-8206103-1) Avail: NTIS HC A02/MF A01

The recovery of valuable materials and the recycling of useful products from wastes generated in energy production and industrial processing are considered. The technical feasibility for recovery and recycle, including decontamination of nuclear-related materials, were proven and demonstrated. The economic feasibility depends on both the resale and strategic values of the material, the saving from reusing rather than disposing of the material, the reclamation cost, and other factors that may influence the incentive for recovery and recycle. A model to identify the economic and other incentives for the reclamation of useful material resources was developed. Using available data to quantify factors such as strategic and resale values, reclamation cost and disposal cost saving, this model calculates the incentive value consisting of the above factors and selects the appropriate reclamation option. Because this model is empirical, there are limitations to its application. However, within the boundary where the model was tested, it can be a useful tool for the decision maker to evaluate the economic feasibility of reclamation. DOE

N83-29386# National Materials Advisory Board, Washington, D. C.
TITANIUM: PAST, PRESENT, AND FUTURE Final Report
Jan. 1983 218 p refs
(Contract EDW-C-0008)
(PB83-171132; NMAB-392) Avail: NTIS HC A10/MF A01 CSCL 11F

The capabilities of the United States to meet current and anticipated needs for titanium and its alloys are assessed. The various production steps from ore through mill products are examined both historically and for their adequacy to meet perceived future demands. Bottlenecks throughout this production cycle are identified and promising solutions to problems are put forward. Encouraging evidence of recent U.S. private enterprise entrepreneurial activities is noted. End uses of titanium mill products are reviewed historically as a basis to anticipate future

developments and requirements. Technological opportunities and the role of innovation in the future of titanium are examined and several good prospects are perceived. The close relationship of U.S. government agencies with the U.S. titanium industry from its start three decades ago is reviewed. Recommendations are made that would permit the industry to serve the nation even better in the future. GRA

N83-30309# Naval Health Research Center, San Diego, Calif.
THE NAVY MENTAL HEALTH INFORMATION SYSTEM (NAMHIS): AN OVERVIEW Interim Report
R. B. CHAFFEE, G. D. BAKER, and D. KOLB Feb. 1983 27 p refs
(AD-A126087; NAVHLTHRSCHC-83-2) Avail: NTIS HC A03/MF A01 CSCL 05B

A standardized mental health recordkeeping system has been developed by the Naval Health Research Center to serve as a basis for a comprehensive, automated Navy Mental Health Information System (NAMHIS). The system is designed to collect and store information obtained in direct patient contacts to generate consultation reports and to perform administrative functions. An individual patient record is initiated when an individual first comes to an outpatient mental health clinic, and an Administrative/Encounter Form is completed. It contains basic demographic data and information about who referred the patient, reasons for referral, services provided, and disposition as well as clinician and clinic identifications. Each time an individual returns to the clinic a Follow-Up/Encounter Form is completed to record the service provided and the disposition. All data are entered into the computer via a terminal located in the clinic. From these data the following reports can be generated: Report of Consultation, Monthly Managerial Report, Monthly Quality Assurance Report, and Monthly Outpatient Morbidity Report. Initially, the system will be implemented on a fully automated basis is one clinic in the San Diego region. Future plans call for regionwide implementation and ultimately recommendations concerning Navywide implementation. GRA

N83-30318# Office of Technology Assessment, Washington, D.C.
MEDLARS AND HEALTH INFORMATION POLICY
Sep. 1982 150 p refs
(PB83-168658; OTA-TM-H-11; LC-82-600639) Avail: NTIS HC A07/MF A01 CSCL 05B

The National Library of Medicine's (NLM) role in the creation and distribution of computerized health related bibliographic informtion in light of the private sector's presence in this field and the public interest was examined. MEDLARS (Medical Literature Analysis and Retrieval System) and its effectiveness in disseminating bibliographic health related information is discussed. GRA

N83-31517*# National Aeronautics and Space Administration, Washington, D. C.
THE PLANNING AND CONTROL OF NASA PROGRAMS AND RESOURCES
Jul. 1983 42 p Supersedes NASA-TM-83090
(NASA-TM-85840; NAS 1.15:85840) Avail: NTIS HC A03/MF A01 CSCL 05A

The major management systems used to plan and control NASA programs and resources are described as well as their integration to form the agency's general management approach in carrying out its mission. Documents containing more detailed descriptions of the processes and techniques involved in the agency's major management systems are listed. A.R.H.

N83-31520# Naval Postgraduate School, Monterey, Calif. Dept. of Administrative Sciences.
RESOURCES MANAGEMENT SYSTEM (RMS): AN OVERVIEW M.S. Thesis
D. E. BRANDT Dec. 1982 76 p refs
(AD-A127199) Avail: NTIS HC A05/MF A01 CSCL 05A

This thesis provides a synopia of the resources management system (RMS) which is currently in use at many Navy shore activities. The information is presented in manual format so that it can be used as a guide to the RMS. The manual provides insight into the background of RMS and provides a concise view of RMS operations at the local command level. The manual is focused at the local command level because the greatest number of RMS participants are at that level. The overview highlights relationships within the systems and provides a view of the RMS reporting requirements. Author (GRA)

N83-31531# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).
USE OF SCIENTIFIC AND TECHNICAL INFORMATION IN THE NATO COUNTRIES
Mar. 1983 131 p refs In ENGLISH; partly in FRENCH Meeting held at Rome, 29-30 Sep. 1982
(AGARD-CP-337; ISBN-92-835-0325-2; AD-A130887) Avail: NTIS HC A07/MF A01

Organizational structure and operation of defense/aerospace information centers, typical services, and a coordinated information structure are discussed.

N83-31532# Dokumentationszentrum der Bundeswehr, Bonn (West Germany).
ORGANIZATIONAL STRUCTURE AND OPERATION OF DEFENCE AND AEROSPACE INFORMATION CENTERS IN THE FEDERAL REPUBLIC OF GERMANY
H. BRAUN and G. TITTLEBACH (Fachinformationszentrum Energie Physik Mathematik G.m.b.H., Eggenstein-Leopoldshafen, West Germany) *In* AGARD Use of Sci. and Tech. Inform. in the NATO Countries 9 p Mar. 1983
Avail: NTIS HC A02/MF A01

The objectives, tasks, users and services of both information centers are described in detail. The spectrum of information services covers the production of machine-readable databases, magnetic tape services, the publication of printed information services, online services, individual information services, like retrospective search and SDIs, and literature supply. Present development, efficiency, operational methods and techniques are discussed as well as the organizational structures, budgets, future trends and matters of cooperation. Author

N83-31533# Technisch Documentatie en Informatie Centrum voor de Krijgsmacht, The Hague (Netherlands).
ROYAL NETHERLANDS ARMED FORCES SCIENTIFIC AND TECHNICAL DOCUMENTATION- AND INFORMATION-CENTER (TDCK)
E. GRUETZMACHER *In* AGARD Use of Sci. and Tech. Inform. in the NATO Countries 17 p Mar. 1983 refs
Avail: NTIS HC A02/MF A01

The history; organization, tasks and authorizations; service rendering; user's circle and informations-sources; and recent internal developments of the Netherlands Armed Forces Scientific and Technical Documentation and Information Center (TDCK) are summarized. Author

N83-31534# Centro di Dokumentazione Tecnico-Scientifica della Difesa, Rome (Italy).
THE ITALIAN DEFENCE SCIENTIFIC AND TECHNICAL DOCUMENTATION CENTRE
G. MORELLI *In* AGARD Use of Sci. and Tech. Inform. in the NATO Countries 4 p Mar. 1983
Avail: NTIS HC A02/MF A01

The history of the Italian Defence Technical Scientific Documentation Center, its structure, sectorial organization, staff consistency and qualification, administration; its dependence,

authority and tasks; structural and operational inconveniences; and present services. Author

N83-31535*# National Aeronautics and Space Administration, Washington, D. C.
ORGANIZATIONAL STRUCTURE AND OPERATION OF DEFENSE/AEROSPACE INFORMATION CENTERS IN THE UNITED STATES OF AMERICA
H. E. SAUTER (Defense Technical Information Center, Alexandria, Va.) and L. N. LUSHINA *In* AGARD Use of Sci. and Tech. Inform. in the NATO Countries 23 p Mar. 1983 refs
Avail: NTIS HC A02/MF A01 CSCL 05B

U.S. Government aerospace and defense information centers are addressed. DTIC and NASA are described in terms of their history, operational authority, information services provided, user community, sources of information collected, efforts under way to improve services, and external agreements regarding the exchange of documents and/or data bases. Contents show how DTIC and NASA provide aerospace/defense information services in support of U.S. research and development efforts. In a general introduction, the importance of scientific and technical information and the need for information centers to acquire, handle, and disseminate it are stressed. Author

N83-31540# National Research Council of Canada, Ottawa (Ontario). Technical Information Service.
BENEFITS TO INDUSTRY (OF COORDINATED DEFENCE/AEROSPACE INFORMATION STRUCTURE)
J. CHANDER and G. KIROUAC *In* AGARD Use of Sci. and Tech. Inform. in the NATO Countries 7 p Mar. 1983
Avail: NTIS HC A02/MF A01

The need for and the sources of information for the defence aerospace industry are considered. Some of the problems that the industry faces are addressed and some of the services available in Canada are described. The issue of possible modifications to the present information system is raised in an attempt to find solutions to the perceived information problems. Author

N83-31541# Centre de Documentation de l'Armement, Paris (France).
ADVANTAGES GAINED BY THE GOVERNMENT FROM A COORDINATION OF DEFENSE-AEROSPACE INFORMATION
C. PAOLI *In* AGARD Use of Sci. and Tech. Inform. in the NATO Countries 8 p Mar. 1983 refs
Avail: NTIS HC A02/MF A01

The benefits derived by government authorities from the coordination of information in the sectors of defense and aerospace are described through the organization of the French Armament Documentation Center (CEDOCAR) as regards bibliographic and factual information, the Research Design and Engineering Directorate (DRET), and its Contractors as regards information relating to research programs. Data flows and transfers within the structures of these agencies are analyzed. Author

N83-32655# Comptroller General of the United States, Washington, D.C.
BETTER USE OF INFORMATION TECHNOLOGY CAN REDUCE THE BURDEN OF FEDERAL PAPERWORK
General Accounting Office 11 Apr. 1983 49 p *refs*
(GAO/GGD-83-39; B-210393) Avail: NTIS HC A03/MF A01

Four data collection activities were reviewed as case studies to determine the potential benefits associated with information technology. In addition, GAO assessed OMB's policies and procedures in this area. GAO found that increased use of information technology would reduce Federal paperwork burden and improve the efficiency of the data collection activities reviewed. Author

N83-32656# Comptroller General of the United States, Washington, D.C.
IMPLEMENTING THE PAPERWORK REDUCTION ACT: SOME PROGRESS, BUT MANY PROBLEMS REMAIN
General Accounting Office 20 Apr. 1983 69 p refs
(GAO/GGD-83-35; B-180224) Avail: NTIS HC A04/MF A01

Paperwork burden reduction, policy and management decisions, and limited progress are discussed. Author

N83-33789# Committee on Science and Technology (U. S. House).
US SCIENCE AND ENGINEERING EDUCATION AND MANPOWER: BACKGROUND; SUPPLY AND DEMAND; AND COMPARISON WITH JAPAN, THE SOVIET UNION AND WEST GERMANY
E. F. COOPER Washington GPO 1983 271 p refs Presented to the Subcomm. on Sci., Res. and Technol. of the Comm. on Sci. and Technol., 98th Congr., 1st Sess., Apr. 1983 Prepared by the Library of Congr., Congr. Res. Serv.
(GPO-19-177) Avail: Subcommittee on Science, Research and Technology

Scientific and technical education in the United States as it relates to the supply and demand of science and engineering manpower; scientific and technical education in Japan, the Soviet Union, and West Germany; potential directions for science and engineering manpower; the supply of Department of Defense scientists and engineers in the United States and a history of Congressional concern and some actions taken by the National Science Foundation related to science and engineering education are addressed. Author

N83-35697# Oak Ridge Y-12 Plant, Tenn.
EVALUATING WORD-PROCESSING SYSTEMS
C. A. REEVES, JR. Apr. 1983 45 p refs Presented at the East Tenn. Chapter of ARMA Admin. Management and Inform. Systems Conf., Knoxville, Tenn., 28-29 Apr. 1983
(Contract W-7405-ENG-26)
(DE83-012392; Y/DL-871; CONF-830479-1) Avail: NTIS HC A03/MF A01

An overview is given on how to evaluate word-processing systems running on mall computers and central processors, or as stand-alone systems. Software is compared, and details are given on features the author feels are important in any word processing system, both stand-alones and on computer systems. A brief account is given on how word processing can be used in the records management environment. DOE

N83-35950# Office of Management and Budget, Washington, D. C.
MANAGING FEDERAL INFORMATION RESOURCES (PAPERWORK REDUCTION ACT OF 1980) Annual Report
Apr. 1983 47 p refs
(PB83-195065) Avail: NTIS HC A03/MF A01 CSCL 05B

It is shown that OMB and the agencies are making substantial *progress in achieving improved information resource management* within the Federal Government and reduced information collection burdens on the private sector and other levels of government. The Act and its administration by OMB recognize that the production and use of information have costs as well as benefits and that there are economies to be gained by improved information management. GRA

N83-36995# Texas A&M Univ., College Station. Coll. of Business Adminstration.
INFORMATION RICHNESS: A NEW APPROACH TO MANAGERIAL BEHAVIOR AND ORGANIZATION DESIGN
R. L. DAFT, R. H. LENGEL, and R. GRIFFIN May 1983 73 p refs
(Contract N00014-83-C-0025; NR PROJ. 170-950)
(AD-A128980; TR-ONR-DG-02) Avail: NTIS HC A04/MF A01 CSCL 05B

This paper introduces the concept of information richness, and proposes three models of information processing. The models

describe (1) manager information behavior, (2) organizational mechanisms for coping with equivocality from the environment, and (3) organizational mechanisms for internal coordination. Concepts developed by Weick (1979) and Galbraith (1973) are integrated into two information tasks: equivocality reduction and the processing of a sufficient amount of information. The premise of this paper is that the accomplishment of these information tasks and the ultimate success of the organization are related to the balance of information richness used in the organization.
GRA

N83-37000# Air War Coll., Maxwell AFB, Ala.
INFORMATION OVERLOAD: THE ARMY'S FAILURE TO MANAGE A RESOURCE
R. D. WHITSETT 21 Apr. 1983 78 p refs
(AD-A129989) Avail: NTIS HC A05/MF A01 CSCL 05A

Information is a valuable resource of Headquarters, Department of the Army (HQDA). This fact is evidenced by HQDA's extensive reporting requirements levied on the field, its many complex management information systems, and its large investment in data processing equipment, software, and personnel. In fact, the primary function of HQDA, as the major planning and resource management activity of the Army, is centered about the acquisition, distribution, processing, storage, use, and dissemination of information. This paper explores the Army's attempts to manage its information systems as a valuable resource; provides a historical perspective on the subject; examines the Army's present information management systems; and, supplies some insight on the future of information resource management in the Army. The paper concludes that in the past three decades the Army's top management has not been sincerly committed to the development of an Information Resource Management program. GRA

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MANAGEMENT OF R&D

Includes project and program management; agency, national, and international overviews; and R&D productivity.

A83-12851
AERONAUTICAL RESEARCH - SOME CURRENT INFLUENCES AND TRENDS /THE SECOND SIR FREDERICK PAGE LECTURE/
J. CHARNLEY (Ministry of Defence, London, England) Aeronautical Journal, vol. 86, Oct. 1982, p. 283-293.

An attempt is made to assess major influences affecting British defence procurement with emphasis on defence-related research. It is noted that the growth of technology and consequent increasing capability for the design of increasingly potent weapons systems has led to costly and extended R & D programs. A new system costs the same to develop, however, whether hundreds of units or only one is produced. Since the number of production units that can be afforded has been falling, the proportion of defence budgets spent on R & D shows a long term tendency to increase, and currently stands at about 30% of the British defence budget. This leads to a desire on the part of governments to procure off-the-shelf items not requiring development expenditures. Attention is given to the appropriation of new RAF equipment and the retirement of obsolescent systems, as well as planning research, the influence of fuel costs, and changes in research and procurement direction and emphasis. O.C.

A83-13716* National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
FIRST SPACELAB MISSION STATUS AND LESSONS LEARNED
H. G. CRAFT, JR. (NASA, Marshall Space Flight Center, Spacelab Payload Projects Office, Huntsville, AL), M. J. SMITH (NASA, Spacelab Flight Div., Washington, DC), and D. MULLINGER (ESA, Cologne, West Germany) In: NASA-ESA Spacelab systems and programs; Proceedings of the Seminar, Washington, DC, April 23, 24, 1981. Bellingham, WA, SPIE - The International Society for Optical Engineering, 1982, p. 124-133.

There are 38 experiments and/or facilities currently under development, or undergoing testing, which will be incorporated into Spacelab for its first mission. These experiments cover a range of scientific disciplines which includes atmospheric research, life sciences, space plasma research, materials science, and space industrialization technology. In addition to the full development of individual experiments, the final design of the integrated payload and the development of all requisite integration hardware have been accomplished. Attention is given to the project management lessons learned during payload integration development. O.C.

A83-18963
THE ROLE OF THE RESEARCH ESTABLISHMENTS IN THE DEVELOPING WORLD OF AEROSPACE
T. H. KERR (Royal Aircraft Establishment, Farnborough, Hants., England) Aeronautical Journal, vol. 86, Dec. 1982, p. 359-369.

The role of defence R&D establishments in the developement of a weapon system is more complex and less publicized than their pure research role. Attention is given to the chronology of R&D management in Britain, including the duration and percentage cost of the main stages in project development. A draft target for the functions and performance of a new weapon system is generated through interactions of the Service Staffs and feasibility study researchers in the R&D establishments. After operational analyses have led to approval, the Systems Controller coordinates and funds the intramural and extramural work required for the feasibility study to establish project costs and time scales. If the study confirms project feasibility, a staff requirement describing the functions, performance and operating environment of the weapons system is prepared. As development work proceeds, R&D establishment involvement diminishes. Case studies of this process are given which include helicopter agility development, helicopter rotor design, an air combat simulator, a missile demonstrator, a thermal imaging system, and the operational analysis of land/air engagements. O.C.

A83-20648*# Martin Marietta Aerospace, Denver, Colo.
THE SPACE SHUTTLE FOCUSED-TECHNOLOGY PROGRAM - LESSONS LEARNED
P. E. FITZGERALD, JR. (Martin Marietta Aerospace, Michoud Div., Denver, CO) and E. A. GABRIS (NASA, Office of Aeronautics and Space Technology, Washington, DC) Astronautics and Aeronautics, vol. 21, Feb. 1983, p. 60-67, 72.

The results of a focused technology program (FTP), its management structure, the development of the Space Shuttle, and lessons applicable to future space programs such as a space station are discussed. A committee was formed by NASA in 1969 to define the technologies necessary for a reusable spacecraft. Basic and applied research assessments were featured at the beginning of the process. Working groups were established to cover all necessary areas, e.g., Operations, Structures and Materials, Aerothermodynamics, etc., and tasks were distributed to appropriate NASA centers. Funding was drawn from existing budgets. The FTP proceeded successfully because of an understanding of the respective roles of industry and government, the willingness of industry to invest early in a new technology, and the unclassified status of information generated by the program. The in-house design and technology transfer methods that brought the project to a technology demonstration phase are explored, noting the necessity for users to take part in the development within their field. D.H.K.

A83-23372
THE ROLE OF ADVANCED NAVIGATION IN FUTURE AIR TRAFFIC MANAGEMENT
R. C. RAWLINGS (Royal Aircraft Establishment, Farnborough, Hants., England) Journal of Navigation, vol. 36, Jan. 1983, p. 37-53.

Attention is called to the trend whereby the separate parts of an operational system are improved without properly evaluating the interactions between the parts, in particular the interaction between air traffic control and the flight deck. It is stressed that unless this aspect is studied, it is likely that the full capability of the system for improving the safety and economy of operation will not be fully realized. Potential improvements in plan navigation, vertical profile management, and time control are examined, together with the developments that will be needed to achieve them and the implications that this would have on the air traffic management of the future. It is shown that at present the problem rests not in the capability of the machine in performing the task but in the communication with the machine by the pilot and air traffic controller. C.R.

A83-24174#
STATUS OF THE SPACELAB PROGRAM [STATUS DES SPACELAB PROGRAMMS]
A. KUTZER (ERNO Raumfahrttechnik GmbH, Bremen, West Germany) Deutsche Gesellschaft fuer Luft- und Raumfahrt, Jahrestagung, Stuttgart, West Germany, Oct. 5-7, 1982, 51 p. In German.
(DGLR PAPER 82-059)

In June 1974, the European Space Agency (ESA) commissioned an industrial consortium under the direction of a German aerospace company with the development of Spacelab. This space laboratory is to provide scientists and engineers with the possibility to conduct experiments and manufacturing processes for which the physical conditions in space (weightlessness and vacuum) are important. The development program for Spacelab in Europe could be concluded eight years after this commission has been awarded. It is expected that the Orbiter 'Challenger' together with Spacelab will be launched for the first seven-day mission on September 30, 1983. A description is presented of the development phase, taking into account technology, management, scheduling, and cost factors. G.R.

A83-24355*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
CONTROL - DEMANDS MUSHROOM AS STATION GROWS
S. Z. SZIRMAY (California Institute of Technology, Jet Propulsion Laboratory, Pasadena, CA) and J. BLAIR (NASA, Marshall Space Flight Center, Huntsville, AL) Astronautics and Aeronautics, vol. 21, Mar. 1983, p. 46-49.

The NASA space station, which is presently in the planning stage, is to be composed of both rigid and nonrigid modules, rotating elements, and flexible appendages subjected to environmental disturbances from the earth's atmospheric gravity gradient, and magnetic field, as well as solar radiation and self-generated disturbances. Control functions, which will originally include attitude control, docking and berthing control, and system monitoring and management, will with evolving mission objectives come to encompass such control functions as articulation control, autonomous navigation, space traffic control, and large space structure control. Attention is given to the advancements in modular, distributed, and adaptive control methods, as well as system identification and hardware fault tolerance techniques, which will be required. O.C.

A83-24357*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
SYSTEMS AND OPERATIONS - LIVING WITH COMPLEXITY AND GROWTH
W. R. HOOK (NASA, Langley Research Center, Hampton, VA) Astronautics and Aeronautics, vol. 21, Mar. 1983, p. 53-55.

Since the space station concept currently being developed by NASA calls for system updates and additions over a period of at least ten years following launch, attention must be given to the interfaces between station elements. Efforts have begun to develop generic fault detection, isolation, and correction techniques that could simplify on-orbit operations, maintenance and repair. An integrated hydrogen-oxygen system has been identified as the feature promising the greatest reduction in resupply costs. Scavenging excess fuel from the Space Shuttle's internal and external tanks, and using leftover Shuttle payload for fluid tankage, could supply hydrogen and oxygen for consumption in the form of propellants, fuel cell electricity, and life support gases. Advancements in cryogenic fluid management and storage technology are the keys to the design of this integrated system. Attention is given to the Interactive Design and Evaluation of Advanced Spacecraft computer-aided design and analysis system, which allows system engineers to study the integration problems presented by 40 technical modules. O.C.

A83-27326*# National Aeronautics and Space Administration, Washington, D. C.
THE NASA PROGRAM IN SPACE ENERGY CONVERSION RESEARCH AND TECHNOLOGY
J. P. MULLIN, D. J. FLOOD, J. H. AMBRUS, and W. R. HUDSON (NASA, Washington, DC) In: IECEC '82; Proceedings of the Seventeenth Intersociety Energy Conversion Engineering Conference, Los Angeles, CA, August 8-12, 1982. Volume 5. New York, Institute of Electrical and Electronics Engineers, 1982, p. 2150-2162.

The considered Space Energy Conversion Program seeks advancement of basic understanding of energy conversion processes and improvement of component technologies, always in the context of the entire power subsystem. Activities in the program are divided among the traditional disciplines of photovoltaics, electrochemistry, thermoelectrics, and power systems management and distribution. In addition, a broad range of cross-disciplinary explorations of potentially revolutionary new concepts are supported under the advanced energetics program area. Solar cell research and technology are discussed, taking into account the enhancement of the efficiency of Si solar cells, GaAs liquid phase epitaxy and vapor phase epitaxy solar cells, the use of GaAs solar cells in concentrator systems, and the efficiency of a three junction cascade solar cell. Attention is also given to blanket and array technology, the alkali metal thermoelectric converter, a fuel cell/electrolysis system, and thermal to electric conversion. G.R.

A83-30021* Hawaii Univ., Honolulu.
A PROGRAM FOR PLANETARY EXPLORATION
D. MORRISON (Hawaii, University, Honolulu, HI) and N. W. HINNERS (NASA, Goddard Space Flight Center, Greenbelt, MD) Science (ISSN 0036-8075), vol. 220, May 6, 1983, p. 561-567. refs

A series of recommendations constituting a core program for planetary exploration, to last from the present to the year 2000, is the outcome of a two-year study undertaken by the NASA Solar System Exploration Committee. The missions envisioned by the core program must be insulated from costly changes and delays once they are approved. The present Committee has therefore restricted its recommendations to missions which do not require novel technologies, but rather continue the techniques of the flybys, orbiters and atmospheric entry probes that have been successful in the past. Recommendations are made for exploration of the inner planets, cometary and asteroid bodies, and the outer planets. Attention is given to the identification of key elements driving mission costs. It is noted that the Space Shuttle/Centaur upper stage combination brings within reach comet and asteroid rendezvous missions that were once thought to require costly new technology. O.C.

A83-30274#
STRUCTURE AND ORGANIZATIONAL MECHANISM OF THE INTERCOSMOS PROGRAM [STRUKTURA I ORGANIZATSIONEN MEKHANIZ'M NA PROGRAMATA 'INTERKOSMOS']
K. SERAFIMOV B'lgarska Akademiia na Naukite, Spisanie (ISSN 0007-3989), vol. 29, no. 1, 1983, p. 60-66. In Bulgarian. refs

The origins, historical background, and activities of the Intercosmos Program are described. Three diagrams pertaining to the structure and organizational mechanism of the Intercosmos Program are presented and discussed: (1) a diagram illustrating the participation of Bulgaria in the program; (2) the structure of the overall Intercosmos Program; and (3) the structure of space-physics projects within the Program. B.J.

A83-31943
INERTIAL UPPER STAGE - UPGRADING A STOPGAP PROVES DIFFICULT
J. P. GEDDES Interavia (ISSN 0020-5168), vol. 38, 1983, p. 466-468.

The technological and project management difficulties associated with the Inertial Upper Stage's (IUS) development and performance to date are assessed, with a view to future prospects for this system. The IUS was designed for use both on the interim Titan 34D booster and the Space Shuttle Orbiter. The IUS malfunctions and cost overruns reported are substantially due to the system's reliance on novel propulsion and avionics technology. Its two solid rocket motors, which were selected on the basis of their inherent safety for use on the Space Shuttle, have the longest burn time extant. A three-dimensional carbon/carbon nozzle throat had to be developed to sustain this long burn, as were lightweight composite wound cases and shirts, insulation, igniters, and electromechanical thrust vector control. O.C.

A83-32179
UNITED STATES FEDERAL PHOTOVOLTAIC PROGRAM STATUS
M. B. PRINCE and A. L. BARRETT, JR. (U.S. Department of Energy, Photovoltaic Energy Technology Div., Washington, DC) IN: Photovoltaic Solar Energy Conference; Proceedings of the Fourth International Conference, Stresa, Italy, May 10-14, 1982 . Dordrecht, D. Reidel Publishing Co., 1982, p. 20-27.

Program features of the DoE R and D efforts to increase the efficiency and stability of photovoltaic (PV) systems are outlined, including cooperative work with European organizations. The minimum goals for laboratory-scale devices are a 10 pct efficiency, reproducibility, stability, and potential for low cost production. Research is carried out on thin film materials, multi-bandgap cells, concentrators, the physics of amorphous materials and electrochemicial mechanisms, and metrology of surface and subsurface properties. Cost thresholds considered as satisfactory are $0.70/Wp for Si materials and $0.40/Wp for non-Si systems. Work is proceeding with the European community to establish performance criteria and standards, consultation for design review, and arrangements for formal visits between government officials, scientists, and industrial managers. M.S.K.

A83-35060
DEVELOPMENT OF THE 'NEOVA' LIGHT HOVERCRAFT SERIES
J. C. FITZGERALD (Neoteric USA, Inc., Terre Haute, IN) and R. K. WILSON (Neoteric Engineering Affiliates Pty., Ltd., Australia) IN: Canadian Symposium on Air Cushion Technology, 15th, Toronto, Canada, September 29, 30, 1981, Proceedings . Ottawa, Canadian Aeronautics and Space Institute, 1981, p. 209-221, 223-236.

The design and production process for the Neova lightweight hovercraft series is detailed, with attention given to market identification. The process began in the 1960s, with concern being concentrated on the reliability, stability, noise level, ride comfort, structural strength and weight, and potential markets. Design specifications included the ability to market the design as a build-it-yourself kit, accompanied by factory production of parts and entire units; the resulting product was to be an all-terrain vehicle. Scale model testing was performed to study thrust, stability, and control effectiveness. Attention was given to salt corrosion prevention, engine waterproofing, and noise suppression. The Neova II, the most advanced model to date, is 14 ft long, has a 4 cylinder 4 stroke engine, and weighs 200 lb. The ACVs are now intended for recreational, explorational, and transport use, with both larger and smaller versions in development. Fans have been chosen for propulsion to reduce noise and improve control, and a cellular skirt has proven long-lasting in application. M.S.K.

A83-36463#
PROPULSION PROTOTYPES AT GENERAL ELECTRIC
T. F. FOY (General Electric Co., Lynn, MA) IN: Aircraft Prototype and Technology Demonstrator Symposium, Dayton, OH, March 23, 24, 1983, Proceedings . New York, American Institute of Aeronautics and Astronautics, 1983, p. 73-82. 10 p.
(AIAA PAPER 83-1053)

Development histories are presented for proprietary programs of military gas turbine engine development, with comparisons being conducted to indicate the unique character of each such effort. The engines in question are the YJ101, which served as prototype for the F404, the F101/DFE, which was the prototype of the F110 engine, the GE12 technology demonstrator for the T700, and the TF34 engine. The development programs fall into the categories of prototype, technology demonstrator and/or full scale development. Attention is given to engine program management interaction with airframe development. O.C.

A83-39844
EARTH SURVEY SATELLITES AND COOPERATIVE PROGRAMS
E. A. GODBY, J. C. HENEIN, and W. BRUCE (Canada Centre for Remote Sensing, Ottawa, Canada) (COSPAR and Committee on Science and Technology for Developing Countries, Workshop on Role and Impact of Space Research in Developing Countries, Ottawa, Canada, May 16-June 2, 1982) Advances in Space Research (ISSN 0273-1177), vol. 3, no. 7, 1983, p. 149-151. Research supported by the Canadian International Development Agency.

This paper will examine three projects which took very different approaches to the problem of assisting other countries to use the information from earth orbiting satellites in resource management. These programs are a bilateral program with Peru; a multilateral program in West Africa, and a program with very modest funding compared to the other two which allowed experimentation in five countries to receive training and carry out national remote sensing projects. Author

A83-40880
RADIONAVIGATION IN THE YEAR 2001 [LA RADIONAVIGATION EN L'AN 2001]
D. C. SCULL (U.S. Department of Transportation, Washington, DC) (International Omega Association, Annual Meeting, Arlington, VA, Oct. 12-14, 1982) Navigation (Paris) (ISSN 0028-1530), vol. 31, July 1983, p. 309-317. In French.

The precision, economic driving forces, planning, administration, and users of radionavigation system at the turn of the century are discussed. Congressional legislation was passed in 1979 to combine DoD and DoT efforts to produce a radionavigation system for both air and maritime transport, accessible to military and civilian craft. Particular attention is being given to replacement of VOR/DME, Loran-C, and Omega systems with the Navstar/GPS. Precision criteria have been defined for oceanic and air transport en route, for terminal approach, for nonprecision approach, and for horizontal and vertical distances, showing that Navstar is not precise enough for landing approaches. It is not yet known whether or not inertial navigation systems can be developed that allow navigation without references to outside reference sources. Additionally, if the U.S. initiates development of internationally acceptable systems, decisions and agreements must still be made as to the distribution of costs, availability, and the problems of sharing military technology with civil traffic. M.S.K.

A83-41298
QUANTITATIVE INDICATORS FOR EVALUATION OF BASIC RESEARCH PROGRAMS/PROJECTS
J. D. FRAME (George Washington University, Washington, DC) (Institute of Electrical and Electronics Engineers, National Engineering Management Conference, Washington, DC, June 13, 1982) IEEE Transactions on Engineering Management (ISSN 0018-9391), vol. EM-30, Aug. 1983, p. 106-112. refs

The use of quantitative measures of publishing activity in evaluating scientific research programs is discussed. The techniques considered include publication counts (based on data supplied by the scientists themselves, on manual searches of selected journals, on manual counts from abstract collections and indexes, or on computerized counts) and citation analysis, with and without citation-weighting schemes. It is shown that these quantitative measures are most useful for evaluating the long-term basic-research performance of groups of scientists or of programs, rather than individuals, in order to develop appropriate improvement strategies. The importance of identifying adequate control or comparison groups and of careful data collection is stressed, and the limitations inherent in a quantitative approach are considered. Sample analyses are shown, and a table listing average yearly publication and coauthorship rates by scientific field is provided. T.K.

A83-41303
THE MANAGEMENT OF FEDERAL RESEARCH PROGRAMS. I - VARIATIONS IN TECHNIQUES. II - PATTERNS OF MANAGEMENT
J. SALASIN and H. BREGMAN (Mitre Corp., McLean, VA) IEEE Transactions on Engineering Management (ISSN 0018-9391), vol. EM-30, Aug. 1982, p. 156-168. refs
(Contract NIH-5R12-MH-26058)

The responses of 215 managers of U.S. govermenment basic and applied research programs to survey questionnaires regarding planning and evaluation techniques are analyzed statistically. Data were collected on program funding and staffing, area and type of research, project-selection mechanism, objective-identification techniques, program-planning processes, use of quantitative methods in program evaluation, dissemination and application of results, importance of intramural versus extramural projects, and the location of the program in a government agency. It is determined that management techniques correlate weakly with the type of research (basic, exploratory, or applied), the scientific field, the degree to which the administration of the program is 'from the top down', and the closed-loop versus open-loop pattern of results dissemination. The most important finding is that differences in management techniques are positively correlated with differences in the agency affiliation of the program (p less than or equal to 0.05 on seven of eight scales of management parameters). T.K.

A83-42087*# National Aeronautics and Space Administration, Washington, D. C.
PRODUCTIVITY IN AN EVOLUTIONARY SPACE STATION
J. L. ANDERSON and R. F. CARLISLE (NASA, Washington, DC) American Institute of Aeronautics and Astronautics and NASA, Symposium on the Space Station, Arlington, VA, July 18-20, 1983. 7 p.
(AIAA PAPER 83-7103)

Space station productivity is treated from a systems point of view, considering the functions and attributes of space station development, formation, and operation that affect productivity. An optimum planning method is needed to assure that the station will have mission flexibility, technology advancement, maintainability, and evolutionary capability. Advanced technology will be designed into the housekeeping and utility functions of the station. Greater risk taking may be allowed into designs if the potential benefits of the advanced system support the risk, and if the system can be buffered from causing a failure cascade throughout the station. A common data base is needed to store and track all designs, developments, and changes in the station subsystems. Systems that can be automated and free the human inhabitants for more productive work are favored, as are modular components that are highly fault-free. Human control must also be possible, especially during check-out and verification, and also for teaching the automated systems new or modified tasks. M.S.K.

A83-42089*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
SPACE STATION INFORMATION SYSTEMS
W. L. SWINGLE (NASA, Johnson Space Center, Avionics Systems Div., Houston, TX) and C. W. MCKAY (Houston, University, Clear Lake, TX) American Institute of Aeronautics and Astronautics and NASA, Symposium on the Space Station, Arlington, VA, July 18-20, 1983. 9 p. refs
(AIAA PAPER 83-7105)

The space operations information system is defined and characterized in a wide perspective. Interactive subsets of the total system are defined and discussed. Particular attention is paid to the concept of end-to-end systems and their repetitive population within the total system. High level program goals are reviewed and related to more explicit system requirements and user needs. Emphasis is placed on the utility and cost effectiveness of data system services from a user standpoint. Productivity, as a quantitative goal, in both development and operational phases is also addressed. Critical aspects of the approach to successful development of the data management system are discussed along with recommendations important to advanced development activities. Current and planned activity in both technology and advanced development areas are reviewed with emphasis on their importance to program success. Author

A83-42620
UNIVERSITIES - HAVE THEY A ROLE IN AERONAUTICAL RESEARCH? CONTRIBUTION TO RAES DISCUSSION EVENING
A. D. YOUNG (Queen Mary College, London, England) Aeronautical Journal (ISSN 0001-9240), vol. 87, June-July 1983, p. 225-228.

The importance of university research in other countries is surveyed, with attention given to the US, Germany, France, and Holland. The absence of effective machinery in the UK for coordinating university research resources as part of a national program and arousing and sustaining the interests of university staff in the problems of industry is lamented. The abolition of the Aeronautical Research Council is regarded as an error. The staff of the university departments that formerly played an active role in aerospace research find themselves at a loss. They are in the dark as to the overall national research program and are increasingly uncertain where the important problems lie and what contributions they can make. Reconstituting the research council is seen as the ideal solution. In the meantime, it is recommended that the Royal Aeronautical Society follow the example of AIAA in the US in calling attention to key problems and setting up working groups to investigate them. C.R.

A83-43761#
25 YEARS OF NASA - REFLECTIONS AND PROJECTIONS-APPLICATIONS
L. JAFFE American Astronautical Society, Goddard Memorial Symposium, 21st, Greenbelt, MD, Mar. 24, 25, 1983. 9 p. refs
(AAS PAPER 83-153)

NASA contributions to world communications, meteorological forecasting, and remote sensing activities in the first 25 yr of NASA existence are reviewed, with projections of future programs. International negotiations to share costs, operations, benefits, and profits from communications satellites began in 1961 and led to the formation of Intelsat, which now has over 60,000 telephone circuits, handles 35,000 hr of television per year, operates at 99.9 percent availability, and represents a $1 billion investment. Global communications satellite systems are expected to reach an $18 billion investment by the year 2000, and include navigation and search and rescue data available to aircraft and ocean vessels. Meteorological spacecraft, the first launched in 1960, have increased forecasting confidence out to nearly five days. Landsat

MSS data has proven useful for geological mapping, crop forecasting, urban studies, land use planning, water management, and map making. Remote control of computerized ocean vessels is feasible, and experimentation is proceeding on materials processing in space. M.S.K.

A83-45601
SPACE TECHNOLOGY - APOLLO: THE DRIVER AND THE DRIVEN
E. HERBERT IEEE Spectrum (ISSN 0018-9235), vol. 20, Sept. 1983, p. 56-58.

Managerial aspects of the development of the technologies necessary for the Apollo program are reviewed, including the advent of NASA interactions with higher education. The Apollo program received substantial funding and permitted each NASA center to have an in-house systems engineering team. Problems were solved by dedicating multiple engineering groups to work on different solution approaches. Reliability was assured by setting up multiple and redundant production lines. Feedback lines were established between the astronauts and the engineers-designers, a process that has continued to the present day with the development of the Shuttle. Finally, NASA began funding doctoral studies at universities with programs that included space studies, thus ensuring that PhD candidates were working at facilities which matched their developing expertise. M.S.K.

A83-45606
SPACE TECHNOLOGY - SUPERPROJECT MANAGEMENT
E. HERBERT IEEE Spectrum (ISSN 0018-9235), vol. 20, Sept. 1983, p. 68, 69.

The growth of NASA was explosive during the 1960s, when the lunar project and space race objectives became increasingly politicized. NASA had about 17,000 employees by 1960, interfacing with 60,000 people in various industries. Major development areas were systems integration, i.e., minimizing the connections between the spacecraft and launch vehicle, establishing the guidance and communications ground segments, designing separate command and excursion modules, and assuring safety and repairability. The Apollo guidance and navigation computer, as well as other systems, were designed with strong feedback from the astronauts, a process enhanced by the development of a large data base and remote access terminals. The introduction of redundant computer systems was a key factor in the survival of the astronauts on the Apollo 13 mission. M.S.K.

A83-45612
THE FUTURE OF SPACE - NASA'S DUAL CHALLENGE: SERVING YET STRIVING
J. M. LOGSDON (George Washington University, Washington, DC) IEEE Spectrum (ISSN 0018-9235), vol. 20, Sept. 1983, p. 86-89.

Factors influencing NASA's changing goals are discussed. At the time of the Apollo 11 launch, programs were proposed for a 50-100 person space station by 1980, a permanent moon base, an unmanned grand tour of the planets, a manned mission to Mars in the 1980s, and the development of an earth to low orbit reusable vehicle. NASA is currently being constrained more to design to cost, and to upgrade its research centers to continue to attract and hold competent technical personnel. The Shuttle was originally intended to service a space station in LEO. The space station is viewed as the most promising program that could be acceptable politically and be put to multiple uses, provided that NASA can successfully integrate activities with the private sector. An adjunct to this requirement is that NASA research and development efforts have been determined to be key factors in the continuance of U.S. technical and economic competitiveness in the world. M.S.K.

A83-46929
RESEARCH AND DEVELOPMENT OF HELICOPTERS IN EUROPE
B. STEVERDING (U.S. Army, Washington, DC) Vertiflite (ISSN 0042-4455), vol. 29, Sept.-Oct. 1983, p. 36-39.

Industrial and government research practices for helicopters in Europe and the U.S. are compared. In Europe, four aerospace companies have the capability of designing and producing new machinery to specification for the military. Off-the-shelf components are used almost exclusively in order to reduce risk, resulting in uniformity of product, obslescence at the start of production, and consultation with university expertise only on vexatious problems. Government contracts are issued to academic groups for long-term research in specific areas. Research done at the European governments' centers is not systems oriented, and often involves individuals' continuing interest in particular topics. It is concluded that European research is devoted more to continuity than innovation, while the overall levels of competence and techniques are equivalent to those of U.S. researchers and facilities. European ideas and methods are pooled between governments and industrial concerns at a rate sufficient to maintain a critical mass of creative activity. The recent U.S. policy on limiting technical information exchange with Europe is suggested to be detrimental. D.H.K.

A83-47259#
THE PROGRAM MANAGEMENT OF THE TELESAT SPACE SEGMENT (A PROGRAM MANAGER'S RECOLLECTIONS)
J. S. KORDA (Telesat Canada, Ottawa, Canada) International Astronautical Federation, International Astronautical Congress, 34th, Budapest, Hungary, Oct. 10-15, 1983. 4 p.
(IAF PAPER 83-85)

A83-47330#
THE REACTION MOTORS DIVISION - THIOKOL CHEMICAL CORPORATION
F. I. ORDWAY (Alabama Space and Rocket Center, Huntsville, AL) and F. H. WINTER (National Air and Space Museum, Washington, DC) International Astronautical Federation, International Astronautical Congress, 34th, Budapest, Hungary, Oct. 10-15, 1983. 6 p. refs
(IAF PAPER 83-289)

A description is presented of the administrative history of the considered division, taking into account developments until June 1972 when the division came to a formal end. The various projects undertaken by this organization are discussed, giving attention to prepackaged engines for Navy air-launched missiles, the X-15 research aircraft, vernier units for Surveyor spacecraft, and other vernier developments. It is pointed out that the division was at a disadvantage with competitors in the western states who were free to test their rockets in areas remote from heavily populated centers. G.R.

A83-47334#
PROJECT ROVER - THE UNITED STATES NUCLEAR ROCKET PROGRAM
J. A. DEWAR (U.S. Department of Energy, Washington, DC) International Astronautical Federation, International Astronautical Congress, 34th, Budapest, Hungary, Oct. 10-15, 1983. 8 p.
(IAF PAPER 83-301)

The U.S. Rover nuclear rocket program, which ran from the mid-1950s to 1972, is examined from the technical, managerial, and political viewpoints. Initial work on the hardware began after it was calculated that a rocket with a chemical first stage and a nuclear second stage had a large payload advantage over purely chemically-fueled rockets. Political opinion agreed only with a project directed toward demonstrating the feasibility of the concept. The KIWI-A was ground-tested and produced 70 MW output (70,000 lb thrust) in 1959. NASA, however, did not include the nuclear rocket in long-range plans announced at about the same time. Testing of the cold components continued in an effort to improve the structural reliability of the reactor, which tended to eject pieces of its interior during firing. Hot-testing resumed and 1000 MW power was achieved in 1964. Government policy then directed

funds more toward the Apollo program than toward a flight test. The Nerva engine ran at 1100 MW for over an hour without damage in 1968. The program was cancelled in 1972, and it is suggested that the development of a flight-rated engine could continue if public support was backing a manned Mars mission. M.S.K.

A83-47335*# National Aeronautics and Space Administration, Washington, D. C.
COMMUNICATIONS SATELLITES - THE EXPERIMENTAL YEARS
B. I. EDELSON (NASA, Washington, DC) International Astronautical Federation, International Astronautical Congress, 34th, Budapest, Hungary, Oct. 10-15, 1983. 8 p. refs
(IAF PAPER 83-302)

Only eight years after the launc of Sputnik-1 by the Soviet Union, the first commercial satellite, 'Early Bird', entered service. In just twelve years commercial satellite service extended around the earth and became profitable. The reasons for the successful development of the communications satellite services in a comparatively short time are considered. These reasons are related to the presence of three ingredients, taking into account technology to create the system, communications requirements to form a market, and a management structure to implement the system. The formation of the concept of using earth orbiting satellites for telecommunications is discussed. It is pointed out that the years from 1958 to 1964 were the true 'experimental years' for satellite communications. The rapid development of technology during this crucial period is described, giving attention to passive satellites, active systems, and development satellites. G.R.

A83-47993#
THE IMPACT OF COMPUTERS ON THE TEST CELL OF TOMORROW
C. F. ASH (Aero Systems Engineering, Inc., St. Paul, MN) American Society of Mechanical Engineers, International Gas Turbine Conference and Exhibit, 28th, Phoenix, AZ, Mar. 27-31, 1983. 8 p.
(ASME PAPER 83-GT-187)

The role that computers are to play in engine testing is outlined. It is noted, that although the adoption of completely automated closed-loop test cells has been slower than expected, economic pressures and technological advances will combine to make closed-loop testing the standard approach in the years to come. Among the benefits will be better overall management of the engine test program, more consistent and reliable data, more effective use of personnel and equipment, and lower costs. The successful application of a real-time computer system with both open-loop and closed-loop capabilities is discussed. This particular system, the Automatic Data Acquisition and Processing System, managed its first 3000 hours of engine operation without a single hardware or software interruption. C.R.

N83-10507*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
FSAS FUTURE ROLE
W. T. CALLAGHAN *In its* Flat Plat Solar Array Proj.: Proc. of the 20th Proj. Integration Meeting p 61-65 Apr. 1982
Avail: NTIS HC A23/MF A01 CSCL 10A

The latest thinking about how the Flat-Plate Solar Array Project (FSA), will redirect activities away from recent product-oriented technology development efforts and toward longer-term research on technical problems that could limit future large-scale use of photovoltaics is addressed. With the emphasis on research, the Project is now organizing a series of workshops addressing the key basic technological questions by specific topic. Intervals between Project Integration Meetings are being extended because there are fewer contracts within ESA and because work under those contracts has been attenuated. J.M.S.

N83-10725# National Oceanic and Atmospheric Administration, Washington, D. C. Federal Coordinator for Meteorological Services and Supporting Research.
THE FEDERAL PLAN FOR METEOROLOGICAL SERVICES AND SUPPORTING RESEARCH, FISCAL YEAR 1983
Mar. 1982 130 p refs
(PB82-215708; NOAA-82041201; PCM-P1-1982) Avail: NTIS HC A07/MF A01 CSCL 04B

The measures being taken to protect weather-sensitive activities are emphasized. The various agency plans for improving these services are described. Numerical weather prediction is analyzed. Numerical weather prediction is at the core of the complex set of forecast services, and more accurate forecasts depend primarily on progress in numerical weather prediction. Interagency cooperation that is essential to meet the needs for meteorological services is highlighted. E.AK.

N83-10971# Instituto de Pesquisas Espaciais, Sao Paulo (Brazil).
COPLAN, AN INTERACTIVE SYSTEM FOR PROJECT MANAGEMENT [COPLAN, UM SISTEMA INTERATIVO PARA GERENCIA DE PROJETOS]
H. G. V. S. BORGES, A. FELICIANO, and C. DERENNAESAOUZA Jul. 1982 66 p refs In PORTUGUESE; ENGLISH summary
(INPE-2456-PRE/151) Avail: NTIS HC A04/MF A01

Two interfaces for the packages PROMIS/TIME and PROMIS/RAM, used in large project planning, control, and resource allocation, with the purpose of adapting them for (user friendly) interactive use are described. The user is guided by displayed instruction and enters data for network data bases, PERT networks, their events, activities, etc., through formatted displays. The system produces various reports and graphic outputs at the user's command. S.L.

N83-10977# National Academy of Sciences - National Research Council, Washington, D. C. Committee on Independent Research and Development Issues.
THE DOD-NASA INDEPENDENT RESEARCH AND DEVELOPMENT PROGRAM: ISSUES AND METHODOLOGY FOR AN IN-DEPTH STUDY Final Report
1981 90 p refs
(PB82-192741) Avail: NTIS HC A05/MF A01 CSCL 05A

The Department of Defense and the National Aeronautics and Space Administration reimburse contractors, as overhead items, for the expenses of certain independently chosen R and D projects judged relevant to military needs. These independent R and D (IR&D) expenses arerecognized by the agencies as necessary costs of doing business. The agencies also expect the system of reimbursement to help develop innovative technologies and foster strong and competitive contractor industries. The agencies set a ceiling (by formula or negotation) on each company's recovery. Bid and proposal costs are also reimbursed, lumped with IR&D costs under a single ceiling for each company. Critics have quarreled with many of the system's features, from accounting procedures to the system's fundamental propriety. The Committee on Independent Research and Development Issues identified and analyzed the issues raised by critics and proponents, compared and interpreted prior studies, and developed guidelines and a methodology for a comprehensive study of the IR&D system; the committee's report contains in addition a detailed history of the IR&D system and a catalog of proposed alternatives to the current system. Author

N83-11770# Council for Scientific and Industrial Research, Pretoria (South Africa).
MANAGING AND DOCUMENTING 10-20 MAN YEAR PROJECTS
P. VISSER *In its* Proc. of the 2nd South African Computer Symp. on Res. in Theory, Software and Hardware 12 p 1981
Avail: NTIS HCA14/MFA01

The management of software development is not different from normal management, yet it is known to be difficult. The reasons

can be found in the characteristics of software development which resembles research work in most management aspects. The method of implementation of management techniques must therefore be adapted to these characteristics: (1) not visible in the normal sense; (2) production facilities not obvious. (3) type of personnel - highly skilled; (4) peoples systems; (5) end product defined as part of production - direct control is not possible as for manufacture; and (6) measurement dependent on judgement. Author

N83-11876# Washington Univ., St. Louis, Mo. Center for Development Technology.
EVALUATION OF THE SECOND 5-YEAR OUTLOOK ON SCIENCE AND TECHNOLOGY Final Report
E. B. SHULTZ, JR. and W. P. DARBY Apr. 1982 37 p refs
(Contract NSF PRM-81-19828)
(PB82-197252) Avail: NTIS HC A03/MF A01 CSCL 05A

The second Five-Year Outlook on Science and Technology is evaluated. Fifty-one specific issues are raised and discussed. A list of twenty-two topics of major importance is presented for consideration. Policy issues are also discussed. N.W.

N83-12844# Southwest Research Inst., San Antonio, Tex. Electronic Systems Div.
BIOTECHNOLOGY RESEARCH REQUIREMENTS FOR AERONAUTICAL SYSTEMS THROUGH THE YEAR 2000, VOLUME 1 Final Report, 1 Apr. 1981 - 30 Jul. 1982
H. H. PEEL 30 Jul. 1982 60 p 3 Vol.
(Contract F49620-81-C-0059; AF PROJ. 2305)
(AD-A118457; SWRI-14-6522-VOL-1; AFOSR-82-0642TR-VOL-1)
Avail: NTIS HC A04/MF A01 CSCL 01A

This report discusses the basic biotechnology research problems that require solution by the year 2000 to ensure optimum performance of manned Air Force aeronautical systems. The projected aeronautical systems for strategic, tactical and support systems are discussed, with emphasis placed on the roles of increased automation and information processing, as well as the increased physical stress of higher performance aircraft, extended mission durations and new weapon threats. Six generic areas of biotechnology are considered, along with the research needed to address the needs of the year 2000 aircrew. First discussed is the human-machine symbiosis needed in systems that will become extraordinarily complex. This is followed by the related needs in developing improved human-machine information interfaces that avoid overloading the human operator or pilot. Many missions of the future will be unforgiving and of high intensity. The problems and research needed to deal with the increased stress and to protect and enhance aircrews' performance during these missions are discussed in detail. The report discusses how simulators can be advanced to provide not only better training for aircrews, but also how they can be used in the development of new systems for optimizing the human-information-machine relationship. GRA

N83-12845# Southwest Research Inst., San Antonio, Tex. Electronic Systems Div.
BIOTECHNOLOGY RESEARCH REQUIREMENTS FOR AERONAUTICAL SYSTEMS THROUGH THE YEAR 2000, VOLUME 2 Final Report, 1 Apr. 1981 - 30 Jul. 1982
H. H. PEEL 30 Jul. 1982 204 p refs Proceedings of Biotechnol. Res. Requirements Study Session, San Antonio, 4-8 Jan. 1982 2 Vol.
(Contract F49620-81-C-0059; AF PROJ. 2305)
(AD-A118458; SWRI-14-6522-VOL-2; AFOSR-82-0643TR-VOL-2)
Avail: NTIS HC A10/MF A01 CSCL 01A

This report discusses the basic biotechnology research problems that require solution by the year 2000 to ensure optimum performance of manned Air Force aeronautical systems. The projected aeronautical systems for strategic, tactical and support systems are discussed, with emphasis placed on the roles of increased automation and information processing, as well as the increased physical stress of higher performance aircraft, extended mission durations and new weapon threats. Six generic areas of biotechnology are considered, along with the research needed to address the needs of the year 2000 aircrew. Author (GRA)

N83-13130*# National Aeronautics and Space Administration, Washington, D. C.
SPACE RESEARCH AND TECHNOLOGY PROGRAM: PROGRAM AND SPECIFIC OBJECTIVES, DOCUMENT APPROVAL
13 Jun. 1982 177 p
(NASA-TM-85162; NAS 1.15:85162) Avail: NTIS HC A09/MF A01 CSCL 22A

A detailed view of the Space Research and Technology program work breakdown structure is provided down to the specific objective level. Goals or objectivs at each of these levels are set forth. The specific objective narratives are structured into several parts. First, a short paragraph statement of the specific objective is given. This is followed by a list of subobjectives. A list of targets is then provided for those areas of the specific objective that are amenable to a quantitative description of technical accomplishment and schedule. Fluid and thermal physics, materials and structures, computer science and electronics, space energy conversion, multidisciplinary research, controls and human factors, chemical propulsion, spacecraft systems, transportation systems, platform systems, and spacecraft systems technology comprise the principal research programs. N.W.

N83-14015# National Academy of Sciences - National Research Council, Washington, D. C. Subcommittee on Postperformance Evaluation of Research.
THE QUALITY OF RESEARCH IN SCIENCE Final Report
Mar. 1982 125 p refs
(Contract NSF EVL-81-15789)
(PB82-221755) Avail: NTIS HC A06/MF A01 CSCL 05A

Pursuant to a mandate by the Senate Appropriations Committee for the development of methods that the National Science Foundation (NSF) could use to carry out postperformance evaluation of the research it supports, seven specific activities were recommended to NSF, including improved use and articulation of evaluative information already being collected. The evaluation of basic research in industry, review practices in scientific journals, studies on the evaluation of scientific research, and a site-visit report on NSF's current evaluation practices are discussed. GRA

N83-14683*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
THE NASA REDOX STORAGE SYSTEM DEVELOPMENT PROJECT, 1980
Dec. 1982 73 p refs
(Contract DE-AI04-80AL-12726)
(NASA-TM-82940; E-1340; DOE/NASA/12726-18; NAS 1.15:82940) Avail: NTIS HC A04/MF A01 CSCL 10C

The technical accomplishments pertaining to the development of Redox systems and related technology are outlined in terms of the task elements: prototype systems development, application analyses, and supporting technology. Prototype systems development provides for a major procurement to develop an industrial capability to take the current NASA Lewis technology and go on to the design, development, and commercialization of iron-chromium Redox storage systems. Application analyses provides for the definition of application concepts and technology requirements, specific definition studies, and the identification of market sectors and their penetration potential. Supporting technology includes both in house and contractual efforts that encompass implementation of technology improvements in membranes, electrodes, reactant processing, and system design. The status of all elements is discussed. J.M.S.

N83-14690*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
DOE/NASA LEWIS LARGE WIND TURBINE PROGRAM
R. L. THOMAS 1982 15 p refs Presented at the Natl. Rural Elec. Coop. Assoc. and DOE Rural Elec. Wind Energy Workshop, Boulder, Colo., 1-3 Jun. 1982
(Contract DE-AI01-76ET-20320)
(NASA-TM-82991; DOE/NASA/20320-42; E-1423; NAS 1.15:82991) Avail: NTIS HC A02/MF A01 CSCL 10A

An overview of the large wind turbine activities managed by NASA is given. These activities include resuls from the first and second generation field machines (Mod-0A, -1, and -2), the status of the Department of Interior WTS-4 machine for which NASA is responsible for technical management, and the design phase of the third generation wind turbines (Mod-5). R.J.F.

N83-14833*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
REMARKS ON FUTURE DEVELOPMENTS
D. S. JOHNSON *In its* The Conception, Growth, Accomplishments and Future of Meteorol. Satellites p 97-101 Nov. 1982
Avail: NTIS HC A06/MF A01 CSCL 04B

Future developments in satellite meteorology are proposed and examined in the light of policy and funding changes. M.G.

N83-15168*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
RESEARCH AND TECHNOLOGY, FISCAL YEAR 1982 Annual Report, 1982
Nov. 1982 86 p refs
(NASA-TM-82506; NAS 1.15:82506) Avail: NTIS HC A05/MF A01 CSCL 05B

Advanced studies are reviewed. Atmospheric sciences, magnetospheric physics, solar physics, gravitational physics, astronomy, and materials processing in space comprise the research programs. Large space systems, propulsion technology, materials and processes, electrical/electronic systems, data bases/design criteria, and facilities development comprise the technology development activities. N.W.

N83-15169*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
RESEARCH AND TECHNOLOGY, LEWIS RESEARCH CENTER Annual Report, 1982
1982 47 p refs
(NASA-TM-83038; NAS 1.15:83038) Avail: NTIS HC A03/MF A01 CSCL 05B

Aeronautics, space, and terrestrial energy research is covered. Energy conversion processes and systems for propulsion in the atmosphere, in space, and on the ground are reviewed. Electric energy generation and storage for both terrestrial and space applications and materials and structures for such systems are also reviewed. N.W.

N83-15248*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
RESEARCH AND TECHNOLOGY REPORT OF THE LANGLEY RESEARCH CENTER Annual Report
1982 91 p
(NASA-TM-84570; NAS 1.15:84570) Avail: NTIS HC A05/MF A01 CSCL 05B

Highlights of major accomplishments and applications made during the past year at the Langley Research Center are reported. The activities and the contributions of this work toward maintaining United States leadership in aeronautics and space research are also discussed. Accomplishments in the fields of aeronautics and space technology, space science and applications and space transportation systems are discussed. E.A.K.

N83-16829*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
A SEASAT REPORT. VOLUME 1: PROGRAM SUMMARY Final Report
E. POUNDER, ed. 15 Sep. 1980 223 p refs
(NASA-CR-169787; JPL-PUB-80-38-VOL-1; NAS 1.26:169787)
Avail: NTIS HC A10/MF A01 CSCL 22B

The program background and experiment objectives are summarized, and a description of the organization and interfaces of the project are provided. The mission plan and history are also included as well as user activities and a brief description of the data system. A financial and manpower summary and preliminary results of the mission are also included. S.L.

N83-17407# European Space Agency, Paris (France).
REFLECTIONS ON EUROPE IN SPACE. THE FIRST TWO DECADES AND BEYOND In ENGLISH and FRENCH
A. DATTNER Mar. 1982 45 p
(ESA-BR-10; ISSN-0250-1589) Avail: NTIS HC A03/MF A01; ESA, Paris FF 55 (Member States, AU, CN and NO) + 20% others

The history of ESA since the 1960's is summarized. Changes in organizational structure and scientific activity are described. The ERS-1, Spacelab, communications satellite, and Ariane programs are outlined. Author (ESA)

N83-17454*# Operations Research, Inc., Silver Spring, Md.
RESEARCH AND TECHNOLOGY PROGRAM PERSPECTIVES FOR GENERAL AVIATION AND COMMUTER AIRCRAFT Final Report
J. S. BAUCHSPIES and W. E. SIMPSON Sep. 1982 157 p refs
(Contract NASW-3554)
(NASA-CR-169875; NAS 1.26:169875; TR-2101) Avail: NTIS HC A08/MF A01 CSCL 01B

The uses, benefits, and technology needs of the U.S. general aviation industry were studied in light of growing competition from foreign general aviation manufacturers, especially in the commuter and business jet aircraft markets. Author

N83-17564# Office National d'Etudes et de Recherches Aerospatiales, Paris (France).
ACTIVITIES REPORT OF THE FRENCH AEROSPACE AND RESEARCH INDUSTRY Annual Report, 1981
24 May 1982 246 p refs Transl. into ENGLISH from original FRENCH Original contains color illustrations
Avail: NTIS HC A11/MF A01

The solution of the difficult and varied problems raised by aircraft and spacecraft design involves multiple disciplines and techniques, some of which lie outside the traditional aerospace area (data processing, solid state physics, coherent optics). The activities in the fields of physics, structures, aerodynamics, materials, systems, computer science and energetics are reported. S.L.

N83-18274# Marconi Co. Ltd., Basildon (England). Airadio Products Div.
COMMUNICATIONS MANAGEMENT: A VITAL LINK
W. E. BRIERLEY *In* AGARD Advan. Avionics and the Mil. Aircraft Man/Machine Interface 19 p Jul. 1982
Avail: NTIS HC A15/MF A01

A method by which additional radio equipment can be fitted to light helicopters, preferably by reduction in the already allocated panel area, together with increased control facilities is investigated. A unit is being designed which will provide the required facilities within a panel area only 35% of that required for the controllers it replaces, whilst still providing all the functions required. The proposed Communications Management System control panel provides in one unit the facilities for two pilots to: select control, and display any one of six transmitter-receivers; monitor and/or independently change the frequency or pre-set channel of the selected radio; transmit/receive on the selected radio; select and adjust any or all in any combination eight radio receiver outputs and other audios; monitor and adjust pre-set channels on the left

hand display whilst maintaining normal opertion on the right hand station; and direct emergency selection of guard channels for UHF, VHF, TAC VHF in the event of system failure. The system is organised to ensure that when a radio is selected, the only frequencies that can be selected are within the particular radio band, or if a pre-set channel is selected, only channels applicable to the selected radio are available. R.J.F.

N83-18551*# National Aeronautics and Space Administration, Washington, D. C.
MANAGING NASA IN THE APOLLO ERA
A. S. LEVINE 1982 359 p refs
(NASA-SP-4102; NAS 1.21:4102) Avail: NTIS HC A16/MF A01 CSCL 05A

The administration and organization are described and analyzed. Policies on manpower and the budgetary process for contracting for research development, the structure of NASA-DOD relations, and program planning are discussed. S.L.

N83-18555# Department of Energy, Washington, D. C. Office of Nuclear Power Systems.
PROGRAM MANAGEMENT PLAN FOR THE CONDUCT OF A RESEARCH, DEVELOPMENT AND DEMONSTRATION PROGRAM FOR IMPROVING THE SAFETY OF NUCLEAR POWERPLANTS
Dec. 1981 15 p
(DE82-008776; DOE/NE-0032) Avail: NTIS HC A02/MF A01

Public Law 96-567, Nuclear Safety Research Development, and Demonstration Act of 1980, (the Act) which provides for an accelerated and coordinated program of light water reactor safety research, development, and demonstration is discussed. The Department of Energy (DOE) initiated its response to Section 4 of the Act by conducting individual information gathering meetings with Nuclear Regulatory Commission (NRC) and a wide cross section of the nuclear industry. Needs of type of activities were recommended. It is concluded that the Department's ongoing Light Water Reactor (LWR) safety program is responsive to the Act. The Department's ongoing program includes tasks in the areas of regulatory assessment, risk assessment, fission product source term, and emergency preparedness as well as providing technical assistance to the Institute of Nuclear Power Operations (INPO) to improve training of nuclear power personnel. DOE

N83-19080# National Academy of Sciences - National Research Council, Washington, D. C. Office of Physical Sciences.
REVITALIZING LABORATORY INSTRUMENTATION: THE REPORT OF A WORKSHOP OF THE AD HOC WORKING GROUP ON SCIENTIFIC INSTRUMENTATION
Jul. 1982 145 p refs Workshop held in Washington, D.C., 12-13 Mar. 1982
(PB82-249210) Avail: NTIS HC A07/MF A01 CSCL 14B

The status of scientific instrumentation in university research laboratories was reviewed. Approaches to alleviating the problem within existing budgetary constraints were explored. There is a serious problem of providing adequate instrumentation in university research laboratories. Approaches to the management of the university research enterprise that could promote more effective use of existing resources were discussed. A series of regional workshops were recommended, the main purpose of which would be to inform the university community (both researchers and administrators) of ways to make more effective use of existing resources. GRA

N83-19438# Naval Air Development Center, Warminster, Pa.
THE U.S. NAVY APPROACH TO CRASHWORTHY SEATING SYSTEMS
M. SCHULMAN *In* AGARD Impact Injury Caused by Linear Acceleration: 12 p Oct. 1982 refs
Avail: NTIS HC A21/MF A01

The U.S. Navy has for the past 22 years been committed to the support of a number of research and development programs to improve seating systems in non-ejection aircraft. This committment has resulted in a family of crashworthy seats which have gone through considerable testing and evaluation to demonstrate their capacity to manage crash loads and to limit those loads transmitted from the aircraft to the crewmembers. The development process has led to crashworthy armored and unarmored pilot/co-pilot, troop, passenger, gunner and specialty seats. However, the demonstration that these seats are effective in increasing the probability of survival during and after a crash does not necessarily mean that they will be adopted for military aircraft. New generation helicopters will require crashworthy seating in accordance with the latest military specifications, but retrofitting current operational aircraft with advanced seats is a more difficult undertaking. The acquisition manager must make the final decision and then provide the funding to support the effort. Author

N83-19632# Science Management Corp., Washington, D.C.
RESEARCH STUDY OF THE DIRECT AND INDIRECT EFFECTS OF FEDERALLY-SPONSORED R AND D IN SCIENCE AND ENGINEERING AT LEADING RESEARCH INSTITUTIONS. VOLUME 1: EXECUTIVE SUMMARY Final Report, 1975-1979
D. J. BOWERING and J. K. SHEEHAN 16 Nov. 1981 42 p refs 2 Vol.
(Contract NSF SRS-80-18112)
(PB82-239336) Avail: NTIS HC A03/MF A01 CSCL 05I

The statistical technique of path analysis was applied to sets of survey data on science and engineering activities at leading research universities. Testable hypotheses were developed on the measurable effects of federally sponsored R&D on selected educational outcomes at the subject universities within three disciplines: physical sciences, biological sciences, and engineering. GRA

N83-19633# Science Management Corp., Washington, D.C.
RESEARCH STUDY OF THE DIRECT AND INDIRECT EFFECTS OF FEDERALLY-SPONSORED R AND D IN SCIENCE AND ENGINEERING AT LEADING RESEARCH INSTITUTIONS, VOLUME 2 Final Report, 1975 - 1979
D. J. BOWERING 17 Nov. 1981 184 p refs 2 Vol.
(Contract NSF SR-80-18112)
(PB82-239328) Avail: NTIS HC A09/MF A01 CSCL 05I

A structural model was developed for each of the three foregoing disciplines of the causal linkages of federally-sponsored R&D expenditures and three outcomes, graduate degree production, graduate enrollment, and professional staff size, on which the variable has an effect, while controlling for the effects of other factors, such as institution size and tuition revenue. Generally, the largest effects of federally-sponsored R&D expenditures were on professional R&D staff size, Ph.D. production, and graduate enrollment (in that order) and that the effects generally were stronger in engineering than in the physical and biological sciences. Smallest effects were on the size of the non-R&D staff and master's degree production. GRA

N83-19634# Institution of Engineers, Calcutta (India).
ENGINEERING THE FUTURE FOR THE BENEFIT OF MANKIND, VOLUME 2
Jun. 1981 171 p refs Proc. of the Natl. Seminar, Calcutta, 17-19 Feb. 1980 Previously announced as N83-70307
(PB82-225491) Avail: NTIS HC A08/MF A01 CSCL 05K

This seminar was organized with a view to visualize and enlist the task which the engineering community should undertake in meeting the technological challenges brought about by the unprecedented rapid developments in science and technology all over the world. Distinguished speakers were invited to highlight the intricate interlinkage between the different facets of the multi-dimensional problems of future development along with a meaningful enriched life for the community as well as the individual. This volume of proceedings is comprised of recommendations, plenary lectures and keynote addresses delivered at the various sessions. The topics covered are: Food for the Millions; Technologies for Total Water Management; Rural and Urban Housing; New Horizons of Man-made and Natural Fibers; Challenges of Energy Crisis; New Approaches to Habitat vis-a-vis

Environment; Transport in Future; Engineering for Better Health; and The Need of Increased International Cooperation. GRA

N83-19638# National Science Foundation, Washington, D.C. Communications Program.
THE 5-YEAR OUTLOOK ON SCIENCE AND TECHNOLOGY, 1981. VOLUME 1: SOURCE MATERIALS
1982 399 p refs 3 Vol.
(PB82-249079; NSF/PRM-82002; NSF-81-41) Avail: NTIS HC A17/MF A01 CSCL 05A

The demographic state of the world; human diseases, including cancer, diabetes mellitus, and arthritis; nutrition research; cognition; and ecology and systematics are discussed. Plant disease; water resources; radioactive waste management; the Sun and Earth and the science of macromolecules; are also considered in relation to scientific development. Chemical synthesis of materials; developments in mathematics; research in Europe and the United States; research in industry; fuel science and technology; transportation; and prospects for technologies are reviewed. GRA

N83-19640# National Bureau of Standards, Washington, D.C.
SCIENCE AND TECHNOLOGY: THE CHALLENGES OF THE FUTURE
D. R. JOHNSON, ed. May 1982 88 p Proc. of the NBS 80th Anniv. Colloq. Series, Feb. - Mar. 1981, Washington, D.C. 88 p
(PB82-241365; NBS-SP-627; LC-82-600544) Avail: NTIS HC A05/MF A01 CSCL 05A

Challenges to science and technology are discussed. The roles of the Department of Commerce and the National Science Foundation are considered. Views on the interrelationships between Government, science and the society are expressed. Government-industry relationships, thoughts and ideas about managing research in a changing environment, the national technological edge that the United States possesses in computer software, and technological advantages to productivity and growth from an economical point of view are also discussed. GRA

N83-19706# Committee on Science and Technology (U. S. House).
AERONAUTICAL RESEARCH
Washington GPO 1983 124 p Hearing before the Subcomm. on Transportation, Aviation and Mater. of the Comm. on Sci. and Technol., 97th Congr., 2d Sess., 14 Dec. 1982
(GPO-14-796) Avail: Subcommittee on Transportation, Aviation and Materials

Aeronautical research is addressed. The aviation industry is examined. Author

N83-19763# Aeronautical Research Labs., Melbourne (Australia).
AERODYNAMIC TEST FACILITY REQUIREMENTS FOR DEFENCE R AND D TO 2000 AND BEYOND
N. POLLOCK and M. L. ROBINSON Sep. 1982 43 p refs
(AD-A122096; ARL-GD-005; WSRL-0287-SD) Avail: NTIS HC A03/MF A01 CSCL 14B

Existing Australian aerodynamic test facilities are reviewed with respect to their suitability to meet current and projected defense needs. The deficiencies of the existing facilities are identified and new facilities proposed. This document is a compilation of views of the authors and of senior staff engaged in the management and practice of aerodynamics at the Aeronautical Research Laboratories and the Weapons Systems Research Laboratory. GRA

N83-20183# Commissariat a l'Energie Atomique, Fontenay-aux-Roses (France). Dept. de Protection.
THE STAR WANDERER: THE INDIVIDUAL AND RISK MANAGEMENT [LE VAGABOND DES ETOILES: L'INDIVIDU ET LA GESTION DU RISQUE]
F. GHERTMAN and J. P. PAGES *In* ESA Reliability and Maintainability p 31-35 Sep. 1982 refs In FRENCH
Avail: NTIS HC A99/MF A01

The problem of how to account for the individual in considerations for improving the safety of large systems is addressed. Risk is often assessed by the safety manager as the triplet: (probability of the event, consequences, and evaluation of the consequences); for the individual, risk results in a confrontation between himself and the situation to which he must respond. Failure can be better understood by considering the fact that, at each instant, the individual reacts differently not only as a function of the problems which he has to resolve (where his capability is involved), but also as a function of the place he occupies in a network of relations (affective dimensions). Attempts are made to isolate some dimensions characterizing the individual which have their importance in the day-to-day safety management of large systems. Transl. by A.R.H.

N83-20810*# National Aeronautics and Space Administration, Washington, D. C.
FISCAL YEAR 1983 RESEARCH AND TECHNOLOGY PROGRAM
1982 142 p
(NASA-TM-84840; NAS 1.15:84840) Avail: NTIS HC A03/MF A01 CSCL 05A

A compilation of summary portions of each of the Research and Technology Operating Plans (RTOPS) used for management review and control of research currently in progress throughout NASA is presented. Subject, technical monitor, responsible NASA organization, and RTOP number indexes are included. B.G.

N83-20819# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
TELEINFORMATION AND MANAGEMENT
E. SIWAK-SZCZEPEK 26 Oct. 1982 16 p Transl. into ENGLISH from Wiad. Telekom. (Poland), n. 4, Apr. 1979 p 107-110
(AD-A122030; FTD-ID(RS)T-1041-82) Avail: NTIS HC A02/MF A01 CSCL 05B

Characteristics of teleinformation systems and their usefulness in management process are addressed. Author

N83-20873*# Battelle Columbus Labs., Ohio.
THE NASA SUBORBITAL PROGRAM: A STATUS REVIEW Final Report
R. TEETER and B. REYNOLDS Jan. 1983 130 p refs
(NASA-CR-170084; NAS 1.26:170084; BCL-AP-IL-83-3) Avail: NTIS HC A07/MF A01 CSCL 03B

The status of the NASA suborbital program is reviewed and its importance to astrophysical and geophysical programs is assessed. A survey of past scientific and developmental accomplishments, an examination of the trends in program costs, and an analysis of current and future program roles are included. The technical disciplines examined are primarily those of astronomy/astrophysics/solar physics and magnetospheric/ionospheric/ atmospheric physics. Author

N83-21398*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
OVERVIEW OF NASA TIRE EXPERIMENTAL PROGRAMS
J. A. TANNER *In its* Tire Modeling p 163-174 Mar. 1983 refs
Avail: NTIS HC A11/MF A01 CSCL 20K

Ongoing aircraft tire experimental programs are reported. These programs are designed to measure profile growth due to inflation pressure and vertical loading, contact pressures in the tire footprint, and a number of tire mechanical properties including spring, damping, and relaxation characteristics. Author

N83-21726# Ebasco Services, Inc., New York.
LIGHTNING RESEARCH PLAN Final Report
D. A. MARK Mar. 1982 121 p refs
(Contract EPRI PROJ. 1980-1)
(DE82-903144; EPRI-EL-2289) Avail: NTIS HC A06/MF A01

The objective is to prepare a comprehensive, coordinated and cost effective plan for undertaking future lightning research projects that will be applicable to the improvement of distribution system surge protection. The main investigative work of the project included the following: state of the art study in lightning research to determine the availability of lightning stroke data and instruments for data gathering; the use of analytical methods in distribution system surge protection and the need for further analytical work; and identification of research performed by others and its applicability to the utility industry. The results of these investigations are used in the proposed research plan that incorporates the recommended projects, identifies priorities and expected costs.
DOE

N83-21808*# *National Aeronautics and Space Administration*, Washington, D. C.
THE NASA COMPUTER SCIENCE RESEARCH PROGRAM PLAN
Mar. 1983 100 p refs
(NASA-TM-85631; NAS 1.15:85631) Avail: NTIS HC A05/MF A01 CSCL 09B

A taxonomy of computer science is included, one state of the art of each of the major computer science categories is summarized. A functional breakdown of NASA programs under Aeronautics R and D, space R and T, and institutional support is also included. These areas were assessed against the computer science categories. Concurrent processing, highly reliable computing, and information management are identified. Author

N83-22089# Rome Air Development Center, Griffiss AFB, N.Y.
RADC TECHNICAL OBJECTIVE DOCUMENT (TOD) C(3)I, FISCAL YEAR 1984
C. P. CROCETTI Dec. 1982 61 p
(AD-A122765; RADC-TR-82-267; RADC-TOD-82-11) Avail: NTIS HC A04/MF A01 CSCL 17B

This TOD describes the technical programs of the Rome Air Development Center in support of the Air Force Command, Control, Communications and Intelligence (C3I) mission. The technical objectives have been aligned with the VANGUARD mission areas of Command, Control, and Communications (C3), Reconnaissance and Intelligence, Strategic Systems (Defense), and Technology as a means of focusing the RADC support of VANGUARD.
Author (GRA)

N83-22144# Marconi Avionics Ltd., Rochester (England).
THE MANAGEMENT OF A LARGE REAL-TIME MILITARY AVIONICS PROJECT
P. J. CARRINGTON, R. M. GISBEY, and K. P. J. MANNING *In* AGARD Software for Avionics 8 p Jan. 1983
Avail: NTIS HC A19/MF A01

The AQS 901, an airborne submarine detection system installed in the Royal Australian Air Force Orion and the RAF Nimrod Long-Range Maritime Patrol Aircraft, is described. to counter the modern submarine threat, the development of sensor and processing systems to detect and locate the enemy submarine has a high priority. Expendable, sensitive underwater listening devices, called sonobuoys, pick up the faint but characteristics submarine sounds. These sonobuoy signals are transmitted on an radio frequency link to the aircraft where real-time analysis is performed by the AQS 901 Sonics Processor to extract the wanted signal from the noise, to present the data to the operator in the most easily assimilated form, and to provide a wide range of user options for display manipulation and data combination. The AQS 901 system consists of 22 units of special-purpose hardware and 150 K of CORAL software. The project started in 1973, the first flight trials took place in 1977, and the system went into service in 1980. The software is now in maintenance. R.J.F.

N83-22146# Bundesakademie fuer Wehrverwaltung und Wehrtechnik, Mannheim (West Germany).
A LIFE CYCLE MODEL FOR AVIONIC SYSTEMS
H. SCHAAFF *In* AGARD Software for Avionics 7 p Jan. 1983 refs
Avail: NTIS HC A19/MF A01

A life cycle model that puts emphasis on design activities of avionics system is given. The objective of the project management of an avionic system must be to bring forth the user requirements as completely, as correctly and as early as possible because this saves money and time. The life cycle model presented helps to achieve this especially by the introduction of the formal activity functional design and its distinct separation from the technical design. The presented model is valid for avionic systems, but not only for these. It is valid for military embedded computer systems in general. R.J.F.

N83-23209# Department of Transport, Pretoria (South Africa). Metropolitan Transport Planning.
MANAGEMENT OF TRANSPORTATION RESEARCH
T. C. MACKEY, R. I. JACKSON, and P. G. FANNER *In* CSIR Ann. Transportation Conv., Vol. 1 14 p 1982 refs
Avail: NTIS HC A16/MF A01

The extent of Transportation Research expenditure world wide is evaluated against South Africa's less than R6,5M annual research investment. A more benefit/cost type commercial approach a new procedure for guiding and controlling research using the practising engineer and expertise from outside are recommended. The need for timely evaluation is stressed and guidelines for this evaluation are provided. The need for a coordinating body for purely Transportation Research is emphasized. E.A.K.

N83-23241*# Systems Control, Inc., West Palm Beach, Fla.
HELICOPTER TECHNOLOGY BENEFITS AND NEEDS. VOLUME 2: APPENDICES
J. ZUK (National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.) and R. J. ADAMS Jul. 1980 53 p refs Presented at Public Service Helicopter Users' Workshop, Moffett Field, Calif., 14-16 Jul. 1980 2 Vol.
(Contract NAS2-10411)
(NASA-CR-166470-VOL-2; NAS 1.26:166470-VOL-2) Avail: NTIS HC A04/MF A01 CSCL 05A

Vehicle design, avionics and flight systems; safety and reliability; navigation, guidance and flight control; propulsion; auxiliary systems; human factors; and monitoring and diagnostic systems are the technology areas involved in solving operational and technical problems related to the use of helicopters. Tables show the problems encountered and the proposed research and technology for helicopter use for search and rescue; emergency medical services; law enforcement; environmental control; fire fighting; and resource management. A.R.H.

N83-25056# Department of Energy, Washington, D. C.
AN ASSESSMENT OF THE BASIC ENERGY SCIENCE PROGRAM. VOLUME 1: TECHNICAL REPORT
Mar. 1982 56 p 2 Vol.
(DOE/ER-0123) Avail: NTIS HC A04/MF A01

An assessment was undertaken of basic energy sciences (BES) program. A randomly selected sample of 129 projects was reviewed by panels of scientific peers. The reviews were conducted by 40 separate panels with an average of four members per panel. The panels rated individual projects on the basis of quality of science, quality of the project team, and probable impact on the mission. All of the ratings in the assessment were on a scale of 0 to 10. For each rating variable, a set of descriptors was provided which defined intervals on the scale. In all cases, the descriptors for 5 to 10 had the sense of project quality ranging from acceptable to outstanding; and descriptors below 5 had the sense of a project having serious deficiencies. These ratings were used to make statistical inferences concerning the BES program. There was substantial uniformity in the judgments of the panel members. The mean of the standard deviations of panel members' ratings

of individual projects was less than 1.0 (on the scale of 0-10) for the 129 projects reviewed. S.L.

N83-26729# National Academy of Sciences - National Research Council, Washington, D. C. Subcommittee on Postperformance Evaluation of Research.
QUALITY OF RESEARCH IN SCIENCE: METHODS FOR POST-PERFORMANCE EVALUATION IN THE NATIONAL SCIENCE FOUNDATION
1982 125 p refs
(Contract NSF C-EVL-81-15789)
(PB83-144972; NSF/OAO-82001) Avail: NTIS HC A06/MF A01 CSCL 05A

The results of basic research in science are assessed. It was concluded that: (1) postperformance evaluation can and should be carried out at the program or division level; and (2) postperformance evaluation at the individual project level is best done in the course of reviewing proposals for the renewal of research grants. GRA

N83-26785*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
SOME HISTORICAL TRENDS IN THE RESEARCH AND DEVELOPMENT OF AIRCRAFT
M. L. SPEARMAN Apr. 1983 15 p
(NASA-TM-84665; NAS 1.15:84665) Avail: NTIS HC A02/MF A01 CSCL 01B

A survey of some trends in aircraft design was made in an effort to determine the relation between research, development, test, and evaluation (RDT and E) and aircraft mission capability, requirements, and objectives. Driving forces in the history of aircraft include the quest for speed which involved design concepts incorporating jet propulsion systems and low drag features. The study of high speed design concepts promoted new experimental and analytical research techniques. These research techniques, in turn, have lead to concepts offering new performance potential. Design trends were directed toward increased speed, efficiency, productivity, and safety. Generally speaking, the research and development effort has been evolutionary in nature and, with the exception of the transition to supersonic flight, little has occurred since the origin of flight that has drastically changed the basic design fundamentals of aircraft. However, this does not preclude the possibility of dramatic changes in the future since the products of research are frequently unpredictable. Advances should be expected and sought in improved aerodynamics (reduced drag, enhanced lift, flow field exploitation); propulsion (improved engine cycles, multimode engines, alternate fuels, alternate power sources); structures (new materials, manufacturing techniques); all with a view toward increased efficiency and utility. Author

N83-26874*# Harris Corp., Melbourne, Fla.
HOOP/COLUMN ANTENNA DEVELOPMENT PROGRAM
M. R. SULLIVAN *In* NASA. Langley Research Center Large Space Antenna Systems Technol., Pt. 1 p 469-512 May 1983
Avail: NTIS HC A25/MF A01 CSCL 22B

The development of the hoop/column spacetenna reflector is discussed. Schedules, mission configurations, systems compatibility, deployment sequence, cable development, and ground model fabrication and assembly are discussed. R.J.F.

N83-29807# Committee on Governmental Affairs (U. S. Senate).
OVERSIGHT OF DEPARTMENT OF ENERGY RESEARCH AND DEVELOPMENT FACILITIES
Washington GPO 1983 138 p refs Hearing before the Permanent Subcomm. on Invest. of the Comm. on Govt. Affairs, 97th Congr., 2d Sess., 27 Jul. 1982
(GPO-99-908) Avail: Permanent Subcommittee on Investigations

The management and administration of the research and development facilities are investigated. The internal procedural controls within these facilities and their oversight are assessed. S.L.

N83-30302# Davidson (Harold F.), Fairfax, Va.
DEPARTMENT OF DEFENSE IN-HOUSE RDT AND E (RESEARCH DEVELOPMENT TEST AND EVALUATION) ACTIVITIES Management Analysis Report
H. F. DAVIDSON 30 Oct. 1981 160 p
(Contract DAAK21-82-C-0097)
(AD-A125498) Avail: NTIS HC A08/MF A01 CSCL 05A

This report was prepared for the US Army Materiel Development and Readiness Command at the direction of the deputy chief of staff for research, development, and acquisition. This edition is the fifteenth of a series that was initiated in 1966. Each In-House RDTE activity of the Department of Defense is described on one page in this compilation. The data for 1981 are summarized in tables preceding the main text and charts and tables are provided for each service showing organizational relationships and command chain. All current DOD RDTE activities which meet the report requirement of having at least 25 per cent of their budget in RDTE funds are listed in the contents alphabetically within each department. Some T&E facilities which do not meet the requirement previously noted are also listed by special request. Organizational changes during FY 1981 appear in Appendix 1. GRA

N83-32670# National Academy of Sciences - National Research Council, Washington, D. C. Computer Science and Technology Board.
ROLES OF INDUSTRY AND THE UNIVERSITY IN COMPUTER RESEARCH AND DEVELOPMENT Final Report
1982 97 p
(Contract NSF MCS-78-228116)
(PB83-192039) Avail: NTIS HC A05/MF A01 CSCL 05A

Steps to encourage university-industry interaction in computer science research and development are recommended. Possible initiatives in this direction are as follows: increased funding for joint university-industry project; funding for sabbatical visits to or from industry, emphasizing in industry; and organization of special research grants funded jointly by NSF and industry. GRA

N83-34844# General Accounting Office, Washington, D. C. Mission Analysis and Systems Acquisition Div.
THE B-1 BOMBER PROGRAM: A NEW START
13 Apr. 1983 9 p
(AD-A127523; GAO/MASAD-83-21) Avail: NTIS HC A02/MF A01 CSCL 05A

We recently completed our review of the B-1B bomber program. This review was made because the B-1B is a key element of the strategic force modernization program, is costly, and has a compressed development and production schedule to meet the initial operational capability date of 1986. Our review was also directed at examining the B-1B cost estimates, management plans, and cost performance reports. We found that the B-1B program cost estimate still omits known program costs. We are concerned that the cost omissions obscure congressional visibility of the B-1B acquisition. In this regard, we recommend that you have your Office provide the Congress in a single package an estimate, including all the acquisition costs related to the B-1B program. GRA

N83-34958# National Bureau of Standards, Washington, D.C. Office of Research and Technology Applications.
FEDERAL LABORATORY DIRECTORY, 1982 Final Report
J. C. WYCKOTT, ed. Feb. 1983 268 p refs Prepared in cooperation with Federal Lab. Consortium, Washington, D.C.
(PB83-194035; NBS-SP-646; LC-82-600663) Avail: NTIS HC A12/MF A01 CSCL 14B

This Directory provides limited information about some 388 Federal laboratories with ten or more full time professionals engaged in research and development. Summary data arranged by Federal agency and by State provide a broad overview of the Federal laboratory system. Laboratory lists by staff size, by State and by agency provide a cross reference. For each laboratory, a contact for obtaining technical information is given by name, address, and phone number. Major mission and major scientific or testing equipment is listed for each laboratory. Author (GRA)

N83-36997# Assistant Secretary of the Navy, Washington, D.C. Research Engineering and Systems.
DEPARTMENT OF THE NAVY RDT AND E MANAGEMENT GUIDE
Mar. 1983 270 p refs
(AD-A130067) Avail: SOD HC $6.00/MF A01 CSCL 05A

The Department of the Navy RDT&E Management Guide was developed to aid both newcomers to RDT&E management and practicing journeymen. For newcomers, the Guide provides a means of rapid orientation in the Department of the Navy system for managing its RDT&E effort. For practicing RDT&E managers, the Guide is a quick source of general information and identifies directives containing detailed guidance. Author (GRA)

N83-37006# National Science Foundation, Washington, D.C. Div. of Policy Research and Analysis.
PROCEEDINGS OF A WORKSHOP ON THE ROLE OF BASIC RESEARCH IN SCIENCE AND TECHNOLOGY: CASE STUDIES IN ENERGY R AND D (RESEARCH AND DEVELOPMENT)
1983 141 p Workshop held in Washington, D.C., 12-13 Mar. 1983
(PB83-213645; NSF-83-30; NSF/PRA-83012) Avail: NTIS HC A07/MF A01 CSCL 05A

Meanings of the term basic research are provided and a common definition is sought. The direct impact of basic research on the advancement of energy technology and science and the indirect benefits of that research to society in general are evaluated. Research programs at the Department of Energy and in private industry are examined. Characteristics of industries involved in research and development (R&D) are discussed. These industries are said to be large, diversified, multinational corporations that are highly affected by government regulation and that carry on their R&D in diversified locations. Industry and university interactions are discussed. GRA

N83-37007# General Accounting Office, Washington, D. C. Program Analysis Div.
THE FEDERAL ROLE IN FOSTERING UNIVERSITY-INDUSTRY COOPERATION
25 May 1983 68 p
(PB83-218008; GAO/PAD-83-22; B-210894) Avail: NTIS HC A04/MF A01 CSCL 05A

Closer links between universities and industry in research and education can enhance technological innovation. However, cooperative arrangements between them are difficult to create and sustain because of differences in missions, values, and rewards. GAO examined three well-known forms of university-industry collaboration--research parks, cooperative research centers, and industrial extension services--to develop information and guidelines to help policymakers in designing any new or revised Federal initiatives to stimulate cooperation. Each form of cooperation draws upon different strengths and resources of the participants and produces different outcomes. None is likely to succeed unless the participants possess the relevant strengths and mutual interests. Author (GRA)

06

COSTING AND BUDGETING, COMMERCIALIZATION, ECONOMIC IMPACT

Includes cost control and analysis, cost effectiveness, productivity, marketing, competition, and technology transfer.

A83-10438
ECONOMIC AND INDUSTRIAL ASPECTS OF THE CONQUEST OF SPACE [ASPECTS ECONOMIQUES ET INDUSTRIELS DE LA CONQUETE SPATIALE]
J. MITTERRAND (Groupement des Industries Francaises Aeronautiques et Spatiales, Paris, France) L'Aeronautique et l'Astronautique, no. 95, 1982, p. 76-80. In French.

The economics of spaceflight are examined in terms of American and European budget allotments, technology development, and the return on investment. NASA's technology transfer operations have proved that each dollar spent on the space program has resulted in six dollars gained by the American economy. The 1980 budget allotments announced by the U.S., Japan, and Europe for space activities are outlined, noting the economic savings resulting from the usage of meteorological and communications satellites. Several areas of industry which have benefitted from developments in space technology include energy storage, aerospace materials, medical monitoring systems, plasma jets, pyrotechnics, composite materials, medical prosthetics, and radiation detectors. French participation in international and national space programs are reviewed. European success in space activities in competition with the U.S. is mentioned as hinging on programs undertaken with a consensus among participating nations.
M.S.K.

A83-10756
TESTABILITY - A QUANTITATIVE APPROACH
T. NICHOLS (Magnavox Advanced Products and Systems Co., Torrance, CA) In: AUTOTESTCON '81; Proceedings of the Conference, Orlando, FL, October 19-21, 1981. New York, Institute of Electrical and Electronics Engineers, Inc., 1981, p. 221-224. refs

This paper is based on a concept which will allow the test engineer to present quantitative evidence in terms of cost to support design modifications he may request to enhance testability. A testable circuit is defined here to be a circuit whose functional operation can be verified and whose faulty components can be detected and isolated by external Automatic Test Equipment (ATE). A non-testable circuit is one which must be tested in its next assembly. The cost of using the next assembly as a test bed will be used to establish the cost of not including requested testability modifications. (Author)

A83-11145
HOW PARAMETRIC COST ESTIMATING MODELS CAN BE USED BY THE PROGRAM MANAGER
K. F. MOLZ (RCA, Cherry Hill, NJ) In: NAECON 1982; Proceedings of the National Aerospace and Electronics Conference, Dayton, OH, May 18-20, 1982. Volume 2. New York, Institute of Electrical and Electronics Engineers, Inc., 1982, p. 550-552.

Sophisticated parametric models are now available to cover every aspect of weapon system acquisition and deployment. This paper describes the potential use of parametrics throughout the life of a program, and gives specific examples of when and how it can be used to advantage. Particular attention is given to such uses as contractor evaluations for system procurement, and costs and schedule support of alternative paths when a program is rescheduled or redirected, or is being managed to overcome cost, performance, or schedule difficulties. Hardware, software, and field life cycle aspects are considered. B.J.

A83-11154
ACTIVITY DISTRIBUTION ANALYSIS
B. FAD (RCA, Cherry Hill, NJ) In: NAECON 1982; Proceedings of the National Aerospace and Electronics Conference, Dayton, OH, May 18-20, 1982. Volume 2. New York, Institute of Electrical and Electronics Engineers, Inc., 1982, p. 624-627.

The number of activities making up a major program and the time phasing of each in relation to the total life cycle makes budgeting a tedious and error-prone process. This paper describes PRICE A, an automated aid to budgeting which removes much of the tedium and minimizes the error of the process. PRICE A, which is not a cost-estimating program, distributes expenditures over time, measures any user-defined escalation conditions, and accumulates expenditures of multiphased projects. A sample case study of the life cycle of a military digital communications processing device is presented to demonstrate the utility of PRICE A. B.J.

A83-14000
AIRLINE ECONOMICS
G. W. JAMES, (ED.) (Air Transport Association of America, Washington, DC) Lexington, MA, D.C. Heath and Co., 1982. 344 p

This anthology is a compilation of recent ATA studies on airline economics. The background of industry economics is presented, and recent developments in the airline industry and the outlook for the future (e.g., changes in the U.S./international market, 1970-1980, and the impact of the Airline Deregulation Act). Finally, a summary is given of presentations by airline executives to the ATA/Stanford University Symposium on airline planning conducted in the summer of 1980; particular attention is given to marketing planning, financial planning

A83-14046
AIRLINE PLANNING: CORPORATE, FINANCIAL, AND MARKETING
N. K. TANEJA (MIT; Flight Transportation Associates, Inc., Cambridge, MA) Lexington, MA, D.C. Heath and Co., 1982. 217 p. refs

Planning concepts employed prior to the 1973 actions of the Organization of Petroleum Exporting Countries, as well as the 1978 Airline Deregulation Act, are no longer adequate for effective airline management. Attention is accordingly given to problems and promising solutions in the areas of strategic corporate planning, financial planning, effective marketing practices which continuously monitor the changing needs and preferences of passengers and shippers, and the use of computerized simulation and analysis systems for the improvement of decision-making processes. Such decision support systems employ analytical subroutines, intuitive judgment, past experience, and rules of thumb for interactive evaluation of alternatives. Also considered is the role of the U.S. government in the formulation of regulatory policy, and the formulation of airline responses to policy changes. O.C.

A83-15673#
THE EUROPEAN LAUNCH VEHICLE ARIANE: ITS COMMERCIAL STATUS - ITS EVOLUTION
M. GLAVANY (Arianespace, Evry, Essonne, France) In: International Scientific Conference on Space, 22nd, Rome, Italy, March 25, 26, 1982, Proceedings. Rome, Rassegna Internazionale Elettronica Nucleare ed Aerospaziale, 1982, p. 269-277.

The status of the Ariane program is summarized. The shareholders and participating countries in the French private firm Arianespace are listed and the Ariane rocket is very briefly described, depicting the planned models and showing their anticipated performances and the types of fairing available to them, and comparing the available volume in Ariane 3 and 4 and foreign competitors. The current status of the Ariane program, including the development phase, promotional series, and commercial phase are briefly presented. The Guiana space center and second launch pad are described and the advantages of Arianespace's launch service and the vehicle are listed, along with Ariane's advantages over the Space Shuttle. The expected market share for Ariane is shown in comparison with that of the Shuttle and other nations. C.D.

A83-21421
INDUSTRIAL INNOVATION POLICY - LESSONS FROM AMERICAN HISTORY
R. R. NELSON (Yale University, New Haven, CT) and R. N. LANGLOIS (New York University, New York, NY) Science, vol. 219, Feb. 18, 1983, p. 814-818. refs

The historical interrelations of government support of R & D and technical change in seven major American industries point to three types of policy that have been successful in the past: (1) government R & D support for technologies in which the government has a strong and direct procurement interest; (2) decentralized systems of government-supported research in the 'generic' area between the basic and the applied; and (3) a decentralized system of clientele-oriented support for applied R & D. A fourth type of policy, under which the government attempts to 'pick winners' in commercial applied R & D, has been a clear-cut failure. (Author)

A83-22169#
THE U.S. COAST GUARD SES - BUYING AN OFF-THE-SHELF VESSEL
D. G. BAGNELL and S. A. THOMAS (U.S. Coast Guard, Washington, DC) American Institute of Aeronautics and Astronautics, Society of Naval Architects and Marine Engineers, and American Society of Naval Engineers, Marine Systems Conference, 7th, New Orleans, LA, Feb. 23-25, 1983, AIAA 8 p. (AIAA PAPER 83-0620)

The paper discusses the U.S. Coast Guard's purchase of three commercial surface effect ships. The differences between commercial and government design standards are discussed. The conclusion is that cooperation and information exchange is useful for both groups even though there may be no immediate need for the product. (Author)

A83-23148
COST CONTROL OF AIRCRAFT MANUFACTURE - A MODERN APPROACH
E. T. JACKSON (British Aerospace Public, Ltd., Co., Bristol, England) Aeronautical Journal, vol. 87, Jan. 1983, p. 9-20.

Two requirements of the system described are that it call attention in timely fashion to jobs on the shop floor that are causing problems and that it provide a fast and reliable method of comparing the work issued to the shops with the original estimates. The cost control system can be divided into a job and time recording system and a job monitoring system. The job and time recording system gives daily reports for the shop floor containing the actual performance against standard hours for jobs worked on during the previous day and night shifts. A visual display inquiry service gives actual performance against standard hours for all jobs being worked on and limited historical data. The job and time recording system has microfiche records of actual bookings against standards, and these are broken down by department. It also furnishes costs-versus-standards reports giving the total standard hours issued to the shop floor. The job monitoring system provides a weekly performance based on completed work and a compilation of actual versus standard hours. C.R.

A83-24425
THE COST DEFINITION PHASE OF A NEW COMMERCIAL AIRCRAFT PROGRAMME
W. G. LOEKEN (Boeing Commercial Airplane Co., Seattle, WA) Aeronautical Journal, vol. 87, Feb. 1983, p. 68-75.

The cost estimating process and cost management of the 757 aircraft are discussed. At peak production, 10,000 people will be employed directly, while 1000 suppliers of parts and materials will employ another 20,000. The configuration of the 757 was determined after analyses of traffic and airline service patterns, with the constraint that the aircraft had to sell in economic quantities. Major changes from the 727 program included a new technology wing and advanced, fuel-efficient engines. Computer

aided design and manufacturing practices reduced the changes necessary for successful construction of the 757 with respect to the 727 as the baseline aircraft, and commonality with the 767 was added to the flight deck. Computers were also used to track release dates for various components in order to assure an economic work flow and avoid costly surprises and delays. The program was completed within 0.5% of cost estimates. M.S.K.

A83-25120
AIRCRAFT LEASING PRACTICES IN THE UNITED STATES - A FEW OBSERVATIONS
J. T. STEWART, JR. (FAA, Chief Counsel's Office, Washington, DC) Air Law, vol. 8, no. 1, 1983, p. 58-78. refs

The interactions between the interested parties, the government, and areas of the world affected by U.S. aircraft leasing policies are discussed. Leasing leads to use of the aircraft by the lessee, and may involve large financial institutions and/or investors who actually purchase the aircraft and then lease it to the party desiring use. Additional leasing arrangements are described under terms such as finance leasing, safe harbor leasing, and tax leasing, all designed to maximize the economic return and to acquire use of aircraft. Particular emphasis is given to generating tax benefits. Safety regulations and registration requirements for aircraft leased in the U.S. are reviewed, and details of leases enacted mainly to obtain leverage for further financial transactions are examined. Finally, international agreements affecting aircraft leasing are reviewed. M.S.K.

A83-27372#
ESA PROCEDURES TO ACCOUNT FOR INFLATION [LES PROCEDURES DE L'AGENCE SPATIALE EUROPEENNE FACE A L'INFLATION]
J. VUAGNAT (ESA, Departement des Finances, Paris, France) ESA Bulletin, no. 33, Feb. 1983, p. 26-28. In French.

In order to allow for the effects of inflation in projects which will take several years to bring to realization, ESA has based projections of costs in the year ahead on costs at the midpoint of the planning year. Predictions of increases are calculated in terms of the rates of increases from the year prior to the current year up to the present year. A coefficient of variation is determined for each country participating in ESA in order to adjust allotments to the historical conditions in each country. Formulas for cost increases are included into the contracts with manufacturers, using the inflationary projections for each country and for each product, as well as for the cost of living increases for personnel salaries. The success of the techniques are noted to reside in using actual historical inflation figures instead of estimates, and it is mentioned that successful coverage of inflationary tendencies has been achieved for the last 4-5 yr. M.S.K.

A83-30831#
THE TECHNICAL 'PRODUCTIVITY GAP'
R. W. HAGER (Boeing Aerospace Co., Seattle, WA) Astronautics and Aeronautics (ISSN 0004-6213), vol. 21, May 1983, p. 66-70.

A discussion is presented concerning the steps that may be taken to maximize the pertinence to design problems, analytical or design quality, and design producibility and finality, of engineering work. The backdrop to such considerations is the projected numerical decline of U.S. engineering graduates and the far greater manpower resources commited to training in engineering fields by such competitors as the Soviet Union and Japan. These trends require a 100 percent increase in engineering productivity over the next decade, assuming even a modest 7 percent/year increase in engineering requirements. Attention is given to the potential gains and pitfalls inherent in the adoption of such novel design tools as CAD, central data bases and networks, word processors, and personal computers. Also noted are the potential advantages of postgraduate training and retraining of engineers in emerging, critical fields. O.C.

A83-30832#
WHY BILLIONS CAN AND SHOULD BE SPENT ON SPACE
P. W. KEATON (Los Alamos National Laboratory, Los Alamos, NM) Astronautics and Aeronautics (ISSN 0004-6213), vol. 21, May 1983, p. 86-88, 90-92. refs

An attempt is made to identify the financial resources that can be expected from governmental funding agencies, over a given period of time, for large space programs. Long term trends in the U.S. economy and the federal budget suggest ways of projecting future spending on space activities. Multiplying a representative space funding percentage of GNP by the cumulative GNP for the next 22 years, or $100 trillion, yields a $130 billion constant-fraction-of-GNP extrapolation. Other extrapolations cited are smaller or larger, and it is found difficult to choose the most probable figure. Past patterns of spending suggest that one third of the $400 million projected as available for space-related use will be committed to large national space technology development and space exploration programs. O.C.

A83-31490
EFFECTIVE LOW COST TESTING - A LABORATORY PERSPECTIVE
J. T. OSMANSKI and D. J. DINICOLA (Martin Marietta Aerospace, Denver, CO) IN: Environmental stress impact and environmental engineering methods; Proceedings of the Twenty-seventh Annual Technical Meeting on Emerging Environmental Solutions for the Eighties, Los Angeles, CA, May 5-7, 1981. Volume 1 . Mt. Prospect, IL, Institute of Environmental Sciences, 1981, p. 114-118.

Technological, operational, and interactive variables of the environmental test laboratory are discussed in terms of their cost effectiveness. Efficiency factors in laboratory layout and configuration are addressed, and the array of technological choices offered by current technology is briefly reviewed. The importance of the personnel skill mix to cost effective laboratory operation is emphasized and the implementation of laboratory changes is considered. Management of operational variables is addressed, including laboratory workload, personnel, maintenance, operating procedures and checklists, breadth of laboratory capability, lab-to-lab interchange, and types of tasks. Efficient management of laboratory interactions with outside sources is more briefly considered. Finally, overall actions and guidelines for providing a frame of reference toward addressing cost effectiveness are discussed. C.D.

A83-31923
TOWARDS THE STARSHIP ENTERPRISE - ARE THE CURRENT TRENDS IN DEFENCE UNIT COSTS INEXORABLE?
D. L. KIRKPATRICK and P. G. PUGH Aerospace (UK) (ISSN 0305-0831), vol. 10, May 1983, p. 16-23. refs

The causes and future implications of the steadily increasing unit procurement costs of military aircraft are examined on the basis of U.K. data from 1910 to the present. The increase in unit cost, presently at a rate of 8.3 percent per annum, is shown to result from a combination of technological advance in competition with adversary nations and inefficiencies inherent in defense-budget mechanisms. Technological cost increases are found to be more rapid whenever the limits of a particular technology are approached, even in the case of improvements intended to reduce operating costs. The relationship of unit cost, unit effectiveness, and overall force effectiveness is explored, and the best aircraft is described as one having a unit effectiveness slightly lower than that of one with the optimum cost/effectiveness ratio. The effect of rising unit costs on procurement policy since World War II is characterized: aircraft are procured in decreasing numbers, fewer types of aircraft are developed, and periods of service are lengthened. Continuation of these policy trends is seen as militarily questionable. The ability of countermeasures such as allied collaboration, exports, computer-based technology, and value engineering to change the 8-percent-per-annum cost increase is seen as limited, with the result that the next generation of combat aircraft will consist of at most 40 percent as many aircraft as the present one. Reversal of the cost-increase trend is found to be a possible but unlikely alternative. T.K.

A83-33360*# Massachusetts Inst. of Tech., Cambridge.
THE FUTURE OF THE U.S. AVIATION SYSTEM
R. A. AUSROTAS (MIT, Cambridge, MA) AIAA, ASCE, TRB, ATRIF, and CASI, International Air Transportation Conference, Montreal, Canada, June 1-3, 1983. 9 p. refs
(Contract NAS1-15268)
(AIAA PAPER 83-1594)

The growth of the aviation system of the U.S. over the last twenty years is described. Long-term and short-term causes of air travel are analyzed, showing the interaction of economic activity, airline yields and quality of service. Future trends in general aviation, aircraft technology, and telecommunications are described. Potential future scenarios for the airline industry are presented.
Author

A83-37961
THE SPACE TRANSPORTATION COMPANY INC.
A. N. STEAR Society of Automotive Engineers, Aerospace Congress and Exposition, Anaheim, CA, Oct. 25-28, 1982. 5 p.
(SAE PAPER 821368)

The Space Transportation Company Inc. was formed in 1979 to seek private funding for a fifth space shuttle. In early 1982, the Company made a formal proposal to NASA to acquire the fifth Orbiter and indicated that funding for this acquisition was available. This presentation will discuss the current organization of the The Space Transportation Company, its relationship with NASA, and the funding arrangements it has in place to carry out its intended plans.
Author

A83-38901
LIGHTER-THAN-AIR SYSTEMS CONFERENCE, ANAHEIM, CA, JULY 25-27, 1983, COLLECTION OF TECHNICAL PAPERS
Conference sponsored by the American Institute of Aeronautics and Astronautics. New York, American Institute of Aeronautics and Astronautics, 1983, 187 p.

The present conference on lighter-than-air (LTA) vehicles covers barriers and possibilities associated with the use of airships in developing countries, the market potential of the light utility airship concept, the effect of buoyancy and power design parameters on hybrid airship performance, thermal effects on a high altitude surveillance airship, patterning techniques for inflatable LTA vehicles, a dynamic analysis of the magnus effect-lift LTA 20-1 heavy lift aircraft, and the application of the panel method to airships. Also considered are a six degree of freedom heavy lift airship simulation, the lateral response of an airship to turbulence, recent LTA program progress in Japan, tethered aerostat operations in Arctic weather, the Cyclo-Crane hybrid aircraft concept, and the preliminary design of a very large pressurized airship for civilian and military applications.
O.C.

A83-38906#
APPLICATIONS AND MARKET POTENTIALS FOR THE LIGHT UTILITY AIRSHIP CONCEPT
T. S. BERGER (Ulita Manufacturing, Inc., Sheboygan, WI) IN: Lighter-Than-Air Systems Conference, Anaheim, CA, July 25-27, 1983, Collection of Technical Papers . New York, American Institute of Aeronautics and Astronautics, 1983, p. 40-51. refs
(AIAA PAPER 83-1975)

An assessment is presented of the market potential of small airships designed for such light utility and general surveillance missions as border patrol, municipal law enforcement, pollution monitoring, etc. Attention is given to a proprietary small airship design, the LUA-1, which is expected to demonstrate performance improvements over comparable aircraft in such areas as fuel consumption, maintenance down time, slow flight characteristics, vehicle vibration and noise levels, pilot and crew fatigue, equipment stowage capabilities, and operating costs.
O.C.

A83-42085#
SPACE STATION ARCHITECTURAL ISSUES AS VIEWED BY THE USER COMMUNITY - COMMERCIAL USER MISSION CONCERNS
P. W. WOOD (Booz, Allen and Hamilton, Inc., Arlington, VA) and M. WEINBERG (Weinberg Consulting Group, Inc., Washington, DC) American Institute of Aeronautics and Astronautics and NASA, Symposium on the Space Station, Arlington, VA, July 18-20, 1983. 4 p.
(AIAA PAPER 83-7100)

The results of a preliminary survey of potential commercial first-users of a Space Station are presented as a guide to developing systemized techniques for marketing Space Station services. The survey was performed to identify the user community and any obstacles to private sector involvement. One-to-one contacts were made to generate interest among nonaerospace industries. Continuing communication with literature, interviews, and press releases, as well as media articles, is carried out to nurture the interest and draw contacts from new organizations. Areas of technical interest still needing resolution include the data base of space materials processing, the durability of humans in space, and the protection of intellectual property. Cost doubts center around the potential 9-12 year payback, and some fears were found that military payloads might interfere with scheduled manifests. It is recommended that NASA continue the contacts and establish easily accessed communications with experts at the NASA centers. A public emphasis on successful commercial ventures in space is indicated.
M.S.K.

A83-42569#
THE ENTROPY OF AFFORDABILITY
J. L. PETTIGREW (USAF, Aeronautical Systems Div., Wright-Patterson AFB, OH) IN: Annual Mini-Symposium on Aerospace Science and Technology, 9th, Wright-Patterson AFB, OH, March 22, 1983, Proceedings . New York, American Institute of Aeronautics and Astronautics, 1983, p. 14-6-1 to 14-6-8. refs

The impact of inflation, deficit spending, increasing federal debt, and the increasing cost of energy on future defense spending is discussed. Parametric estimators are presented which show the relative rate at which the U.S. is losing its ability to afford weapons. A program to calculate life cycle costs of weapons systems is described, and recommendations are made for planning for future affordability problems.
C.D.

A83-43750
AN INTEGRATED MODEL FOR PRODUCTION COST ESTIMATION AND DESIGN-TO-COST CONTROL OF SMALL MISSILES
R. A. BUTTS and J. B. FOX (General Dynamics Corp., Convair Div., San Diego, CA) Society of Allied Weight Engineers, Annual Conference, 41st, San Jose, CA, May 17-19, 1982. 21 p.
(SAWE PAPER 1481)

A computerized model has been developed for cost estimation and design-to-cost (DTC) processes for cruise missiles which yields results comparable to a detailed estimating process without incurring such a method's cost and time delay. The model projects current manufacturing and procurement cost data to future years, in order to support cost reduction and tradeoff studies, government budgeting, DTC procedures, business planning, and conjectural analyses. Basic cost model output may be further used as input to a DTC reporting/management accessory routine which can provide cost traceability over the life of the program, as well as current status reports and variance analyses with respect to predetermined goals. Time-phased expenditures and fiscal commitments can be obtained with a funding spread accessory routine. Both routines can be either automatically linked to the present model or independently assessed.
O.C.

A83-44181
BEYOND PERCHERON - LAUNCH VEHICLE SYSTEMS FROM THE PRIVATE SECTOR
W. C. HORNE, T. C. PAVIA, B. L. SCHRICK, R. S. WOLF, J. R. FRUCHTERMAN, and D. J. ROSS (Phoenix Engineering, Inc., Redwood City, CA) IN: Guidance and control 1983; Proceedings of the Annual Rocky Mountain Conference, Keystone, CO, February 5-9, 1983 . San Diego, CA, Univelt, Inc, 1983, p. 373-392. refs (AAS PAPER 83-081)

Private ventures for operation of spacecraft launching services are discussed in terms of alternative strategies for commercialization of space activities. The Percheron was the product of a philosophy of a cost-, rather than a weight-, minimized a lunch vehicle. Although the engine exploded during a static test firing, other private projects continued, including the launch of the Conestoga, an Aries second stage Minuteman I. Consideration is being directed toward commercial production and launch of the Delta rocket, and $1 and a $1.5 billion offers have been tendered for financing a fifth Orbiter for NASA in exchange for marketing rights. Funding for the ventures is contingent upon analyses of the size and projected growth rate of payload markets, a favorable national policy, investor confidence, and agreeable capitalization levels. It is shown that no significant barriers exist against satisfying the criteria, and private space ventures are projected to result in more cost-effective operations due to increased competition.
M.S.K.

A83-45427
THE FUTURE FOR COMMUNICATION SATELLITES OF THE PAM-D/HALF ARIANE CLASS
U. RENNER (ESA, European Space and Technology Centre, Noordwijk, Netherlands) Space Communication and Broadcasting (ISSN 0167-9368), vol. 1, July 1983, p. 145-154.

The underpinnings of the current orders for 50 communications satellites, to be manufactured by four companies, are examined, with attention given to future progress in communications satellites. Existing launch services include the Delta 3920 (PAM-D kick stage, 1247 kg), the Shuttle and a PAM-D (1247 kg), and the Ariane 3/Sylda (two 1195 kg packages). Half the satellite mass will be filled with propellant. The Delta class vehicle has a usable 2.18 m diameter space for the spacecraft, the Orbiter has 4.5 m, while the Ariane 3/Sylda has 2.8 m. Some detail is provided of the standard capabilities of the buses produced by the four manufacturers in terms of the masses, size, frequencies, active channels, and projected lifetimes. Future markets are foreseen in 20/30 GHz point to point communications, DBS television systems, and medium class Intelsats.
M.S.K.

A83-45720
COMMERCIAL LAUNCH VEHICLE SERVICES
K. E. DEGNAN Satellite Communications (ISSN 0147-7439), vol. 7, Sept. 1983, p. 34-36.

Plans to discontinue the use of expendable launch vehicles have been reevaluated in view of the growing number of communications satellite payloads. A White House directive of May 16, 1983, makes space hardware, services, and facilities available to private sector users. Whereas the customer must bear all costs, the government will absorb the sunk costs of research and development. The five primary launch vehicles available to commercial users are described. When mated with the payload-assisted module D (PAM-D), the Delta 3920 can carry a 1200 kg payload into transfer orbit at a cost of $18.5 million. Ariane 2/3 can carry a payload weighing as much as 2600 kg, with a launch cost of $25-30 million. The Titan 34D, mated with the IUS, can deliver a payload of about 2500 kg to a geosynchronous transfer orbit. It is noted that a second Atlas class is being developed which will be able to deliver 5200 kg to orbit. Costs for the Space Shuttle will continue to range from $14 million to $20 million until 1988. After that, however, the costs may rise by as much as 70 percent.
C.R.

A83-45833
AIRLINE SUBSIDIES
F. LEGREZ IN: Essays in air law . The Hague, Martinus Nijhoff Publishers, 1982, p. 147-154.

The history of government subsidies to private airlines is surveyed, noting instances where subsidies have been implicit and not overt. Several European airlines received, for decades, direct government payments for each kilometer flown. The U.S. government has paid overly large fees to airlines for carrying mail. The practice persisted until the mid-1950s, when the airlines, with increased passenger seating and significantly improved safety records, began to make sufficient profits to be weaned from public money. Compensations have since been paid for specific reasons, e.g., when the British government subsidized the purchase of the Concordes and when the French goverment subsidized Air France for flying out of a new, seldom-used airport. It is noted that international carriers will take losses to be competitive and make up for the losses on the less competitive domestic flights. Another indirect subsidy occurs when a stripped-down airline charges half-fares by flying the same routes established by a national airline, thereby carrying passengers who would otherwise fly on 'normal' priced flights by airlines that maintain flights at other hours.
M.S.K.

A83-45853
NEAR TERM PRODUCTS AND SERVICES
G. W. DRIGGERS (Combustion Engineering, Inc., Cropwell, AL) IN: Space industrialization. Volume 1 . Boca Raton, FL, CRC Press, Inc., 1982, p. 19-37. refs

The space industrialization (SI) products and services which are achievable within the period 1980-1995 are discussed. Information services offering portable telephone, teleconferencing, a national information service, direct broadcast television, and electronic mail from a multipurpose GEO platform could be implemented. Current materials processing work is proceeding on crystal growth and solidification, metallurgical alloys and processes, composites, glasses, chemical processes, separation sciences, and fluid studies. Consideration of Shuttle transportation only indicates that only low volume, high value products will initially be produced. NASA is seeking and stimulating industrial research, coordinating in-house research, and disseminating information. Lower costs would be incurred with development of a heavy lift launch vehicle and a fully reusable orbit transfer vehicle. Materials processed in space could originate on the earth or moon, the latter having lower fuel requirements for escape velocity. It is suggested that once research and development costs to bring the lunar materials scenario to fruition have been brought to a low enough cost, a corporation may be encouraged to take over the entire enterprise.
M.S.K.

A83-45860
SYSTEMS ANALYSIS AND ECONOMICS
J. P. VAJK (Science Applications, Inc., Pleasanton, CA) IN: Space industrialization. Volume 2 . Boca Raton, FL, CRC Press, Inc., 1982, p. 165-191. refs

The underlying principles and techniques of systems analysis are surveyed for applications to space industrialization (SI) and the economics of such ventures. Rational analysis is dependent on the concept of boundaries and simplified processes within those boundaries. External parameters to which the system responds can then be manipulated to observe their effects. Hierarchical levels of detail can be chosen for examining subsystems behavior, with each subsystem described by a general statement that can be broken down to simpler terms and choices made of design features. Solutions can then be drawn between the results of each design feature when considered in relation to other system features. SI will depend on its ability to serve the consumers of its products and services, generating revenue from inputs of raw materials, energy, capital, and labor. Subsystems of SI will include the government, management, production, transportation, and the suppliers. A metasystem is needed for SI, one which will perform the usually sequential design and deployment functions simultaneously. Design tools for the metasystem include scheduling

and packing theory, nondeterministic, polynomial time problem solving, and optimization, and impact assessment. Economic considerations will cover dividends, interest, inflation, depreciation, and capitalization. It is concluded that computer calculations using combinatorial mathematics will provide significant insight into financing methods, although it will in the long run be intuition, judgment, and personal values that will bring SI to realization. M.S.K.

A83-47235#
COMMERCIAL ATLAS/CENTAUR PROGRAM
D. E. CHARHUT and J. E. NIESLEY (General Dynamics Corp., Convair Div., San Diego, CA) International Astronautical Federation, International Astronautical Congress, 34th, Budapest, Hungary, Oct. 10-15, 1983. 7 p.
(IAF PAPER 83-21)

The current status of the Atlas/Centaur program is examined, taking into account launch history, launch vehicle performance, and current flight schedule. Attention is given to the communications satellite market, changes regarding the environment of space launch vehicles, the Atlas/Centaur record, Atlas G/Centaur, the Atlas/Centaur family, spacecraft fairing and envelopes, commercialization activities, and the benefits of a commercial Atlas/Centaur program. It is pointed out that the existence of a viable commercial Atlas/Centaur program provides an alternate or backup launch capability to the Space Shuttle at no additional cost to the government. Such a program will result in the maintenance of the existing production and launch facilities, which would otherwise become unusable. G.R.

A83-47316#
THE COMMERCIAL CENTAUR FAMILY
W. F. RECTOR, III and D. E. CHARHUT (General Dynamics Corp., Convair Div., San Diego, CA) International Astronautical Federation, International Astronautical Congress, 34th, Budapest, Hungary, Oct. 10-15, 1983. 6 p.
(IAF PAPER 83-233)

This paper presents a brief history of the Centaur program, including the demonstrated high reliabililty of the Centaur vehicle. The commercial communications satellite market is discussed as well as the new United States space policy that supports commercial launch vehicles. A family of launch vehicles consisting of Atlas/Centaurs and Shuttle/Centaurs is defined. Requirements for successful commercial operations are outlined and the differences between government operations and a commercial business mode are discussed. The paper concludes with some obstacles to be overcome in the transition to a commercial program and the benefits which can be derived from commercialization of the Centaur family of launch vehicles. Author

A83-47317#
ECONOMICS OF TELECOMMUNICATIONS SPACE SEGMENTS
J. A. VANDENKERCKHOVE (ESA, Paris, France) International Astronautical Federation, International Astronautical Congress, 34th, Budapest, Hungary, Oct. 10-15, 1983. 30 p. refs
(IAF PAPER 83-234)

A model is developed for assessing the economics of telecommunications satellite systems, which includes the development and manufacturing of the spacecraft, the launch, and operations in orbit. This model can account for parameters such as the mass and lifetime of the satellites, the number and type of payloads, the number of satellites procured and launched, the average mean time to failure of the satellite, and the management of the space segment efforts. The model is subdivided into four parts: the spacecraft mass model, the spacecraft procurement costs model, the mean time to failure model, and the space segment cost-effectiveness model. Among other results, it is found that the application of advanced technology is often cost effective. The satellite economics are found to generally improve with increases in the payload scale, although the gain diminishes as the spacecraft mass becomes heavier. A penalty is definitely incurred by multiple-mission spacecraft. N.B.

A83-47322#
COMPETITION IN SPACE - GOVERNMENT VS. INDUSTRY
P. D. MALEY (Space Shots International, Houston, TX) International Astronautical Federation, International Astronautical Congress, 34th, Budapest, Hungary, Oct. 10-15, 1983. 7 p. refs

The present capabilities of the Shuttle and the Ariane launch vehicles are compared, and attention is given to other national and private launch facilities. Through 1986, the Shuttle launch charges are $17.5 million while the Ariane charge is $31 million, considering a launch to LEO. With the advent of the Ariane 4 the European launch vehicle becomes more economically favored for placing payloads in GEO, at least until Shuttle-derived vehicles are operational. However, only 20 percent down payment is required for a current Ariane launch, while NASA mandates money up front. Additionally, payload integration for Ariane takes 22 mos, while the Shuttle payload integration plan involves 4 yr of planning. It is noted that NASA has become more customer-oriented and is helping arrange financing and insurance. Internationally, only the U.S.S.R., with the Proton booster, is presently offering launch services to other countries. Several private companies in the U.S., the most successfuly being Space Services International, are preparing launch sites, vehicles, or negotiating for proven launch vehicles as encouraged by present U.S. government policy. M.S.K.

A83-47820
PUSH TO COMMERCIALIZE SPACE RUNS INTO BUDGET CUTBACKS, BOONDOGGLE CHARGES,AND FEAR OF HIGH RISKS
P. KINNUCAN High Technology (ISSN 0277-2981), vol. 3, Oct. 1983, p. 43-45, 48-51.

Government attempts to increase the participation of private enterprise in the commercialization of space are explored. The electrophoresis experiments on the Shuttle have progressed sufficiently far for the sponsoring company to schedule one of its own employees for a flight, as well as clinical testing of the product. Government policy aimed at encouraging private sector participation is in line with the concept that competition and the profit motive produce better service at a lower price. Propositions to transfer the Landsat and Metsat systems to private concerns have failed to lead to swift action. Similarly, leasing launch rights to expendable boosters has been inhibited by the presence of direct competition with government subsidized launch services like the Shuttle and the Ariane. Industrialists have encouraged the government-supported development of a space station and unmanned, reusable launch vehicles that are less costly than the Shuttle. NASA, meanwhile, is entering into joint development contracts with industries for experimentrng with prototype production systems, e.g., the electrophoretic pharmaceuticals and GaAs semiconductors grown in space. M.S.K.

A83-48334#
LIFE CYCLE COST MANAGEMENT - AN ENGINEER'S VIEW
J. L. PETTIGREW (USAF, Aeronautical Systems Div., Wright-Patterson AFB, OH) American Institute of Aeronautics and Astronautics, Aircraft Design, Systems and Technology Meeting, Fort Worth, TX, Oct. 17-19, 1983. 10 p. refs
(AIAA PAPER 83-2451)

Questions concerning the commitment to improving affordability are discussed, taking into account the use of basic tools of statistical analysis, an approach established by the Air Force Systems Command for developing and stabilizing the scope of all programs, and affordability as the real key to justifying a weapons system. Attention is also given to the economic future with the effect of compounding inflation, the cost of a tactical aircraft compared to inflation, the entropy of affordability, the entropy of specialization, the life cycle cost (LCC), the cost of improving affordability, aspects of feedback in system engineering, engineering for supportability, and questions regarding the accountability for the future today. G.R.

A83-48378#
COMPARATIVE COST OF MILITARY AIRCRAFT - FICTION VERSUS FACT
H. F. MARX (Northrop Corp., Aircraft Div., Hawthorne, CA) American Institute of Aeronautics and Astronautics, Aircraft Design, Systems and Technology Meeting, Fort Worth, TX, Oct. 17-19, 1983. 11 p. refs
(AIAA PAPER 83-2565)

This paper describes why most of the comparative costs of weapon systems, especially aircraft, which are reported by the media are either grossly distorted or completely wrong. It delineates four distinct fallacies, associated with material released to the media, explains why each is wrong, and proposes a practical, desirable, and almost painless solution to the problem. Author

A83-49586#
DESIGNING FOR SUPPORTABILITY AND COST EFFECTIVENESS
G. WEINSTEIN (Grumman Aerospace Corp., Bethpage, NY) American Institute of Aeronautics and Astronautics, Aircraft Design, Systems and Technology Meeting, Fort Worth, TX, Oct. 17-19, 1983. 4 p.
(AIAA PAPER 83-2499)

It is pointed out that logistic support requirements for an aircraft are affected by each act and decision made through the system life cycle. Logistic support planning must, therefore, begin concurrent with the system concept definition. Aspects of logistic support planning are discussed, taking into account the ILS detail specification (ILSDS), the integrated logistic support plan (ILSP), and the logistics support analysis (LSA) plan. Preconcept definition supportability data are considered along with ILS goals. Attention is given to maintenance man-hour limits, personnel manning minimization, support equipment minimization, aspects of maintenance planning, and life cycle costs (LCC). G.R.

A83-49587#
A MCDONNELL DOUGLAS PERSPECTIVE - COMMERCIAL AIRCRAFT FOR THE NEXT GENERATION
R. E. BATES and J. MORRIS (Douglas Aircraft Co., Long Beach, CA) American Institute of Aeronautics and Astronautics, Aircraft Design, Systems and Technology Meeting, Fort Worth, TX, Oct. 17-19, 1983. 10 p.
(AIAA PAPER 83-2502)

This paper reviews, from a McDonnell Douglas perspective, the market for the commercial airplane by range and size through 1977. Airframe and propulsion technology is surveyed and improvements in fuel and economic efficiency are predicted. Significant potential gains are shown to be achievable with the application of these technologies. The development costs of new and derivative airplanes are discussed with suggestions made as to which technology developments are suitable for application to derivative aircraft and which are not. The authors then explain why the airline requirements for the 90s will, for the most part, be satisfied by derivatives of existing aircraft, but see the likely development of new aircraft in the 100- to 150-seat short-medium range categories. The final part of the paper describes potential derivatives of the DC-9 and DC-10, and also a new 150-seat short-medium range aircraft. Author

N83-10468*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
SOME CLOSING THOUGHTS: PRACTICAL PAYOFFS FROM SATELLITE SYSTEMS
In its The LANDSAT Tutorial Workbook p 389-407 1982 refs Original contains imagery. Original photography may be purchased from the EROS Data Center, Sioux Falls, S.D. 57198. ERTS
Avail: NTIS MF A01; SOD HC $55.00 CSCL 05B

The benefits-to-cost ratio of satellite remote sensing, both as a substitute for conventional methods of monitoring and assessing resources, and as a supplement to these methods is examined using a model which analyzes the cost of aerial photography versus satellite scanner for producing and interpreting an image of the Earth's surface sized to LANDSAT dimensions. Examples of cost savings are tabulated for ground surveys, aerial photos, and LANDSAT. Possible additional benefits from LANDSAT D are assessed. The way in which satellites fit into more comprehensive models for resources management is discussed. It is shown that remote sensing is but one essential component in a complex system that aggregates technical. Socioeconomics, political, cultural, and other factors in the human decision process.
A.R.H.

N83-11134# Rolls-Royce Ltd., Derby (England). Div. of Operations.
TRIED AND PROVEN ENGINE TECHNOLOGY: A VITAL KEY TO IMPROVING AIRLINE ECONOMICS
D. A. HEAD 1982 11 p
(PNR-90112) Avail: NTIS HC A02/MF A01

It is argued that engine related cost reduction in airline operation will come from the perfecting of current technologies. Drastic changes in engine design, comparable to the introduction of big fan engines in the 1960's, are ruled out. Trends towards increased automation of production, and multinational product development are noted. The need for better management in order to gain maximum benefit from technological advances is stressed.
Author (ESA)

N83-11872# Federal Aviation Administration, Washington, D.C. Office of Aviation Policy and Plans.
ECONOMIC VALUES FOR EVALUATION OF FEDERAL AVIATION ADMINISTRATION INVESTMENT AND REGULATORY PROGRAMS
W. L. KEECH Sep. 1981 80 p refs
(AD-A118255; FAA-APO-81-3) Avail: NTIS HC A05/MF A01 CSCL 05A

Drawing on economic theory, empirical investigations and data from government, private and academic literature, this report updates economic values commonly used by the Federal Aviation Administration in the evaluation of investment and regulatory programs. These values, commonly referred to as critical values, provide the basis upon which the effectiveness of the aviation system or changes therein may be denominated and assessed in monetary terms. The critical values updated in this report include the value of time of air travelers, the value of a statistical life, unit costs of statistical aviation injuries, unit replacement and restoration costs of damaged aircraft, and aircraft variable operating costs.
Author (GRA)

N83-14022*# Operations Research, Inc., Silver Spring, Md.
GOVERNMENT FINANCIAL SUPPORT FOR CIVIL AIRCRAFT RESEARCH, TECHNOLOGY AND DEVELOPMENT IN FOUR EUROPEAN COUNTRIES AND THE UNITED STATES Final Report
B. CHANDLER, R. GOLASZEWSKI, C. PATTEN, B. RUDMAN, and R. SCOTT 1 Apr. 1980 93 p refs Prepared in cooperation with Gellman Research Associates, Inc.
(Contract NASW-2961)
(NASA-CR-169537; NAS 1.26:169537) Avail: NTIS HC A05/MF A01 CSCL 05D

Data on the levels of government financial support for civil aircraft airframe and engine (CAAE) research and technology (R&T) in the United States and Europe (United Kingdom, West Germany, France and The Netherlands) and means of comparing these levels are provided. Data are presented for the years 1974-1977. European R&T expenditure data were obtained through visits to each of the four European countries, to the Washington office of the European Communities, and by a search of applicable literature. CAAE R&T expenditure data for the United States were obtained from NASA and Federal Aviation Administration (FAA). Author

N83-14062# Clemson Univ., S.C. Dept. of Industrial Management.
COST FUNCTIONS FOR AIRFRAME PRODUCTION PROGRAMS Final Report
N. K. WOMER and T. R. GULLEDGE Jul. 1982 201 p refs
(Contract F33615-81-K-5116; N00014-75-C-0451)
(AD-A119788) Avail: NTIS HC A10/MF A01 CSCL 14A

The research objectives were: (a) develop, test, and illustrate the use of a significant new approach to estimating the cost of an airframe production program using already collected data on Air Force airframes; and (b) provide the Air Force with a calibrated tool capable of providing timely answers to significant problems of program management. The researcher developed a model based on the four production cost drivers of learning by doing, learning over time, the speed of the production line, and production line length. It focuses on the production of an individual airframe as a function of its start date and its planned delivery date, and includes technical features of both the airframe production program and the contractor's behavior. The model is estimated from data on the C-141 program, and is used to evaluate the effect of several small changes to the delivery schedule for the C-141. This analysis shows the sensitivity of the model to delivery schedule changes. It also illustrates one of the important ways that the model may be used in program management. A detailed investigation of estimating the model on data from other programs revealed that its parameters are very stable from one program to another, and the parameters can be estimated from early actual data on a new program. Ways to combine the model with a cost estimating relation (CER) and update these estimates with early actual data are discussed in this report. These techniques are applied to data from the F-102 program and the F-5/T-38 program. GRA

N83-15166# Comptroller General of the United States, Washington, D.C.
DEPARTMENT OF COMMERCE COULD SAVE $24.6 MILLION BY MODIFYING COMPUTER PROCUREMENT ACTIONS
28 Apr. 1982 11 p
(GAO/CED-82-81) Avail: NTIS HC A02/MF A01

The computer requirements of the National Bureau of Standards (NBS) and he Environmental Research Laboratories (ERL) were reviewed. Topics investigated include: (1) the feasibility of consolidating the requirements of NBS and ERL and establishing a single data processing center for both organizations; (2) the best location for a single data processing center; (3) the expected cost savings from establishing this center; and (4) the feasibility of a single telecommunications network. Workload justification for two ongoing requests for proposals for acquiring computer hardware and support services for NBS and ERL was also examined. Results indicate that it is feasible to consolidate NBS' and ERL's computer requirements and establish a single data processing center for both organizations. But the cost of a single general-purpose facility to meet the requirements of both agencies exceeds the cost of maintaining two separate general-purpose facilities by several million dollars. Further, the quality of service provided by a single facility may be less than that provided by two. Savings and improved service could result, however, if certain needs of both agencies for a large-scale, scientifically oriented computer were met through sharing. J.M.S.

N83-16252# Army Missile Command, Redstone Arsenal, Ala. Systems Simulation and Development Directorate.
A TECHNICAL VIEW OF COST/SCHEDULE CONTROL SYSTEM CRITERIA
M. M. HALLUM, III Dec. 1981 15 p refs
(AD-A120005; AD-E950285; DRSMI/RD-82-8-TR) Avail: NTIS HC A02/MF A01 CSCL 05J

The objective of this study was to bring an engineer's technical view to the Cost/Schedule Control System Critieria (C/S CSC) and to make technical and engineering personnel aware of the potential benefits of C/S CSC. GRA

N83-17120*# Boeing Commercial Airplane Co., Seattle, Wash.
REQUIREMENTS FOR COMPANY-WIDE MANAGEMENT
J. W. SOUTHALL *In* NASA. Langley Research Center IPAD: Integrated Programs for Aerospace-Vehicle Design p 59-74 Sep. 1980 refs
Avail: NTIS HC A17/MF A01 CSCL 09B

Computing system requirements were developed for company-wide management of information and computer programs in an engineering data processing environment. The requirements are essential to the successful implementation of a computer-based engineering data management system; they exceed the capabilities provided by the commercially available data base management systems. These requirements were derived from a study entitled The Design Process, which was prepared by design engineers experienced in development of aerospace products. Author

N83-17409# National Science Foundation, Washington, D.C. Universities and Nonprofit Institutions Studies Group.
ACADEMIC SCIENCE: R AND D FUNDS, FISCAL YEAR 1980 (DETAILED STATISTICAL TABLES). SURVEYS OF SCIENCE RESOURCES SERIES Annual Report, FY 1980
Apr. 1982 124 p
(PB82-263724; NSF-82-300) Avail: NTIS HC A06/MF A01 CSCL 05A

The publication contains tabular data on 563 institutions of higher education regarding scientific and engineering (S/E) R&D expenditures that are separately budgeted (current-fund) expenditures budgeted and restricted specifically to R&D activities during the subject fiscal year). Data are the product of the National Science Foundation's annual Survey of Scientific and Engineering Expenditures at Universities and Colleges, FY 1980. The survey is confined to institutions offering doctoral or master's degrees in academic S/E programs having $50,000 or more in separately budgeted R&D expenditures. Data are tabulated by: (1) Source of funds; (2) by S/E discipline; (3) character of work; (4) control of institution (public/private); (5) highest degree offered; and (6) largest performers ranking. GRA

N83-17764# Joint Publications Research Service, Arlington, Va.
EUROPEAN SEMICONDUCTOR INDUSTRY: MARKETS, GOVERNMENT PROGRAMS
A. SCHARF *In its* West Europe Rept.: Sci. and Technol., No. 134 (JPRS-82686) p 29-48 20 Jan. 1983 Transl. into ENGLISH from Elektron.-Appl., Elektron.-Intern. Suppl. (West Germany), Sep. 1982 p 13-21
Avail: NTIS HC A05/MF A01

The marketing of the semiconductor industry in Europe and especially microelectronics which is situated between the millstones of USA and Japan is discussed. The concerned enterprises and governments appear to lack the motivation for close cooperation using European resources, corresponding to the ideas of the contracts on which the common market is based. It is felt that microelectronics is promoted in individual countries under more national perspectives, and the enterprises are pursuing strictly their own interests in cooperating with predominantly American and Japanese partners. An insight into the European semiconductor scene, its markets, as well as assistance for promotion and establishment available in the individual countries is discussed. E.A.K.

N83-18568*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
RIMS: RESOURCE INFORMATION MANAGEMENT SYSTEM
J. SYMES *In* NASA, Washington NASA Admin. Data Base Management Systems p 155-189 Jan. 1983
Avail: NTIS HC A13/MF A01 CSCL 05B

An overview is given of the capabilities and functions of the resource management system (RIMS). It is a simple interactive DMS tool which allows users to build, modify, and maintain data management applications. The RIMS minimizes programmer support required to develop/maintain small data base applications. The RIMS also assists in bringing the United Information Services (UIS) budget system work inhouse. Information is also given on

the relationship between the RIMS and the user community.
B.W.

N83-18701*# Northwestern Univ., Evanston, Ill. Transportation Center.
A REAPPRAISAL OF TRANSPORT AIRCRAFT NEEDS 1985 - 2000: PERCEPTIONS OF AIRLINE MANAGEMENT IN A CHANGING ECONOMIC, REGULATORY, AND TECHNOLOGICAL ENVIRONMENT
F. A. SPENCER Mar. 1982 179 p refs
(Contract NAG1-180)
(NASA-CR-165887; NAS 1.26:165887) Avail: NTIS HC A09/MF A01 CSCL 01C

Views of the executives of 24 major, national, regional, and commuter airlines concerning the effect of recent regulatory, economic, and technological changes on the roles they see for their airlines, and consequent changes in their plans for acquiring aircraft for the 1985 to 2000 period were surveyed. Differing perceptions on the economic justification for new-technology jets in the context of the carriers' present and projected financial conditions are outlined. After examining the cases for new or intermediate size jets, the study discusses turboprop powered transports, including the carriers' potential interest in an advanced technology, high-speed turboprop or prop-fan. Finally, the implications of foreign competition are examined in terms of each carrier's evaluation of the quality and financial offerings, as well as possible 'Buy American' policy predisposition. J.M.S.

N83-18978# RAND Corp., Santa Monica, Calif.
FUTURE ANALYSIS, FORECASTING AND PLANNING FOR TELECOMMUNICATIONS, ENERGY AND PUBLIC UTILITIES
B. M. MITCHELL Aug. 1982 8 p Presented at the 4th Intern. Conf., Paris, 30 June 1982
(RAND-P-6796) Avail: NTIS HC A02/MF A01

Within their national borders, public utilities and public enterprises operate in a largely homogeneous environment. To a considerable extent, the same market conditions, national economic factors, and technology are found throughout any one country. It is in comparing the public enterprises of different countries that significant differences among the basic environments of these organizations emerge--differences in the economic structure and organization of the industry, in the role of national government, and even in the analytic techniques used by forecasters. Author

N83-19641# National Center for Higher Education Management Systems, Boulder, Colo.
FINANCING AT THE LEADING 100 RESEARCH UNIVERSITIES: A STUDY OF FINANCIAL DEPENDENCY, CONCENTRATION AND RELATED INSTITUTIONAL CHARACTERISTICS. AN EXECUTIVE OVERVIEW Executive Summary, 1975 - 1979
M. MCCOY, J. KRAKOWER, and D. MAKOWSKI May 1981 51 p refs
(Contract NSF SRS-79-11096)
(PB82-242579) Avail: NTIS HC A04/MF A01 CSCL 05A

Data provided by the 100 leading research universities between fiscal years 1975 and 1979 show that these institutions received major shares of their funds from Federal sources, but they were not increasingly dependent on such funds. Constant-dollar increases in Federal grants and contracts were outpaced by constant-dollar gains in other revenue sources. Doctoral programs displayed the strongest linkage between research and graduate education (particularly in engineering, physical and life sciences). Instructional emphasis on S/E disciplines alone did not imply robust research activity. Related implications were: (1) Federal R&D funding to universities during the time period was nearly 25 to 1 times greater than industry R&D funding; (2) the Federal Government should anticipate the institutional impact of a change in funding levels; and (3) institutions should attempt to compensate in other ways for Federal funding cutbacks. GRA

N83-20181# Centre National d'Etudes Spatiales, Toulouse (France).
THE IN-ORBIT PROFIT SHARING SCHEME OF THE SPOT SATELLITE [LE SCHEMA D'INTERESSEMENT EN ORBITE DU SATELLITE SPOT]
P. COUILLARD *In* ESA Reliability and Maintainability p 15-18 Sep. 1982 In FRENCH
Avail: NTIS HC A99/MF A01

When space applications have a commercial character, it is easy to reckon that the cost of an orbiting satellite is a large factor in setting the cost of the service rendered. This is also true in telecommunication such as those for Earth observation. A guaranteed orbital lifetime is of prime importance. The constant concern of satellite users led to a progressive increase in the life orbital life of geostationary satellites from 3 years to 5 years and then to 7 years. Shortly the objective is a 10-year increase. An improved orbital life is translated by accured reliability and also by particular care taken in constructing the satellite. The search for methods to better incite makers of satellite equipment to hold reliability performance tests resulted in profit sharing in orbit which is demonstrated in the development of SPOT. *Transl. by A.R.H.*

N83-22025*# Gellman Research Associates, Inc., Jenkintown, Pa.
ECONOMIC ANALYSIS OF AERONAUTICAL RESEARCH AND TECHNOLOGY Final Report
A. J. GELLMAN 30 Aug. 1982 147 p refs
(Contract NASW-3598)
(NASA-CR-170083; NAS 1.26:170083) Avail: NTIS HC A07/MF A01 CSCL 05C

The appropriateness of government intervention in the civilian market for aeronautics research and technology (R&T) is examined. The economic rationale for government intervention is examined. The conclusion is that the institutional role played by NASA in civilian aeronautics R&T markets is economically justified.
Author

N83-23196# Commerce Dept., Washington, D.C. Office of the Assistant General Counsel for Economic Affairs.
INFORMATION AND STEPS NECESSARY TO FORM RESEARCH AND DEVELOPMENT LIMITED PARTNERSHIPS
30 Nov. 1982 104 p
(PB83-131516) Avail: NTIS HC A06/MF A01 CSCL 05A

The structure, formation and operation of research and development limited partnerships (RDLP's) were reviewed. The (RDLP) is a type of business organization which makes it possible to form syndicates for venture capital for research and development. The RDLP is an alternative to the traditional sources of the funding for business research. The RDLP removes the limitations on R%D expenditures which arise naturally if R%D is funded out of a firm's retained earnings or from borrowed money. An RDLP can finance an existing firm's R%D, or can provide the seed money for a business start up by tapping the venture capital market. It offers an effective means of financing small and large scale projects. GRA

N83-23313# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Systems and Logistics.
COST ANALYSIS OF TURBINE ENGINE WARRANTIES M.S. Thesis
G. T. HELLESTO and M. G. OLIVERSON Sep. 1982 193 p refs
(AD-A123034; AFIT-LSSR-85-82) Avail: NTIS HC A09/MF A01 CSCL 21E

In the past, the commercial use of warranties for the purchase of turbine engines has proven cost effective. The use of warranties is now viewed by the Air Force as a viable procurement option for future Air Force turbine engine procurement. The Propulsion System Program Office (SPO) has investigated the use of warranties and recognizes the need for a system that can analyze the life cycle cost of an engine under warranty. This thesis shows the development of a decision support system in a computer model that assesses the turbine engine life cycle cost under warranty.

Two versions of the warranty model were developed to provide short and long term warranty analysis and both systems were integrated into the total decision support system designed to assist SPO analysts and contract specialists to evaluate the cost effectiveness of a turbine engine warranty. Author (GRA)

N83-25656# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Systems and Logistics.
AIRFRAME RDT&E COST ESTIMATING: A JUSTIFICATION FOR AND DEVELOPMENT OF UNIQUE COST ESTIMATING RELATIONSHIPS ACCORDING TO AIRCRAFT TYPE M.S. Thesis
C. L. BECK, JR. and D. L. PFEIL Sep. 1982 205 p refs
(AD-A123848; AFIT-LSSR-56-82) Avail: NTIS HC A10/MF A01 CSCL 01C

Airframe RDT&E costs are invariably predicted by utilizing one general cost estimating relationship (CER) regardless of aircraft type(fighter, attack, or bomber/cargo). This practice results in inconsistent and often very significant inaccuracies in predicting weapon system development costs which may affect subsequent program funding. This thesis examines the utility of a unique CER for each aircraft type to be used for estimating airframe development costs. The methodology consisted of factor analysis and step-wise multiple regression analysis. Based on the results, the authors concluded that the unique CERs are consistently and significantly more accurate when estimating airframe RDT&E costs than the general CERs developed by former studies. The results of this study should be applicable to those organizations dealing with the procurement of aircraft airframes. Author (GRA)

N83-25714# RAND Corp., Santa Monica, Calif.
DEVELOPMENT AND PRODUCTION COST ESTIMATING RELATIONSHIPS FOR AIRCRAFT TURBINE ENGINES Interim Report
J. L. BIRKLER, J. B. GARFINKLE, and K. E. MARKS Oct. 1982 81 p refs
(Contract F49620-82-C-0018)
(AD-A123753; RAND/N-1882-AF) Avail: NTIS HC A05/MF A01 CSCL 05A

This document describes a recent study of cost estimating relationships for new military aircraft turbine engine development and production programs. It presents equations for estimating development and production costs and time of arrival for U.S. military turbojet and turbofan engines. The study derives new cost estimating relationships from an expanded data base and uses new diagnostic statistics to screen the relationships and to evaluate the characteristics of the preferred set. Section two of this note identifies the data used, explains the criteria and rationale for selecting explanatory variables, and describes recently developed regression diagnostics. Section three presents the preferred set of relationships. Comments on these results; a comparison with DAPCA equations; suggestions for the use of the cost estimating relationships and directions for possible future research are discussed in Section four. Supporting statistics for the predictive models are available in the Appendix. Author (GRA)

N83-26909# Naval Postgraduate School, Monterey, Calif. Dept. of Administrative Sciences.
COST ANALYSIS OF NAVY ACQUISITION ALTERNATIVES FOR THE NAVSTAR GLOBAL POSITIONING SYSTEM M.S. Thesis
T. F. DARCY and G. P. SMITH Dec. 1982 181 p refs
(AD-A125017) Avail: NTIS HC A09/MF A01 CSCL 05A

This research analyzes the life cycle cost (LCC) of the Navy's current and two hypothetical procurement alternatives for NAVSTAR Global Positioning System (GPS) user equipment. Costs are derived by the ARINC Research Corporation ACBEN cost estimating system. Data presentation is in a comparative format describing individual alternative LCC and differential costs between alternatives. Sensitivity analysis explores the impact receiver-processor unit (RPU) first unit production cost has on individual alternative LCC, as well as cost differentials between each alternative. Several benefits are discussed that might provide sufficient cost savings and/or system effectiveness improvements to warrant a procurement strategy other than the existing proposal. Author (GRA)

N83-29202# General Accounting Office, Washington, D. C. Mission Analysis and Acquisition Div.
ARMY HELICOPTER IMPROVEMENT PROGRAM'S FUTURE MAY DEPEND ON SUCCESS IN CONTROLLING COST Report to the Congress
26 Jan. 1983 19 p
(PB83-168187; GAO/MASAD-83-2; B-209125) Avail: NTIS HC A02/MF A01 CSCL 01C

In less than 3 years, costs of the program to improve the Army's scout helicopter have gone from an initial estimate of $1.3 billion to $2.7 billion. The latest estimate would permit procuring only 578 helicopters instead of the original 720. Additional cost increases can be anticipated. Since the helicopter's configuration was not fully defined when the initial cost estimate was prepared, Defense officials maintain that the initial estimate should not be given too much credence. The Government Accounting Office considers the initial cost estimate, which prompted congressional approval, particularly significant given the repeated congressional objections to the high cost of earlier scout helicopter starts. The Army's ability to contain further cost growth will likely determine the program's future. Author (GRA)

N83-30326*# Stanford Univ., Calif. Dept. of Engineering-Economic Systems.
RESEARCH IN SPACE COMMERCIALIZATION, TECHNOLOGY TRANSFER AND COMMUNICATIONS, VOL. 1 Final Report, 1 Jul. 1978 - 30 Jun. 1983
D. A. DUNN and C. E. AGNEW 1983 468 p refs 2 Vol.
(Contract NASW-3204)
(NASA-CR-172886; NAS 1.26:172886) Avail: NTIS HC A20/MF A01 CSCL 05B

Public sector R and D evaluation, NASA technology transfer, market-oriented approaches to national science policy, and markets with implications for technology transfer are discussed. Author

N83-30327*# Stanford Univ., Calif. Dept. of Engineering-Economic Systems.
RESEARCH IN SPACE COMMERCIALIZATION, TECHNOLOGY TRANSFER AND COMMUNICATIONS, VOL. 2 Final Report, 1 Jul. 1978 - 30 Jun. 1983
D. A. DUNN and C. E. AGNEW 1983 635 p refs 2 Vol.
(Contract NASW-3204)
(NASA-CR-172887; NAS 1.26:172887) Avail: NTIS HC A99/MF A01 CSCL 05B

Spectrum management, models for evaluating communications systems, and implications of communications regulations for NASA are considered as major parts of communications policy. Marketing LANDSAT products in developing countries, a political systems analysis of LANDSAT, and private financing and operation of the space operations center (space station) are discussed. Investment requirements, risks, government support, and other primary business and management considerations are examined. A.R.H.

N83-31339# Naval Postgraduate School, Monterey, Calif. Dept. of Administrative Sciences.
A COST-PERFORMANCE ANALYSIS OF COMPUTER ALTERNATIVES M.S. Thesis
G. T. CONNOLLY Dec. 1982 68 p refs
(AD-A127312) Avail: NTIS HC A04/MF A01 CSCL 05A

This study contains an application of cost-performance analysis to the automation of a manual reporting and record-keeping system. A small local transit company serves as the basis for the analysis. Beginning with a brief history of small business computing and computers in the transit industry, it covers the main aspects of requirements analysis in terms of system size, software and hardware. Four alternative computer systems, two minicomputers and two microcomputer networks, are presented and rated on their responsiveness to the transit company's needs. Tradeoffs in cost and performance are analyzed to determine the marginal costs for each unit of increase in performance. The

cost-performance techniques developed for mainframe systems are shown to be applicable to minicomputer and a microcomputer based systems as well. Author (GRA)

N83-31519# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Systems and Logistics.
A LIFE CYCLE COST MANAGEMENT PRIMER FOR USE WITHIN THE AERONAUTICAL SYSTEMS DIVISION M.S. Thesis
A. K. DOUVILLE Mar. 1983 218 p refs
(AD-A127267; AFIT-LSSR-80-82) Avail: NTIS HC A10/MF A01 CSCL 05A

The LCC Management Primer which serves as the basis for this thesis has been developed in response to the recommendation made by the audit team. It has been designed primarily to provide the notice LCC focal point a basis from which to establish a viable LCC Management program. That basis includes general guidance concerning the use of such accepted management tools as goals, trade-off analyses, and management control systems. It also includes a description of the documents use in managing a program and how those documents can precipitate program cost effectiveness through their LCC Management inputs. In addition to the benefits provided to the novice, the Primer should also be of some benefit to more experienced focal points. Specifically, the information provided in the Primer can serve as quick reference material for such key LCC Management elements as cost-related design goals. GRA

N83-31521# Desmatics, Inc., State College, Pa.
IDENTIFYING FIXED SUPPORT COSTS IN AIR FORCE VISIBILITY AND MANAGEMENT OF OPERATING AND SUPPORT COSTS (VAMOSC)
R. L. GARDNER and D. E. SMITH Apr. 1983 24 p refs Presented at the Resource Analysis and Management Working Group (C-2) of the 50th Mil. Operations Res. Soc. Symp., Annapolis, 8-10 Mar. 1983
(Contract F33600-80-C-0554)
(AD-A127403; TR-115-8) Avail: NTIS HC A02/MF A01 CSCL 05C

This report is essentially a slightly expanded transcript of a presentation given at the 50th Symposium of the Military Operations Research Society (MORs) held at the U. S. Naval Academy, Annapolis, MD, in March 1983. The material represents work in progress under Contract No. F33600-80-C-0554, with the Office of VAMOSC, HQ AFLC/LO, Wright-Patterson AFB, OH. The paper describes an approach for separating installation support costs into fixed and variable components. The findings to date are tentative and are undergoing further investigation. Author (GRA)

N83-32390# Los Alamos Scientific Lab., N. Mex.
DERIVING METRICS FOR RELATING COMPLEXITY MEASURES TO SOFTWARE MAINTENANCE COSTS
L. BRICE, J. CONNELL, and J. TAYLOR 1982 9 p refs Presented at the 13th Computer Meas. Group Conf., San Diego, Calif., 14 Dec. 1982
(Contract W-7405-ENG-36)
(DE83-000672; LA-UR-82-2640; CONF-821202-3) Avail: NTIS HC A02/MF A01

Managers of software maintenance functions know that maintenance costs often increase with the age of software, and that maintenance costs are frequently proportional to software complexity. When the service to expense ratio degrades, sometimes a rewrite of the software results in a payoff. This research is a case study, presenting factors which contributed to the expense of one maintenance function. A descriptive model was used. It is suggested how the descriptive model could be a building block toward the derivation of a predictive model. A predictive model could be used in the presentation of a breakeven/payoff analysis, justifying the expense of rewriting existing software to contain minimum complexity by incorporating modern techniques. DOE

N83-32664# Science Applications, Inc., Orlando, Fla.
USER'S MANUAL FOR TRAINING DEVICE COST MODEL 'TRACOM' Final Report
J. BILLINGS Apr. 1983 72 p
(Contract N61339-79-D-0007)
(AD-A128355; PMT-EM-0004-83) Avail: NTIS HC A04/MF A01 CSCL 14A

TRACOM is a computerized cost model designed to aid the analyst in preparation of Baseline Cost Estimates (BCE). The User's Manual instructs the user how to use the model. The manual describes what data is required, how to input the data, and how to use the model routines to develop a BCE. Author (GRA)

N83-32665# Science Applications, Inc., Orlando, Fla.
USER'S MANUAL FOR COST PROPOSAL EVALUATION PROGRAM (CPEP) Final Report
C. BROUSE and J. DELANG Apr. 1983 113 p
(Contract N61339-79-D-0007)
(AD-A128356; PMT-EM-0003-83) Avail: NTIS HC A06/MF A01 CSCL 14A

The Cost Proposal Evaluation Program (CPEP) is a means to simplify and standardize the methodology for evaluating cost proposals. The User's Manual provides instruction to the cost analyst or evaluation team in the use of the tool. The manual guides the user from a discussion of what data is required (the Cost Proposal Requirements section of an RFP), to a discussion of data preparation after a proposal has been received. The manual continues with step-by-step instructions in the use of the data processing software developed for CPEP. The instructions and the use of the software are both presented in an elementary manner to assist individuals new to cost proposal evaluation. The software provides printouts that are used for comparison to a Government estimate. Costs are presented at various levels of detail, burden or unburdened, inflated or normalized.
Author (GRA)

N83-32677# Army Troop Support and Aviation Materiel Readiness Command, St. Louis, Mo. Cost Analysis Div.
HISTORICAL INFLATION PROGRAM. A COMPUTER PROGRAM GENERATING HISTORICAL INFLATION INDICES FOR ARMY AIRCRAFT, REVISION Final Report
W. H. GILLE, JR. and J. R. HAMILTON Mar. 1983 91 p refs
(AD-A127674; TSARCOM-TR-83-1) Avail: NTIS HC A05/MF A01 CSCL 05C

This report extends and revises Technical Report 82-2 which presents and describes the Historical Inflation Program, a computer program generating historical inflation indices for Army aircraft. The program can be updated monthly, is easily revised for changes in Bureau of Labor Statistics methods, and is capable of handling data for all fiscal year formats. Output is expressed as monthly, quarterly, Fiscal Year, and Calendar Year inflation indices (in Calendar Year 1967 base) and inflation factors (in Fiscal Year base). This report contains updated tables of inflation factors, expressed in a FY 82 base. These indices and factors provide a means of adjusting historical cost data for the procurement of Army aircraft to constant year dollars. Additional features include: computations for the derivation of revised weighting factors, detailed indices enabling the adjustment of historical labor and material costs separately, a discussion of aggregate weighting factors for labor and materials (including trends from sensitivity analysis with more background materials), and additional documentation aimed at making the report useful to a large cross section of the DOD rotary wing aircraft community. This report has been revised to include the latest information concerning the UH-60A BLACK HAWK. Author (GRA)

N83-34117*# Western Union Telegraph Co., McLean, Va. *Government Systems Div.*
SATELLITE PROVIDED CUSTOMER PREMISE SERVICES: A FORECAST OF POTENTIAL DOMESTIC DEMAND THROUGH THE YEAR 2000. VOLUME 2: TECHNICAL REPORT Final Report
Aug. 1983 315 p refs 3 Vol.
(Contract NAS3-23255)
(NASA-CR-168143; NAS 1.26:168143) Avail: NTIS HC A13/MF A01 CSCL 17B

The potential United States domestic telecommunications demand for satellite provided customer premises voice, data and video services through the year 2000 were forecast, so that this information on service demand would be available to aid in NASA program planning. To accomplish this overall purpose the following objectives were achieved: development of a forecast of the total domestic telecommunicatons demand, identification of that portion of the telecommunications demand suitable for transmission by satellite systems, identification of that portion of the satellite market addressable by Computer premises services systems, identification of that portion of the satellite market addressabble by Ka-band CPS system, and postulation of a Ka-band CPS network on a nationwide and local level. The approach employed included the use of a variety of forecasting models, a market distribution model and a network optimization model. Forecasts were developed for; 1980, 1990, and 2000; voice, data and video services; terrestrial and satellite delivery modes; and C, Ku and Ka-bands. Author

N83-35051# Aerojet Tactical Systems, Sacramento, Calif.
AIR FORCE ARMAMENT DIVISION MANUFACTURING COST REDUCTION PROGRAM
P. CRIMMINS *In* APL The 1983 JANNAF Propulsion Meeting, Vol. 2 p 281-290 Feb. 1983
Avail: NTIS HC A14/MF A01 CSCL 21H

Manufacturing technology programs to reduce the manufacturing cost of Air Force Tactical Rocket Motor programs were analyzed. Six propulsion systems were reviewed, and manufacturing cost data were analyzed to identify high cost areas and the significant contributing factors. Potential problems affecting propulsion system costs were also identified from experience, and correlated where possible with the cost drivers. Recommended manufacturing technology programs are established, based on the analyses of these cost drivers and problems. E.A.K.

N83-35921# Joint Publications Research Service, Arlington, Va.
WAYS TO SPEED UP PRACTICAL APPLICATION OF RESEARCH RESULTS DISCUSSED
I. SIGOV *In its* USSR Rept.: Sci. and Technol. Policy, No. 16 (JPRS-84352) p 36-41 19 Sep. 1983 refs Transl. into ENGLISH from Ekon. Nauki (Moscow), no. 5, May 1983 p 25-29
Avail: NTIS HC A05

The conditions under which the country's economy will develop in the 80's require ever more persistently the acceleration of scientific and technical progress. In this regard, a most acute and decisive issue today involves the practical application of scientific discoveries and invention. In theoretical studies and in practical work ever increasing amounts of attention are devoted to the problem of applying results. However it is still viewed mainly with regard to implementation within the material production sphere of the achievements of technical and natural sciences. At the same time the task of putting into practice the results obtained from research in the social sciences, and especially in economics, is becoming no less important. The urgency of this problem requires in-depth theoretical treatment of the questions concerning the essence, spheres, forms and evaluations of the practical application of the achievements of economic sciences, as well the determination of concrete ways to accelerate this process.
Author

N83-35923# Joint Publications Research Service, Arlington, Va.
COST ACCOUNTING AND ORGANIZATIONAL STRUCTURE OF PRODUCTION UNITS DISCUSSED
V. TARASOV *In its* USSR Rept.: Sci. and Technol. Policy, No. 16 (JPRS-84352) p 48-54 19 Sep. 1983 refs Transl. into ENGLISH from Ekon. Nauki (Moscow), no. 5, May 1983 p 32-36
Avail: NTIS HC A05

When the country is being shifted to an intensive path of development, it is especially important to determine the principles for the construction of effective organizational forms for the management of production. When working to achieve this task there are two basic elements in the economic mechanism of the primary production units which must be used as a foundation: the organizational structure and the internal system of cost accounting. The question of finding the best management forms comes forward as a question primarily of the relation and interdependence of the two named elements in the process of functioning by the economic mechanism. Author

N83-35929# Joint Publications Research Service, Arlington, Va.
OBSTACLES TO NEW IDEAS DEPLORED
V. KOPTYUG *In its* USSR Rept.: Sci. and Technol. Policy, No. 17 (JPRS-84366) p 17-21 20 Sep. 1983 Transl. into ENGLISH from Sov. Rossiya (USSR), 11 Mar. 1983 p 1
Avail: NTIS HC A06

The exceptional significance of intensifying the national economy requires detection and elimination of specific difficulties which interfere with scientific and technical progress. The country awaits from the scientists new basic results in all areas of science, more active influence on improving the social productivity. The scientists clearly recognize the entire measure of their responsibility to society. The goal has to be approached from both sides. The scientists should intensively and responsibly bring their developments to a level where they are adopted by industry. Even more important, industry should be closely interested in the work of the scientists. Author

N83-35931# Joint Publications Research Service, Arlington, Va.
OBSTACLES TO INNOVATION INTRODUCTION REVEALED
N. SHILO *In its* USSR Rept.: Sci. and Technol. Policy, No. 17 (JPRS-84366) p 26-29 20 Sep. 1983 Transl. into ENGLISH from Sov. Rossiya (USSR), 26 Feb. 1983 p 3
Avail: NTIS HC A06

The introduction of new ideas should be mandatory for any production. The system of accounting of a socialist enterprise together with price formation and wages formation should correlate so they force managers to literally hunt for new ideas, and not shy away from them like forbidden fruit. The plan for each enterprise should include: by what period should the innovation be assimilated, what series should be produced, by what year will the innovation guarantee the needs instead of the outdated model. In addition to current planning, a long term plan should have a renewal with regard to technical achievements, and some type of index of up to dateness. Author

N83-35932# Joint Publications Research Service, Arlington, Va.
IMPROVE UTILIZATION OF SCIENTIFIC AND TECHNOLOGICAL POTENTIAL
M. ILIN and A. POPOUDIN *In its* USSR Rept.: Sci. and Technol. Policy, No. 17 (JPRS-84366) p 30-34 20 Sep. 1983 Transl. into ENGLISH from Ekon. Sotrudnichestvo Stran-Chlenov Sev. (USSR), no. 5, May 1983 p 31-33
Avail: NTIS HC A06

The growing importance of scientific and technical progress as a major factor in converting the economics of the countries of the socialist community to the intensive path of development places in the forefront the task of a planned management of the development of the scientific and technological potential of these countries and drafting a policy, along with measures to implement it, for combining most effectively the advantages of the socialist method of production with the achievements of the scientific and technical revolution. This task is being accomplished on the basis of both national plans for social and economic development and

the evolving international socialist division of labor in science and technology. Author

N83-35939# Environmental Protection Agency, Washington, D.C. Management and Organization Div.
COST EFFECTIVENESS STUDY METHODOLOGY AS APPLIED TO EPA'S DIRECTIVES SYSTEM
24 Mar. 1983 31 p
(PB83-191122) Avail: NTIS HC A03/MF A01 CSCL 05A

Details and results of the pilot study conducted of EPA's directives system are presented to demonstrate the successful application of the Division's cost effectiveness methodology. The directives system is the process EPA uses to develop, approve and disseminate Agencywide, policies and procedures in the form of orders and manuals. GRA

N83-35944# Army Construction Engineering Research Lab., Champaign, Ill.
LIFE CYCLE COST DATABASE. VOLUME 2: APPENDICES E, F, AND G, SAMPLE DATA DEVELOPMENT Final Report
R. D. NEATHAMMER Jan. 1983 282 p refs 2 Vol.
(Contract DA PROJ. 4A7-62731-AT-41A)
(AD-A126645; CERL-TR-P-139-VOL-2) Avail: NTIS HC A13/MF A01 CSCL 05B

Sample data developed for life cycle cost (LCC) data bases for use in computing design alternatives for military construction are presented. Sample data were developed for heating, ventilating, and air conditioning systems, floor covering systems, and cooling generating systems. The reseach done to design the LCC data bases is documented and the feasibility of using analytical methods to develop information for the data bases is investigated. It is that use of Engineered Performance Standards is the best way to obtain the data. GRA

N83-35951*# Export Council for Renewable Energy, Washington, D.C.
THE EXPORT TRADING COMPANY ACT OF 1982 AND THE PHOTOVOLTAICS INDUSTRY: AN ASSESSMENT Final Report
S. ENFIELD and C. LAPORTA 2 Sep. 1983 44 p Sponsored by NASA and DOE Prepared for JPL, Pasadena, Calif.
(Contract JPL-766403)
(NASA-CR-173128; DOE/JPL-BD766403-83/1; JPL-9950-869; NAS 1.26:173128) Avail: NTIS HC A03/MF A01 CSCL 05D

The potential advantages of recent export promotion legislation for the U.S. photovoltaics industry were assessed. The provisions of the Export Trading Company Act of 1982 were reviewed and the export trade sector was surveyed to determine what impact the Act is haviang on export company activity. The photovoltaics industry was then studied to determine whether the Act offers particular advantages for promoting its product overseas. A.R.H.

N83-35993# Army Aviation Research and Development Command, St. Louis, Mo. Directorate for Plans and Analysis.
HISTORICAL RESEARCH AND DEVELOPMENT INFLATION INDICES FOR ARMY FIXED AND ROTOR WINGED AIRCRAFT Annual Report
W. CROSBY Mar. 1983 25 p refs
(AD-A129317; USAAVRADCOM-TM-83-F-1) Avail: NTIS HC A02/MF A01 CSCL 05A

This Technical Memorandum is a continuation of previous efforts to develop the necessary rationale and methodology needed in order to construct historical inflation indices, in the Research and Development (R&D) area, relative to Army aircraft. The R&D historical indices, and the sub-indices from which they are derived, are presented in the appendices to this report for the period FY68 through FY82. A computer program is utilized to make the necessary mathematical calculations. Data sources of this report were the Office of Personnel Management (OPM) and the Bureau of Labor Statistics (BLS). OPM supplied data on government salaries. BLS furnished data on industry salaries and thirteen (13) different materials. The computer program prints the R&D historical inflation indices and sub-indices by fiscal year as shown in Appendices A, C, D and E. Author (GRA)

N83-36720# Naval Postgraduate School, Monterey, Calif. Dept. of Administrative Sciences.
SOFTWARE DEVELOPMENT PROJECTS: ESTIMATION OF COST AND EFFORT (A MANAGERS DIGEST) M.S. Thesis
C. J. PIERCE and R. L. WAGNER Dec. 1982 103 p refs
(AD-A126358) Avail: NTIS HC A06/MF A01 CSCL 09B

This research focuses on the principles upon which models have been, and may be, constructed for estimating cost and effort in software development projects. A definition of and factors influencing software engineering economics is presented. The major phases and activities of the software lifecycle are described. Effort, time and cost estimation is analyzed. A presentation is then given of some widely used models for estimating cost and effort. Critical factors which must be considered when constructing a model for estimating cost and effort in software development projects are then presented. The authors summarize by citing areas that require more attention if cost and effort estimates are to be further improved. Author

N83-36987# International Trade Administration, Washington, D.C.
HIGH TECHNOLOGY INDUSTRIES: PROFILES AND OUTLOOKS. THE SEMICONDUCTOR INDUSTRY
1983 33 p
(PB83-211151) Avail: NTIS HC A03/MF A01; also available in set of 4 reports HC E99 as PB83-211128 CSCL 05C

This profile is designed to assess the international competitive position of the U.S. Semiconductor Industry; pinpoint the major foreign and domestic challenges to American semiconductor manufacturers; and present for discussion possible options in terms of U.S. government policies affecting the sector's international standing. GRA

N83-37001# General Accounting Office, Washington, D. C. Mission Analysis and Systems Acquisition Div.
EVALUATION OF THE UNIT COST EXCEPTION REPORTS ON THE HIGH SPEED ANTI-RADIATION MISSILE
F. C. CONAHAN 6 Jun. 1983 4 p
(AD-A129689; GAO/MASAD-83-29) Avail: NTIS HC A02/MF A01 CSCL 05A

The High Speed Anti-Radiation Missile (HARM) is a joint Navy and Air Force program with the Navy designated lead service. Although a joint program, both services prepared unit cost exception reports. We reviewed four unit cost exception reports submitted by the Secretaries of the Navy and the Air Force explaining why unit costs for HARM increased. The reports submitted generally provided the unit cost information required by law. However, the reports did not present a complete picture of a joint Department of Defense program. Each service based its program estimates on different acquisition strategies even though only one strategy can be followed. In addition, the reports did not disclose other reasons contributing to the differences in unit costs or fully explain why costs increased. Since separate reports were submitted, they should have clearly disclosed all differences and any implication on costs. This review was made as part of our continuing examination of unit cost exception reports. GRA

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LOGISTICS AND OPERATIONS MANAGEMENT

Includes transportation, operational satellite and space flight programs, air traffic control, search and rescue, maintenance, fuel conservation, and procurement.

A83-11117#
MORE EFFICIENT AND EFFECTIVE DEFENSE SYSTEM ACQUISITION THROUGH UNIFIED SYSTEM EFFECTIVENESS ANALYSIS AND CONTROL /SEAC/
B. DWORKIN (USAF, Aeronautical Systems Div., Wright-Patterson AFB, OH) In: NAECON 1982; Proceedings of the National Aerospace and Electronics Conference, Dayton, OH, May 18-20, 1982. Volume 1. New York, Institute of Electrical and Electronics Engineers, Inc., 1982, p. 292-297.

A system level approach is proposed for the minimization of problems encountered during military system acquisition and deployment cycles which employs a unified System Effectiveness Analysis and Control (SEAC) concept that is to be applied during all phases of acquisition. The objective of SEAC is the structuring and control of a system program by the use of logical, mission-related and affordability-based measures of effectiveness (MEs). In addition to the design guidance afforded by the MEs, the institutionalization of a system/cost effectiveness analysis unit at each major acquisition management organization will provide analytical support services for program management. O.C.

A83-11155
TECHNIQUES FOR SYSTEM READINESS ANALYSIS
A. B. CALVO (Analytic Sciences Corp., Reading, MA) In: NAECON 1982; Proceedings of the National Aerospace and Electronics Conference, Dayton, OH, May 18-20, 1982. Volume 2. New York, Institute of Electrical and Electronics Engineers, Inc., 1982, p. 628-634. refs

The paper examines several system support issues of interest to the program manager in responding to recent DoD initiatives addressing readiness. Particular attention is given to system readiness measures and readiness modeling techniques (SOAR, OAR, and dormant system analysis). It is suggested that careful consideration should be given to model selection for the evaluation of readiness related issues for various types of systems. A single generic model may not effectively capture the relevant issues; instead, models tailored to specific types of systems, i.e., dormant systems, pods, avionics internal to aircraft, capturing the essential operational and maintenance factors, may prove more efficient and relevant. B.J.

A83-15424
U.S. NAVY SEARCH AND RESCUE MODEL MANAGER
C. T. FOWINKLE (U.S. Navy, Pensacola, FL) In: SAFE Association, Annual Symposium, 19th, Las Vegas, NV, December 6-10, 1981, Proceedings. Van Nuys, CA, SAFE Association, 1982, p. 144-149.

The techniques for improving search and rescue (SAR) operations and maintaining a facile flow of information employed by the SAR Model Manager of the U.S. Navy are described. The SAR Model Manager and his staff continually review existing and recommended changes to SAR procedures and equipment. Additionally, studies are performed to provide recognition incentives to encourage trained rescue swimmers to remain in the service. The SAR Model Manager coordinates the suggestions and recommendations from each service for improved operations, thus ensuring that all the services share in the improvements and cost savings derived from ideas and equipment originating in one of the branches, e.g., night goggles to detect IR distress signals, or changes in the Stokes litter. M.S.K.

A83-16809*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
SPACELAB EXPERIMENT INTEGRATION
R. C. LESTER (NASA, Marshall Space Flight Center, Spacelab Payload Projects Office, Huntsville, AL) American Institute of Aeronautics and Astronautics, Aerospace Sciences Meeting, 21st, Reno, NV, Jan. 10-13, 1983, 7 p.
(AIAA PAPER 83-0593)

The capabilities and characteristics of Spacelab are discussed, and a process is described for the integration of a large number of experiments into the vehicle. Spacelab payload services and experiment integration functions are examined. The latter include science management; mission definition, documentation, and control requirements and interfaces; analytical integration; ground processing; flight operations; and postflight activities. It is concluded that the major factors involved in Spacelab experiment integration have been optimized to a great extent with respect to maximum science return for minimum cost. F.G.M.

A83-17726
AIR TRAFFIC MANAGEMENT - CURRENT PROBLEMS AND FUTURE CONCEPTS; PROCEEDINGS OF THE SPRING CONVENTION, LONDON, ENGLAND, MAY 12, 13, 1982
Convention sponsored by the Royal Aeronautical Society. London, Royal Aeronautical Society, 1982. 151 p.

The present conference on problems and prospects in air traffic management focuses on the British National Air Traffic Services (NATS). Among the topics discussed are the impact on airport operations of the growth of the portion of the civil aviation fleet made up by wide-bodied aircraft, the reconciliation of military and civil air traffic control requirements, NATS plans for implementing highly automated air traffic control centers for London, Scottish domestic airspace and oceanic airspace, air traffic management research underway at the Royal Signals and Radar Establishment, and the consideration of human factors in the design of future air traffic control systems. Also considered are the capability and potential role of airborne avionics in air traffic management, and a projection of concepts for future air traffic management over Europe. O.C.

A83-17727#
NATS - TAKING STOCK
B. HUXLEY (National Air Traffic Services, London, England) In: Air traffic management - Current problems and future concepts; Proceedings of the Spring Convention, London, England, May 12, 13, 1982. London, Royal Aeronautical Society, 1982. 9 p.

Britains's National Air Traffic Services (NATS) were created in December, 1962 for the purpose of integrating military and civil air traffic control in a way that involved no preferential treatment for either. Although a single airspace management system capable of serving both air defence and air traffic control was never implemented, and military and civil air traffic operations are conducted separately despite coordination, an integrated service has in effect been formed in virtue of the office of the Controller, NATS, which is served by a joint military/civil headquarters. An assessment is given of this organizational structure's policies with respect to route capacity, special commercial requirements, military and recreational requirements, environmental interests, and future demand. O.C.

A83-17728#
AIR TRAFFIC MANAGEMENT - THE IMPACT AT THE AIRPORT
G. A. CHAMPNISS (British Airports Authority, London, England) In: Air traffic management - Current problems and future concepts; Proceedings of the Spring Convention, London, England, May 12, 13, 1982. London, Royal Aeronautical Society, 1982. 5 p.

The introduction of wide bodied aircraft has led to the adoption of increased separation standards in order to minimize the effects of wake turbulence. This use of increased separation standards, while of relatively minor significance when the total number of movements by wide bodied aircraft is low, results in a significant reduction in the sustainable capacity of a dedicated landing runway

as the proportion of such aircraft increases. The reduction of separation standards currently in use without adverse effects on safety may be achieved by means of more efficient airport surface movement guidance and control,which optimizes the capacity of a given runway. The aircraft whose impact will be most strongly felt are the 757, 767 and 737, all new generation airliners capable of Category III visibility conditions operations which will require airport facilities to accomodate their expanded capabilities. O.C.

A83-17730
AIR TRAFFIC MANAGEMENT RESEARCH AT THE ROYAL SIGNALS AND RADAR ESTABLISHMENT
J. L. GOODWIN (Royal Signals and Radar Establishment, Malvern, Worcs., England) In: Air traffic management - Current problems and future concepts; Proceedings of the Spring Convention, London, England, May 12, 13, 1982. London, Royal Aeronautical Society, 1982. 10 p.

A description is given of research facilities and efforts at Britain's Royal Signals and Radar Establishment, which may be characterized as 40 per cent concerned with systems and air traffic management (ATM) techniques, 40 per cent with secondary surveillance radar development, and 20 per cent with computing and other laboratory facilities. Advanced ATM elements include improved radar surveillance data and communications, especially with regard to data display and updating facilities for the controllers, increased use of automated assistance to the controller, and an improved understanding of human factors in the system so that the optimum mix of human and machine capabilities can be formulated. Flowchart representations are given of idealized and realistic versions of the ATM control loop, the departure flow regulator cell of a centralized, coordinating ATM sector; and a novel arrivals planning concept. O.C.

A83-17731#
THE CAPABILITY AND POTENTIAL ROLE OF AIRBORNE AVIONIC SYSTEMS IN AIR TRAFFIC MANAGEMENT
R. R. NEWBERY (Royal Aircraft Establishment, Bedford, England) In: Air traffic management - Current problems and future concepts; Proceedings of the Spring Convention, London, England, May 12, 13, 1982. London, Royal Aeronautical Society, 1982. 10 p. refs

An assessment is presented of techniques for navigation, control, displays and flight management currently under development in Britain, along with results of the Civil Avionics Program. The greatest obstacles to future progress identified in the areas mentioned are such communications interfaces as the data input between air crews and flight systems and between the aircraft and ground systems. Computing and display systems may ultimately be developed to form part of a ramp-to-ramp air traffic management system. More immediate plans of the present Program are concentrated on improving the interface between flight systems represented by those of the BAC 1-11 airliner and a simulated future air traffic control system for the southeast of England
O.C.

A83-17735#
AIR TRAFFIC FLOW MANAGEMENT OVER EUROPE
H. GUNTHER (EUROCONTROL, Brussels, Belgium) In: Air traffic management - Current problems and future concepts; Proceedings of the Spring Convention, London, England, May 12, 13, 1982. London, Royal Aeronautical Society, 1982. 15 p.

The types of air traffic delays experienced in Europe are discussed, together with steps taken to ameliorate the problems and the limitations of existing systems. Problems have included desires by the carriers to reduce mileage and flight level constraints, rerouting resulted from saturation of airport capacities, shortages of ATC equipment and personnel, and a lack of coordination between civil and military air carriers, as well as labor problems becoming acute during periods of greatest flight traffic. The problems have been eased by the introduction of radar to facilities which previously did not have radar, the formation of one-way routes, and flow control, specifically route orientation, flight level allocation, the imposition of flow rates, and requiring permission be requested along a flight path before take-off. The air traffic flow management concept was developed to establish a region-wide optimum air traffic flow. A centralized flight data network receives flight plans up to the midnight before the flight, then accepts or refuses the flight plans and offers alternative routes.
M.S.K.

A83-19150
FUEL SAVINGS IN AIR TRANSPORT
J. L. RENTEUX and H. SCHROEDER Airport Forum, vol. 11, Dec. 1982, p. 36-40.

A summary of conclusions reached in a report by Eurocontrol on civil aircraft fuel conservation measures implementable by ATC is presented. The types of aircraft were categorized together with flight statistics. The average European flight was determined to be 320 nm, with total fuel consumed annually amounting to 16 Mtons. Routing changes were projected to save 4% of the total fuel consumed. Delays, if ameliorated, could account for 1,5% savings, while flight profile changes, if minimized, offer a 3.5-4.5% reduction. In total, from 4.9-5.8% of consumption can be saved in the short term, and an additional 4% in the medium term, i.e., 1985. Various additional steps, including improved training for ATCs, links between the flight management computer and the ground-based computers, and start-up and take-off procedures improvements are outlined. D.H.K.

A83-24424
FLIGHT MANAGEMENT SYSTEMS AND DATA LINKS
T. W. HENDRICKSON (Boeing Commercial Airplane Co., Seattle, WA) Aeronautical Journal, vol. 87, Feb. 1983, p. 52-67. refs

Digital avionics system in modern commercial jet aircraft are examined, using as examples systems on the 757 and 767 aircraft. Eight CRTs are provided in the cockpits of the two aircraft, six on the main instrument panel and two on the central console. The central units are color coded and high-resolution, and provide graphic and alphanumeric data. The number of flight deck indicators is reduced by use of the CRTs that include engine condition displays which, in addition to all previous information, are color-coded to define the levels of attention demanded by particular situations. A flight management computer integrates navigation, flight planning, performance management, and three-dimensional guidance on the flight path. Data links with ground stations and elements of the flight management system (FMS) are accomplished through a series of ARINC data buses. Most software is written in HOL, while some of the FMS software is in PASCAL. The benefits of future uses of floating point microprocessors are considered.
(Author)

A83-24867#
THE ROLE OF ADVANCED NAVIGATION IN FUTURE AIR TRAFFIC MANAGEMENT
R. C. RAWLINGS (Royal Aircraft Establishment, Bedford, England) In: Integrated navigation: Actual and potential - Sea-air-space; Proceedings of the International Congress, Paris, France, September 21-24, 1982. Volume 2. Paris, Institut Francais de Navigation, 1982, p. BR 2-1-A to BR 2-12-A.

The future of air traffic control is considered in terms of advanced navigation techniques, vertical profile management, and time control. Navigation performance is assessed noting VHF omni-directional ranging or nondirectional beacons as well as distance measuring equipment. The accuracies of these various systems are discussed with reference to a test aircraft operated over Wales. Future developments in air traffic control are identified, including improvements in the pilot-machine interface, computerized control systems, and advanced communications links. S.C.S.

A83-29241
ON THE ROUTES - BOEING 757 WITH BRITISH AIRWAYS
T. E. FORD Aircraft Engineering (ISSN 0002-2667), vol. 55, April 1983, p. 2-6.

The planned use of Boeing 757s by British Airways is briefly described, and aspects of the aircraft are discussed. The automatic flight controls are addressed, including the functional interrelationship of the autopilot flight director system, the single

channel thrust management system, and other sub systems. The components and functions of the flight management system are considered, and the capabilities of the electronic flight instrument system are described. The engine indication and crew alerting system, which provides the flight crew with primary engine parameters for the whole time and with secondary engine parameters and caution advisory alert messages, is covered. The control surfaces and their functioning are addressed, and the fuel system and powerplants are discussed, indicating some of the parameters. C.D.

A83-29393#
ENERGY CONSERVATION IN AIR TRANSPORTATION - THE CANADIAN AIR TRAFFIC CONTROL EFFORT
R. E. CHAFE (Transport Canada, Ottawa, Canada) Canadian Aeronautics and Space Journal (ISSN 0008-2821), vol. 28, Dec. 1982, p. 339-345.

Air Traffic Services, an element of the Canadian Air Transport Administration, has taken steps to satisfy requirements for a service which will yield energy and cost efficiency improvements for prospective users. Considerations influencing the formulation of policy have included data on the North Atlantic airspace at and above Flight Level 270, together with its transition area over eastern Canada, the demands of military airspace, standard profile aircraft descents to minimize radar vectoring requirements, the possibilities for the automation of air traffic control, and an air traffic flow management program currently under development. O.C.

A83-29968
CHOICE OF OPTIMAL CABIN CAPACITY
D. G. YEOMANS (Cranfield Institute of Technology, Cranfield, Beds., England) (Royal Aeronautical Society, Symposium on Planning Airline Fleet Composition, London, England, Jan. 19, 1983) Aeronautical Journal (ISSN 0001-9240), vol. 87, March 1983, p. 95-98.

Considerations of cabin capacity, which may be briefly characterized as the number of passenger seats available on a given flight, seek to establish a balance between situations in which passengers must be turned away for lack of seats, and the high overhead costs in relationship to revenue resulting from an excess of seating capacity. Although cabin capacity is only a general consideration during aircraft procurement, small adjustments may make the difference between profit and loss once the aircraft is in service. One such adjustment is cabin apportionment to different passenger classes. Optimal seat number is frequently computed by means of the Normal distribution, although Elle (1967) has shown that the Negative Binomial distribution is more correct. Attention is given to the difference between results obtained by means of these two distributions. O.C.

A83-30275
AIR TRAFFIC CONTROL INTO THE 21ST CENTURY
J. L. HELMS (FAA, Washington, DC) Aerospace (UK) (ISSN 0305-0831), vol. 10, April 1983, p. 16-20, 22, 23.

The National Airspace System Plan developed by the FAA is described. The plan is designed to accommodate projected growth in US demand for ATC services, place minimum constraints on operators, improve dissimination of weather and traffic information, and increase system productivity. Its major elements, to be phased in by 1993, are discussed in detail: ATC automation including improvements in Conflict Alert IFR/VFR Mode C Intruder, Conflict Resolution Advisories, En Route Metering, and the ARTS terminal automation system, followed by replacement of the computer hardware and software and implementation of Automated En Route ATC; integrated flow management; automation of FSSs; improvements in aircraft separation assurance (Traffic Alert and Collision Avoidance System and Mode S enhancement of the ATC Radar Beacon System); modernization of the weather system (development of Doppler weather radar system and Center Weather Processor); improvements in the communications system (National Airspace Data Interchange Network and Voice Switching and Control System); streamlining of navigation services and assessement of self-continued navigation systems; implementation of Microwave Landing System and improvements in airport capacity utilization. T.K.

A83-30830#
CHANGING THE COURSE OF U.S. AVIATION
J. E. STEINER and L. K. MONTLE (Boeing Co., Seattle, Wa) Astronautics and Aeronautics (ISSN 0004-6213), vol. 21, May 1983, p. 48-53, 110.

The present discussion concerns the near-term measures that may be taken by the aerospace industrial community of the U.S. to ensure commercial superiority over the comparable aircraft production enterprises of Western Europe as well as those recently announced for the turn of the century by Japanese industrial planners. It is noted that civil aviation advances can play a major role in the achievement of urgent military objectives, and that technological readiness for the penetration of potential markets can be managed with moderate risk through the cooperative orchestration of a multiplicity of technology development efforts. Attention is given to the development history of the technologies ultimately integrated in the form of the ring laser gyro, and to the evolution of advanced flight management system avionics, as paradigmatic cases of intensive and coordinated use of the U.S. aerospace industrial base. O.C.

A83-33363#
AIRPORT PAVEMENT MANAGEMENT - A TOTAL SYSTEM
M. Y. SHAHIN (U.S. Army Construction Engineering Research Laboratory, Champaign, IL) AIAA, ASCE, TRB, ATRIF, and CASI, International Air Transportation Conference, Montreal, Canada, June 1-3, 1983. 12 p. refs
(AIAA PAPER 83-1600)

Airport pavements must be monitored carefully to ensure safe aircraft operations. The U.S. Army Construction Engineering Research Laboratory (CERL) has, therefore, developed a comprehensive airport pavement management system. The airport system has been incorporated into a computerized roads and parking lots management system under the name Paver. The present investigation is concerned with the Paver features pertaining to airports. The system consists of procedures for dividing the airport pavement into manageable sections, data collection, data storage and retrieval, network management, project management, and budget optimization. Attention is given to pavement condition rating, pavement nondestructive testing, budget optimization, life cycle costing, and a benefit analysis. G.R.

A83-33369#
OVERVIEW OF THE AIR CARGO INDUSTRY
M. K. GAMBLE (U.S. Congress, Office of Technology Assessment, Washington, DC) AIAA, ASCE, TRB, ATRIF, and CASI, International Air Transportation Conference, Montreal, Canada, June 1-3, 1983. 4 p. refs
(AIAA PAPER 83-1607)

This paper reviews how three major aspects of the air cargo industry have changed since deregulation. First, deregulation freed carriers from rate and route regulation. Distinctions which regulation maintained between different classes of service providers have begun to disappear. There has been a trend toward multi-modal integration. Second, the rate structure has changed, with carriers and forwarders offering consumers a wider variety of price-service combinations. At the same time, price competition, some would even say price warfare, is keeping earnings low. Finally, since deregulation there have been some changes in route structures, including a trend toward developing hub and spoke networks with centralized sorting hubs. Author

A83-33545#
ADVANCED NAVIGATION SYSTEMS AND FUEL CONSERVATION
C. H. SIMPSON (Air Canada, Montreal, Canada) Canadian Aeronautics and Space Journal (ISSN 0008-2821), vol. 29, March 1983, p. 14-16.

Attention is confined to the savings that can be realized from improvements in operating procedures and navigation procedures, including advanced navigation systems. The Flight Management System is linked to the avionic flight control system on the L-1011-500 Tristar. The computer receives information from the engines, the central air data system, and the navigation receivers. It processes the information in accordance with a predetermined program and sends control signals to the autopilot and auto-throttle system. The way in which the Inertial Navigation System (Omega) works to ensure direct routings is discussed. The importance of air traffic controllers understanding that speed control is far more important than vectors in conserving fuel is stressed. C.R.

A83-33767
FLIGHT OPERATIONS: A STUDY OF FLIGHT DECK MANAGEMENT
C. A. OWENS New York, Van Nostrand Reinhold Co., 1982, 200 p.

After presenting a development history of cockpit design, including pilot tasks, control devices, instrumentation, and avionics, for aircraft employing flight crews of two or more, attention is given to topics associated with the flight operations of modern commercial aircraft. These include pilot activities and responsibilities (especially with respect to air traffic control, weather conditions, and fuel and cargo loads), the distribution of flight tasks among pilot, copilot, navigator and flight engineer, and crew selection and training criteria. Consideration is also given to the variety of documents relating to aircraft operation and navigation, typical management practices in the takeoff, climb, cruise, descent and landing portions of a flight, and the unique requirements of critical phases of flight with respect to unfavorable weather conditions and emergencies due to malfunction. O.C.

A83-35843*# Analytical Mechanics Associates, Inc., Mountain View, Calif.
FLIGHT MANAGEMENT CONCEPTS DEVELOPMENT FOR FUEL CONSERVATION
J. A. SORENSEN (Analytical Mechanics Associates, Inc., Mountain View, CA) and S. A. MORELLO (NASA, Langley Research Center, Flight Management Branch, Hampton, VA) IN: International Symposium on Air Breathing Engines, 6th, Paris, France, June 6-10, 1983, Symposium Papers . New York, American Institute of Aeronautics and Astronautics, 1983, p. 357-366. refs

It is pointed out that increased airspace congestion will produce increased flight delay unless advanced flight management concepts are developed to compensate. It has been estimated that a 5 percent reduction in delay is approximately equivalent, in terms of direct operating costs, to a 5 percent reduction in drag. The present investigation regarding the development of the required flight management concepts is organized into three sections, related to background, current research, and future effort. In the background section, a summary is provided of past technical effort concerning flight management. The second section is concerned with on-going efforts to integrate flight management with ground-based flight planning, and with an advanced concepts simulator to test the new developments. In the third section, attention is given to research concerning airborne flight management integration with other flight functions. G.R.

A83-36951#
CONCEPTS FOR A FUTURE JOINT AIRLIFT DEVELOPMENT PROGRAM
W. G. MOORE, JR. and J. F. SHEA AIAA, ASCE, TRB, ATRIF, and CASI, International Air Transportation Conference, Montreal, Canada, June 1-3, 1983. 4 p.
(AIAA PAPER 83-1591)

It is pointed out that since World War II the U.S. has had the most effective airlift capability in the world in both peace and war. There are, however, signs of deterioration with respect to this capability. The U.S. military has had great difficulty in gaining congressional acceptance of a timely program to modernize and improve the U.S. airlift force. The U.S. civil airlines are faced with an apparent inablity to assure continued preeminence of the U.S. civil airlift structure. Almost 25 years have passed since the current U.S. airlift policy was approved by the President of the U.S., and it is felt that a new statement of Presidential policy is needed. It is believed to be necessary for the President, with congressional approval, to initiate a joint civil-military program for the development of an efficient and effective airlift system able to serve both the nation's civil needs and the military emergency requirements. G.R.

A83-38760
METEOROLOGICAL DATA REQUIREMENTS FOR FUEL EFFICIENT FLIGHT
H. C. TRUE and D. E. WINER (FAA, Washington, DC) IN: Conference on Aerospace and Aeronautical Meteorology, 9th, Omaha, NE, June 6-9, 1983, Preprints . Boston, MA, American Meteorological Society, 1983, p. 293-298. refs

Development in flight management systems and automated air traffic control are discussed. Attention is also given to the meteorological data required by these systems and to the way in which they depend on this data. Radiosondes, satellites, and systems for automated pilot reporting are discussed and compared. The systems capable of meeting aviation requirements in the 1990s are described. It is pointed out that automated air traffic control and flight management will provide potential fuel savings only if accurate, complete, and timely meteorological data are available. Better upper wind and temperature data for flight planning could save one to three percent of domestic commercial aviation fuel, or 100 to 300 millions gallons each year. An advanced automated air traffic control system taking advantage of accurate and timely weather information would save at least three percent of commercial aviation fuel. C.R.

A83-40900
INTERNATIONAL ASPECTS OF AIR TRAFFIC CONTROL LIABILITY. II
R. BOOTSMA The Controller (ISSN 0010-8073), vol. 22, 2nd Quarter, 1983, p. 5-7. refs

A review of different nations' legal provisions governing the liability of ATC personnel and/or management in the case of an accident is continued. In the FRG, the government as provider of ATC services is directly liable for any damages resulting from operator negligence, but can itself take action against the negligent official. FRG Supreme Court rulings have held that slowdown job-actions by ATC personnel are essentially illegal. The question of liability when automated ATC systems malfunction is considered. The case precedents of UK law regarding negligence, liability, and state liability are discussed; similar jurisdiction applies in Australia. A critical appraisal of some positions taken in this paper is appended by the IFATCA Executive Board. T.K.

A83-41311#
SYSTEMS FOR RADIOCOMMUNICATION WITH SHIPS VIA SATELLITE - THE INMARSAT ORGANIZATION [SISTEMI DI RADIOCOMMUNICAZIONI VIA SATELLITE CON LE NAVI ORGANIZZAZIONE INMARSAT]
G. GUIDARELLI MATTIOLI (Ministero delle Poste e Telecommunicazioni, Rome, Italy) Istituto Italiano di Navigazione, Atti, Dec. 1982, p. 57-68. In Italian.

Historical, organizational, and technical aspects of the INMARSAT maritime satellite-communications program are reviewed, with a focus on the Italian installations. The measures adopted by the international conferences since 1973, the signatories and their investment shares, and the management structure of the INMARSAT organization are described. The geosynchronous satellites presently operating or planned are shown to provide global ship-to-shore or ship-to-ship communication coverage, and the hardware and capabilities of ship stations, land stations, network-coordination stations, and satellites are outlined. The Italian land stations, the Earth Station at Fucino and the Maritime Centre at Rome, are described in more detail, including block diagrams and band distributions.
T.K.

A83-41403#
ADVANCED DOD MILITARY SATELLITE COMMUNICATIONS
A. K. PERRY (U.S. Naval Electronics Systems Command, Washington, DC) IN: ICC '82 - The digital revolution; International Conference on Communications, Philadelphia, PA, June 13-17, 1982, Conference Record. Volume 3 . New York, Institute of Electrical and Electronics Engineers, 1982, p. 6H.5.1-6H.5.4.

The attributes against which Military Communication Systems are measured have remained constant since the first government payload was flown. These attributes are performance, endurance, availability and affordability. As Industry and Government move to develop the Military Satellite Communications Systems of the 1990's, two new attributes will become essential: common sense, and a clear perception of the reality of what the system was intended to accomplish.
Author

A83-41418
FEASIBILITY OF INTERNATIONAL TRANSPORT COMMUNICATIONS SYSTEM
T. FREYGARD (SRA Communications AB, Stockholm, Sweden) IN: ICC '82 - The digital revolution; International Conference on Communications, Philadelphia, PA, June 13-17, 1982, Conference Record. Volume 3 . New York, Institute of Electrical and Electronics Engineers, 1982, p. 7H.4.1-7H.4.6.

A satellite system that efficiently handles transmissions of short telex and data messages to and from simple and inexpensive terminals is found to be the least complex solution. It is noted that the Trucksat system requires a satellite transponder complexity similar to that in the maritime satellite system and a mobile terminal that is moderately more complex than a terrestrial mobile radio. A single pair of 25-kHz radio channels could service thousands of trucks. It is desirable that the system data rate over the radio link be at least 1200 b/s. A random access arrangement of the slotted ALOHA type is proposed. It is pointed out that packet collisions and transmission errors will be handled by error detection control and retransmission with a randomized delay.
C.R.

A83-41712*# *National Aeronautics and Space Administration.* Langley Research Center, Hampton, Va.
FLIGHT MANAGEMENT SYSTEMS - WHAT ARE THEY AND WHY ARE THEY BEING DEVELOPED?
J. F. CREEDON (NASA, Langley Research Center, Hampton, VA) IN: Guidance and Control Conference, Gatlinburg, TN, August 15-17, 1983, Collection of Technical Papers . New York, American Institute of Aeronautics and Astronautics, 1983, p. 516-528. refs
(AIAA PAPER 83-2235)

This paper presents the motivation for developing and using flight management systems. The architecture and theoretical basis of these systems is presented and their typical operation during a flight is described. Two computer programs developed to support flight management research are used to obtain numerical results which illustrate significant potential reductions in fuel used and/or airline operating costs which can be achieved through use of flight management systems. The specific levels of savings depend on the nature of the air traffic control system in which the aircraft operates. Accordingly, results are presented both for operations in the existing air traffic control system and in an air traffic control environment with reduced restrictions on airplane operations. The capability of airplanes equipped with suitable flight management systems to operate in a time-based (4-D) environment is also discussed. Programs of the Federal Aviation Administration which may influence the operation of flight management system equipped aircraft in the evolving National Airspace System are also briefly reviewed.
Author

A83-41713#
FLIGHT MANAGEMENT SYSTEMS - WHERE ARE WE TODAY AND WHAT HAVE WE LEARNED?
R. E. SPRADLIN (Boeing Commercial Airplane Co., Seattle, WA) IN: Guidance and Control Conference, Gatlinburg, TN, August 15-17, 1983, Collection of Technical Papers . New York, American Institute of Aeronautics and Astronautics, 1983, p. 529-537. refs
(AIAA PAPER 83-2236)

A description is provided of the transition of commercial aircraft avionics from analog to digital in the decade preceding the decision to produce the 767 aircraft in 1978. A review is conducted of the events which led to the decision to make a major break with the industry-wide avionics design base and develop entirely new and fully integrated digital avionics. Attention is given to advanced laboratory and piloted simulation facilities, the design and testing of the Flight Management System (FMS), and certification to FAA and CAA standards. It is pointed out that the introduction of digital avionics into the 757 and 767 aircraft configurations has been a remarkable successful program.
G.R.

A83-41714#
FLIGHT MANAGEMENT SYSTEMS III - WHERE ARE WE GOING AND WILL IT BE WORTH IT?
R. J. TIBOR and J. C. HALL (Rockwell International Corp., Pittsburgh, PA) IN: Guidance and Control Conference, Gatlinburg, TN, August 15-17, 1983, Collection of Technical Papers . New York, American Institute of Aeronautics and Astronautics, 1983, p. 538-547. refs
(AIAA PAPER 83-2237)

The current digital avionics on the modern transport aircraft of the 1980's have proven to be more reliable, easier to maintain, and more efficient than the equipments they replaced. Questions regarding the necessity of further changes are briefly considered. It is concluded that the technical improvements of the last few years provide already a basis for enhancing aircraft productivity and safety. Some insights into the future flight management systems are presented. Attention is given to developments in air traffic control, the national airspace system, airport facilities, engine and avionics technology, fiber optics, memory and processor trends, new display technologies, voice recognition systems, the processor architecture, software, aspects of redundancy, maintenance trends, and advantages of system integration.
G.R.

A83-43316
AVIATION GASOLINE - ISSUES AND ANSWERS
C. T. ZOOK (FAA, Office of Environment and Energy, Washington, DC) Society of Automotive Engineers, Business Aircraft Meeting and Exposition, Wichita, KS, Apr. 12-15, 1983. 10 p. refs
(SAE PAPER 830705)

The lowest grade of aviation gasoline (avgas) currently available for use in reciprocating aircraft engines is grade 80 avgas. The present investigation is concerned with the availability of 80 octane avgas and the possible impact of the elimination of this grade of aviation gasoline on safety. Attention is given to aviation gasoline characteristics, availability and price, accidents related to use of improper grade of fuel (including an employment of jet fuel), and Federal Aviation Administration (FAA) and industry actions in this area. As a result of the decreasing availability of grade 80 avgas,

some users are looking for a substitute, taking into account methanol, ethanol, and other alternative fuels. In the meantime, the use of grade 100LL is the preferable choice, but grade 100 is also an acceptable substitute for grade 80 avgas. G.R.

A83-43769
THE SIGNIFICANCE OF A STRONG VALUE-ADDED INDUSTRY TO THE SUCCESSFUL COMMERCIALIZATION OF LANDSAT
F. B. HENDERSON, III American Astronautical Society, Goddard Memorial Symposium, 21st, Greenbelt, MD, Mar. 24, 25, 1983. 7 p.
(AAS PAPER 83-185)

A strong, value-added industry is discussed as the basis for transferring the Landsat satellites from the government to the private sector. Specifically, attention is given to satellites which follow the Landsat configuration, with solid state multiline array systems, various spectral bands, and differing spatial resolutions using radar as a sensing medium. The success of commercialization resides on the ability of ground operators to acquire, archive, and process the data into a saleable format, whether the ground segment is operated by the government or the private sector. Typical users may be mineral resources development companies and universities. A global marketing and servicing infrastructure is yet necessary, steps which private industry can not at present afford to develop. It is suggested that the present government policy of discontinuance of the thematic mapper (TM) system without assuring transfer and operation of the system by a private entity may place the U.S. in the position of destroying the developing remote sensing market and remote sensing capabilities before private sector industries can support the technology, thereby depriving the U.S. of the data available from the TM. M.S.K.

A83-44689
FOUR-DIMENSIONAL FLIGHT MANAGEMENT USING COLOUR CRT DISPLAYS
M. F. LEFFLER and R. M. HEIMBOLD (Lockheed-California Co., Burbank, CA) Displays (ISSN 0141-9382), vol. 4, April 1983, p. 83-87.

The development considered in the present investigation represents an extension of the existing L-1011 Tristar flight management system (FMS). The historical background of the flight management system is briefly examined. In 1972, an American aircraft manufacturer achieved certification for a development, called area navigation (RNAV), which improved two-dimensional flight. In 1977, a three-dimensional system was developed. In addition to the two-dimensional features, the vertical flight profile was introduced to conduct a flight with a minimum expenditure of fuel. The next step was a four-dimensional FMS to eliminate terminal area delays, the fourth dimension being time. Attention is given to details regarding the four-dimensional FMS, aspects of CRT instrumentation, alerting systems, and future flight stations. G.R.

A83-45076
SITELCOM-82 - TELECOMMUNICATIONS AND DATA PROCESSING IN THE AIR TRANSPORT INDUSTRY; PROCEEDINGS OF THE CONFERENCE, MONTE CARLO, MONACO, MARCH 2-4, 1982
Conference sponsored by the Societe Internationale de Telecommunications Aeronautiques. Neuilly-sur-Seine, Hauts-de-Seine, France, Societe Internationale de Telecommunications Aeronautiques, 1983, 357 p.

Advances in telecommunications and data processing technology are considered along with the emergence of new information services, taking into account developments from microcomputers to supercomputers expected for the next ten years, videotex in the international market place, the case study of an application of a new information service, the critical evaluation of new information services, and an emerging trend in the telecommunications and data processing industries. Other subjects discussed are related to the influence of the new information technology upon the airline industry, and cooperative approaches to airline information systems. Attention is given to a future reservations system, advanced airline avionics, a schedule planning system, the impact of new technology on engineering and maintenance, SITA advanced telecommunications services, the role of information services in airline management functions, a case study regarding automation at a Canadian airline, airport automation, common data bases and data processing applications, advances in air cargo information handling, and the role of cooperation in the development of airline information systems. G.R.

A83-45081
AIRLINE COMMON DATABASES AND DATA PROCESSING APPLICATIONS
G. STRIGARI (SocieteInternationale de Telecommunications Aeronautiques, Neuilly-sur-Seine, Hauts-de-Seine, France) IN: SITELCOM-82 - Telecommunications and data processing in the air transport industry; Proceedings of the Conference, Monte Carlo, Monaco, March 2-4, 1982 . Neuilly-sur-Seine, Hauts-de-Seine, France, Societe Internationale de Telecommunications Aeronautiques, 1983, p. 263, 265-281.

During the last decade, the airline industry has made considerable progress with respect to an effective utilization of the advantages provided by an employment of data processing operations. The present investigation is concerned with current trends for airlines towards the establishment of common data facilities. The data processing environment of the airline industry is determined by the specific activities in which the airlines are engaged. These activities are related to passenger services, cargo handling, maintenance and engineering, flight operations, and airline management and administration. Potential data processing applications concerning these activities are listed. The establishment of common data bases is considered for a centralization of data which are of interest to several airlines. Attention is given to the structure of common data bases, the advantages of such data bases, and the concept of common airline applications. G.R.

A83-45823#
MATE INSTITUTIONALIZATION
C. M. WHEELOCK (USAF, Aeronautical Systems Div., Wright-Patterson AFB, OH) IN: Testing for space and weapon products; Proceedings of the Symposium, London, England, January 18, 1983 . London, Royal Aeronautical Society, 1983, 7 p.

The U.S. Air Force Management of Automatic Test Equipment (MATE) program established in 1976 is characterized. The aim of the program is the reduction of the high costs and logistics problems associated with conventional ATE for weapon systems. The MATE guides on system acquisition, development, testability design, production and operation, and test-program-set (TPS) acquisition are summarized: the emphasis is on the standardization of ATE and the inclusion of testing considerations in all phases of the weapon-system life cycle, for systems which are presently operational, under development, or planned. Control and support software components are described, including the life-cycle-cost model, the MATE data system, and the TPS acquisition tools. The organizational structure of MATE is discussed in terms of policy-setting, implementation, support, and evaluation functions. T.K.

A83-45900
INTERNATIONAL FORUM FOR AIR CARGO, 11TH, NEW YORK, NY, SEPTEMBER 27-30, 1982, PROCEEDINGS
Forum sponsored by SAE, AIAA, and ASME. Warrendale, PA, Society of Automative Engineers, Inc. (SAE Proceedings P-116), 1982, 304 p.

The present conference on the state and further development of air cargo considers concepts aimed at the maximization of air freight use by all industries, the economic benefits to be derived from the use of air freight on a daily basis, and examples of the growing use of air freight services as a global distribution and marketing tool. Among the specific topics discussed are the role of the air forwarder, automated cargo clearance, the effects of

U.S. airline deregulation, air cargo terminal functions, the transportation of aerospace equipment and components, drugs, pharmaceuticals and chemicals, electronic equipment and components, live cargo and perishables, primted materials, and other merchandise, container ground handling, the interoperability of military and civil cargo systems, economic analysis, and cargo aircraft design. No individual items are abstracted in this volume

O.C.

A83-47227*# McDonnell-Douglas Astronautics Co., Huntington Beach, Calif.

EXOSAT/DELTA - DEMONSTRATED SHORT-TERM BACKUP LAUNCHER CAPABILITY THROUGH INTERNATIONAL COOPERATION

J. K. GANOUNG (McDonnell Douglas Astronautics Co., Huntington Beach, CA), G. ALTMANN (ESA, Paris, France), P. EATON, and J. D. KRAFT (NASA, Washington, DC) International Astronautical Federation, International Astronautical Congress, 34th, Budapest, Hungary, Oct. 10-15, 1983. 12 p. refs

(IAF PAPER 83-01)

The instrumentation, performance parameters, Delta launch implementation, and development program of the Exosat, launched in February 1983 are described. The X ray satellite was integrated into the Delta vehicle over a three month period, and will survey mainly previously observed X ray objects by directing its detectors at them just before they are occulted by the moon. The 120 kg science package, powered by 260 W of power from solar panels, include low- and medium-energy imaging devices. The spacecraft was originally intended for Ariane launch, but scheduling conflicts, plus the need for a polar-type orbit, dictated the use of the Western Space and Missile Center. Maintenance of Delta compatibility throughout the development of the Exosat facilitated the transfer of launch vehicles, as did full existing documentation of the spacecraft and familiarity between the ESA and NASA managers of the development and launch programs, respectively. M.S.K.

A83-47228#

THE NEED FOR ADDITIONAL SPACE SHUTTLE ORBITERS

J. J. IRONS International Astronautical Federation, International Astronautical Congress, 34th, Budapest, Hungary, Oct. 10-15, 1983. 12 p.

(IAF PAPER 83-02)

Congressional testimony before the House Committee on Science and Technology to evaluate NASA's request for funds for a fifth Orbiter are examined, together with testimony regarding private financing of a fifth Orbiter. Some of the controversy resides in the success of the Ariane launch vehicle, the commitment to continue commercial launches of nonrecoverable boosters, and the possibility of NASA building a space station. Even if the fifth Orbiter were ordered, it would not be in service until 1987; by 1991 launch demands would exceed 40 per year, the maximum presently possible with four Orbiters, assuming no problems. However, the assumption of no downtime is tenuous, and Orbiters will be diverted to military launches from Vandenberg, which will further deplete the four-Orbiter fleet. All agencies testifying agreed that a fifth Orbiter is necessary, and that NASA should initiate procurement for the vehicle in 1983 while simultaneously studying the feasibility of private financing of the construction costs.

M.S.K.

A83-47236*# National Aeronautics and Space Administration. John F. Kennedy Space Center, Cocoa Beach, Fla.

PROCESSING CARGOES FOR THE FIRST TWO OPERATIONAL STS FLIGHTS AT KSC

J. J. NEILON (NASA, Kennedy Space Center, Cocoa Beach, FL) International Astronautical Federation, International Astronautical Congress, 34th, Budapest, Hungary, Oct. 10-15, 1983. 8 p.

(IAF PAPER 83-23)

Payload and spacecraft check-out procedures followed at Kennedy Space Center (KSC) are described, and examples are furnished of Shuttle missions STS-5 and -6. Reliability must be assured in order to account for isolated operation in GEO once the satellites are released from the Orbiter. The spacecraft processing is handled in distinct flows that depend on the type of boost engine attached, e.g., the PAM-A, -D, or the IUS. Interface verification occurs in the Vehicle Processing Facility (VPF), which is equipped to store the payloads until an Orbiter is ready. Spacecraft are assigned to their respective processing lines by the Launch Site Support Manager. The STS-5 Orbiter was fitted with Getaway Specials, the SBS-C satellite, and the Anik-C spacecraft, and STS-6 carried the TDRSS-A spacecraft, which was mated to an IUS, three Getaway Specials, and two experiments for the pressurized cabin. The time necessary for preparing payloads is intended eventually to be reduced to 3 weeks.

M.S.K.

A83-47654

MAINTENANCE ASPECTS OF MODERN AVIONICS

IR. W. BROUWER (KLM Royal Dutch Airlines, Engineering and Maintenance Div., Schiphol Airport, Netherlands) Aircraft Engineering (ISSN 0002-2667), vol. 55, Aug. 1983, p. 2-10.

The personnel, equipment, scheduling, costs, and significance of repair programs for modern, digital avionics are examined. It is noted that although the avionics comprise only a small fraction of the costs of large aircraft, their maintenance requires up to 25 percent of the total maintenance schedule. The flight management computer enables optimized, efficient flight with large, flexible aircraft, and the MBTF for the avionics systems is increasing. The implementation of line replaceable units (LRU) has lowered aircraft downtime through modular removal and replacement of defective equipment, which can then be refurbished for reuse away from the aircraft. Built in test equipment (BITE) aids in locating faults without pulling modules. Technicians are nominally trained to acquire expertise in one LRU in order to increase reliability of the LRUs. The growing complexity of the modular parts, though, is lengthening the time necessary to gain expertise on the equipment. M.S.K.

A83-48001#

A COMPARISON OF NAVY AND CONTRACTOR GAS TURBINE ACQUISITION COST

L. T. FINIZIE (U.S. Naval Material Command, Naval Air Development Center, Warminister, PA) American Society of Mechanical Engineers, International Gas Turbine Conference and Exhibit, 28th, Phoenix, AZ, Mar. 27-31, 1983. 5 p. refs

(ASME PAPER 83-GT-198)

An investigation is conducted concerning the reasons for differences between Navy and contractor gas turbine costs. Attention is given to life cycle cost criteria, Navy development costs, a development cost comparison, production costs, and a production costs comparison. It is found that the cost differences are primarily related to the employment of different methods for the determination of the cost. Emphasis on lower operating and support costs will lead to the conduction of more tests to develop a more reliable engine than obtained in previous developments. This difference with respect to engine requirements would cause an increase in development costs. G.R.

A83-48642

LHX - THE US ARMY WANTS 5,000 - INDUSTRY NEEDS THE BUSINESS

R. LOPEZ and M. LAMBERT Interavia (ISSN 0020-5168), vol. 38, Sept. 1983, p. 972-974.

Progress in planning for the U.S. Army LXH helicopter is discussed. The missions of the proposed helicopter, including troop transport, combat, and surveillance, are addressed, and the number of LHX's required is discussed in the light of the Army's helicopter needs. The timetable for LHX production is set forth, and the Army's Advanced Rotorcraft Technology Integration (ARTI) demonstration, planned as a prologue to an LHX competition between two contractors, is discussed. ARTI will blend promising airframe, system, and engine technologies in a technology demonstrator, probably a helicopter. The industry's response to the LHX plans is described, mentioning each company's suggestions and the extent of its need for the LHX contract.

C.D.

N83-10303# PAWA, Inc., Dallas, Tex.
EXPERIENCES IN TRANSPORTATION SYSTEM MANAGEMENT Final Report
J. J. ROARK Nov. 1981 99 p refs Its National Cooperative Highway Research Program Number 81 Sponsored in part by Federal Highway Administration, Washington, D.C. and American Association of State Highway and Transportation Officials, Washington, D.C.
(Contract HR-20-5)
(PB82-181322; TRB/NCHRP/SYN-81) Avail: NTIS HC A05/MF A01 CSCL 13B

The application of transportation system management (TSM) actions in different operating environments is described. Both successful and unsuccessful TSM experiences are analyzed. There are more than 150 actions that can be included in a TSM program. Experiences with these actions are summarized and guidelines within the context of nine operating environments, ranging from a freeway corridor to a local neighborhood are provided. Recommendations for future research needs are included.
Author (GRA)

N83-11055# Comptroller General of the United States, Washington, D.C. Procurement Logistics and Readiness Div.
REQUIREMENTS AND PRODUCTION CAPABILITIES ARE UNCERTAIN FOR SOME AIR FORCE, NAVY AND MARINE CORPS AIRCRAFT SPARES AND REPAIR PARTS
22 Jul. 1982 38 p refs
(AD-A118423; GAO/PLRD-82-77) Avail: NTIS HC A03/MF A01 CSCL 05A

In fiscal year 1982, the Congress appropriated $5.4 billion to procure spares and repair parts for Air Force, Navy and Marine Corps aircraft. This compared to $1.9 billion provided in fiscal year 1980 and $3.9 billion provided in fiscal year 1981. The military services testified that these increases were required to improve the operational readiness of their aircraft. However, GAO has previously reported that many aircraft operational readiness problems were caused by maintenance problems and other reasons--unexpected parts failures, late repair of parts, and modification or updating of parts--rather than a lack of sufficient funds. While approving these increases, the Congress expressed concern regarding whether the aerospace industry could produce the increased quantity of aircraft parts and whether the increased procurements would result in the increased operational readiness claimed by the services. Author (GRA)

N83-11056# George Washington Univ., Washington, D.C. Office of Program in Logistics.
AIRCRAFT PRODUCTION AND DEVELOPMENT SCHEDULES
R. A. HARRISON 15 Apr. 1982 12 p refs
(Contract N00014-75-C-0729; NR PROJ. 347-020)
(AD-A118047; SERIAL-T-463) Avail: NTIS HC A02/MF A01 CSCL 01C

A model of aircraft life cycle cost is developed. This cost is estimated to be a function of the production schedule. The effect modeled is the cost variation as a function of increasing aircraft reliability achieved after the completion of a number of operating hours. An optimization problem is outlined that yields the best production schedule. A search algorithm for this difficult integer nonlinear programming problem is used to find the optimum schedule. Present practices with advanced jet aircraft are found to be suboptimal in several respects. Recommendations include a linear production buildup that continues much longer than at present and extension of the development phase of an aircraft program well beyond the current termination time. Author (GRA)

N83-11119# General Accounting Office, Washington, D. C. Procurement Logistics and Readiness Div.
AIR LAUNCHED CRUISE MISSILE: LOGISTICS PLANNING PROBLEMS AND IMPLICATIONS FOR OTHER WEAPONS SYSTEMS
10 May 1982 12 p refs
(AD-A118129; GAO/PLRD-82-68; B-207053) Avail: NTIS HC A02/MF A01 CSCL 15E

Document reviewed the integrated logistics support (ILS) planning for the Air Force's air-launched cruise missile (ALCM) and the related B-52 carrier aircraft modifications and identified problems which will inhibit the economy and effectiveness of logistics support for the systems. These problems were primarily caused by the program's concurrent development and production acquisition strategy, which was adopted to meet the required operational availability date for the ALCM. Author (GRA)

N83-11175*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
SATELLITE SERVICES WORKSHOP, VOLUME 1 Final Report
1982 453 p refs Workshop held in Houston, Tex., 22-24 Jun. 1982 2 Vol.
(NASA-TM-84873; JSC-18201-VOL-1; NAS 1.15:84873) Avail: NTIS HC A20/MF A01 CSCL 22A

Key issues associated with the orbital servicing of satellites are examined including servicing spacecraft and equipment, servicing operations, economics, satellite design, docking and berthing, and fluid management.

N83-12276# Coates (Joseph F.), Inc., Washington, D.C.
THE CONSEQUENCES OF METRIC PRODUCTION FOR SMALL MANUFACTURERS. VOLUME 2: CASE STUDIES OF LARGE BUSINESS-SMALL BUSINESS INTERACTIONS
H. H. HITCHCOCK, J. F. COATES, M. M. CANAVAN, G. H. PRILLAMAN, and M. S. NETTLES 8 Feb. 1982 284 p Sponsored by the National Metric Board 2 Vol.
(AD-A118634) Avail: NTIS HC A13/MF A01 CSCL 13H

Over the last decade, controversy, concern, and conjecture have surrounded the effects of metric conversion on small business. Enthusiasts for metric argue that conversion would benefit small businesses in two ways. It would expand their markets, especially export markets. It would also improve business by making production processes more rational. Dissenters argue that conversion is unnecessary and possibly harmful to the majority of the nation's small businesses. Against this backdrop, the U.S. Metric Board is fulfilling its statutory mission to find out what happens to small businesses that convert to metric. The first phase of the project was a search for small businesses that had made substantial investments in converting to metric. That search showed that small businesses were most likely to invest in metric production in response to large corporations' needs for metric parts and products. The second phase of the research consisted of three case studies of the effects of large companies' conversion on small business suppliers. The team studied how the conversion of a General Electric Company department, two Ford Motor Company product lines, and three divisions of Ingersoll-Rand affected their small business suppliers. GRA

N83-12277# Coates (Joseph F.), Inc., Washington, D.C.
THE CONSEQUENCES OF METRIC CONVERSION FOR SMALL MANUFACTURERS. VOLUME 1: SUMMARY REPORT Final Report
H. H. HITCHCOCK and J. F. COATES 8 Feb. 1982 35 p refs 2 Vol.
(Contract AA-80-SAC-X8604)
(AD-A118633) Avail: NTIS HC A03/MF A01 CSCL 13H

Metric production capability for America's small manufacturers is wide spread but shallow. There has been little costs to firms to produce metric products. Conversion is spurred by demands of current customers. Metric production presents few problems for small manufacturers. The small manufacturers have not benefited from the conversion except to keep the business of their customers that convert to metric. Metric conversion for small manufacturers

is neither forced nor timely voluntary. They follow the general trends in the industry they serve. Metric production is considered by small manufacturers as a routine aspect of doing business.
Author (GRA)

N83-12278# *Coates (Joseph F.), Inc., Washington, D.C.*
METRIC USE IN THE TOOL INDUSTRY. A STATUS REPORT AND A TEST OF ASSESSMENT METHODOLOGY Final Report
W. E. CUSHEN 20 Apr. 1982 114 p refs
(Contract USMB-1-0581)
(AD-A118632) Avail: NTIS HC A06/MF A01 CSCL 13H

This study served a dual purpose of testing the most promising methods of assessing metric status in the United States while providing an assessment of the current status and progress of metrication activities of the machine tool industry. The machine tool industry provides capital equipment for other manufacturing industries including the automotive, aerospace, construction, and farm machinery industry. It is a small but critical segment of the national economy. There have been a number of studies of industrial metrication, but they dealt with broad categories of industry and provided little detailed information about specific industries or about the process. This study draws directly on the experience of industry companies and on data from many public and private sources. Some of the major findings are: (1) Metrication is progressing slowly but steadily in the U.S. Machine Tool Industry. (2) The U.S. Machine Tool Industry meets overseas demand and the small domestic demand for metric tools by building metric-capable machines. (3) The serious decline of the U.s. share of the world market has been somewhat masked by the fact that the dollar volume of U.S. overseas sales has increased. (4) Because of the paucity of data, assessment of metric status in specific industries cannot be handled through econometric modeling or aggregation of massive amounts of statistical data.
Author (GRA)

N83-12312# United States Metric Board, Arlington, Va.
METRIC USAGE STUDY: A LOOK AT 6 CASE HISTORIES Final Report
1982 32 p
(AD-A118601) Avail: NTIS HC A01 CSCL 13H

This study was prepared to describe the metric experiences, good as well as bad, of a number of firms representing a cross-section of American business and industry. Their experiences show that there are problems as well as opportunities inherent in metric conversion. The six case histories presented in this publication reflect the trend, the drawbacks, and the merits of metric usage in the private sector. The United States Metric Board was created by Congress to plan and coordinate the increasing voluntary use of the metric system in the United States. This study has been developed as part of the Board's public awareness and education program. The six firms that were studied are Black and Webster, Samuel Cabot, Inc., Caterpillar Tractor, National Distillers Company, Levi Strauss & Co., and Inland Steel Company in the preparation of this publication. Author (GRA)

N83-14074# Comptroller General of the United States, Washington, D.C.
AIRCRAFT THRUST/POWER MANAGEMENT CAN SAVE DEFENSE FUEL, REDUCE ENGINE MAINTENANCE COSTS, AND IMPROVE READINESS
29 Jul. 1982 51 p refs
(GAO/PLRD-82-74) Avail: NTIS HC A04/MF A01

It was found that the Department of Defense could achieve additional savings in aircraft fuel and reduce engine maintenance costs by making greater use of reduced power takeoffs and climbs by fighter aircraft. It is recommended that effective local initiatives be better identified, reviewed, and implemented whenever possible. R.J.F.

N83-14093# Lincoln Lab., Mass. Inst. of Tech., Lexington.
UTILITY OF TRAFFIC ADVISORY INFORMATION
J. W. ANDREWS *In* FAA 3rd Symp. on Traffic Alert and Collision Avoidance Systems (TCAS) 15 p 1982
Avail: NTIS HC A12/MF A01

The findings of FAA sponsored evaluations of the operational utility of TCAS II traffic advisories are summarized. The history of previous test programs involving subject pilots and automated traffic advisories is traced. The operational context of the TCAS II automated traffic advisory is explained. Results of the testing done to date are presented. Some areas in which further testing and development will be undertaken are outlined. Author

N83-14147# General Accounting Office, Washington, D. C. Mission Analysis and Systems Acquisition Div.
EVALUATION OF NASA COMMENTS ON GAO REPORT MASAD-82-14: CONSOLIDATED SPACE OPERATIONS CENTER LACKS ADEQUATE DOD PLANNING
12 Aug. 1982 7 p refs
(GAO/MASAD-82-43; B-205335) Avail: NTIS HC A02/MF A01; SOD HC $3.25

A consolidated Space Operations Center for the space transportation system is evaluated. Hardware and software requirements are considered. S.L.

N83-14148# General Accounting Office, Washington, D. C. Mission Analysis and Systems Acquisition Div.
THE CONSOLIDATED SPACE OPERATIONS CENTER
W. H. SHELEY, JR. 24 Jun. 1982 5 p refs
Avail: NTIS HC A02/MF A01

The Consolidated Space Operations Center is discussed. Overall military space planning and its implication for the development of the center are emphasized. Siting criteria and the operational and organizational factors bearing on final site selection, as well as the cost and legal ramifications involved are reviewed. S.L.

N83-14178# Centec Consultants, Inc., Reston, Va. Office of Industrial Programs.
PROGRAM GUIDE TO USED OIL RECYCLING
Jan. 1982 40 p refs Supersedes DOE/CS-0015
(Contract DE-AC01-80CS-40402)
(DOE/CS-40402/1; DOE/CS-0015) Avail: NTIS HC A03/MF A01

Information necessary to organize a used oil recycling program, establish collection points, and enlist the cooperation of concerned individuals and civic minded groups is presented. Emphasis is placed on salvaging a valuable energy resource and reducing environmental pollution caused by indiscriminate dumping and uncontrolled burning. J.M.S.

N83-14820# World Meteorological Organization, Geneva (Switzerland).
INFORMATION ON METEOROLOGICAL SATELLITE PROGRAMS OPERATED BY MEMBERS AND ORGANIZATIONS
Aug. 1982 52 p
(WMO-411-SUPPL-11) Avail: NTIS MF A01

Meteorological satellite programs in Japan, Europe, (METEOSAT), and the US are reviewed. N.W.

N83-15262# Naval Postgraduate School, Monterey, Calif.
THE AV-8B DECISION M.S. Thesis
J. L. GOZA Jun. 1982 95 p refs
(AD-A119765) Avail: NTIS HC A05/MF A01 CSCL 05A

This case study of the debate over the decision of the United States Government to procure the McDonnell Douglas AV-8B Advanced Harrier V/STOL jet aircraft for the U.S. Marine Corps includes a history of the development of the AV-8A Harrier, the development of the Marine Corps' concept of employment of V/STOL aircraft, and the development of the AV-8B. The study centers around the actions taken by the Office of the Secretary of Defense, the Department of the Navy, the U.S. Navy, the U.S. Marine Corps, and the Congress of the United States in the

controversy over the AV-8B during the period 1977-1980. That controversy was over the decision to equip the Marine light attack force during the 1980's with either the AV-8B Advanced Harrier or the A-18 Hornet to replace worn-out A-4M Skyhawks and AV-8B Harriers. Both sides of the argument over the AV-8B are followed in the context of the PPBS process, the President's budget process, and the Major System Acquisition process. Author

N83-15550# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
BIST SYSTEM AND ITS USE IN GOVERNMENT
C. SYC 22 Sep. 1982 12 p Transl. into ENGLISH from Wiad. Telekomunikacyjne (Poland) v. 18, no. 3, Mar. 1979 p 65-68
(AD-A120726; FTD-ID(RS)T-1040-82) Avail: NTIS HC A02/MF A01 CSCL 17B

The effectiveness of the telecommunications networks and existing means of information transfer, that is in the realm of teleinformation are analyzed. The improvement of information processing in the management of such economic areas as: transportation, communication, commerce and supply, the management of materials, energetics and agriculture is emphasized. These areas have gained highest priority in the framework of economic management. The structure of requirements of communication in these sectors of national economy is not much different from requirements for other sectors and includes 70 to 90% of free network transmission, that is, 50 to 200 Bd. These requirements may be satisfied within 50 Bd. by the telex network which is now a digital and completely automated system for domestic purposes. For 200 Bd. additional network may be leased. Most users of the teleinformation system are interested in transmission among subscribers often scattered nationwide.
GRA

N83-15955# Oak Ridge National Lab., Tenn.
ALTERNATIVE MEANS OF COPING WITH NATIONAL ENERGY EMERGENCIES
J. H. SORENSEN 1981 9 p refs Presented at the 3rd Intern. Conf. on Energy Use Management, West Berlin, F. R., Germany, 26 Oct. 1981
(Contract W-7405-ENG-26)
(DE82-002812; CONF-811006-8) Avail: NTIS HC A02/MF A01

A comprehensive management framework is suggested for coping with largescale energy shortages. In doing so, events that may trigger a shortage are overviewed. A systems model of a shortage is discussed. Alternative management strategies are suggested and concepts of evaluating the strategies are briefly reviewed. The conclusion is made that national policies should emphasize a broad-based approach to coping with shortages with long term goals of preventing the events that cause emergencies.
DOE

N83-17394*# Alabama Univ., Huntsville. Dept. of Psychology.
AUTONOMOUS ONBOARD CREW OPERATIONS: A REVIEW AND DEVELOPMENTAL APPROACH
J. G. ROGERS *In* NASA. Marshall Space Flight Center The 1982 NASA/ASEE Summer Fac. Fellowship Program 29 p Aug. 1982 refs
Avail: NTIS HC A99/MF A01 CSCL 05H

A review of the literature generated by an intercenter mission approach and consolidation team and their contractors was performed to obtain background information on the development of autonomous operations concepts for future space shuttle and space platform missions. The Boeing 757/767 flight management system was examined to determine the relevance for transfer of the developmental approach and technology to the performance of the crew operations function. In specific, the engine indications and crew alerting system was studied to determine the relevance of this display for the performance of crew operations onboard the vehicle. It was concluded that the developmental approach and technology utilized in the aeronautics industry would be appropriate for development of an autonomous operations concept for the space platform. M.G.

N83-17455# Department of Energy, Washington, D. C.
SYMPOSIUM ON COMMERCIAL AVIATION ENERGY CONSERVATION STRATEGIES. PAPERS AND PRESENTATIONS
Apr. 1981 385 p refs Symp. held in Washington, D.C., 2-3 Apr. 1981 Sponsored in cooperation with FAA
(AD-A107106) Avail: NTIS HC A17/MF A01 CSCL 01B

Current and future efforts to conserve fuel and to promote energy conservation within the commercial aviation sector were discussed. Energy conservation programs such as flight operations, air traffic control, engineering and maintenance, and corporate management strategies are included.

N83-17460# Federal Aviation Administration, Washington, D.C. Energy Div.
AN OVERVIEW OF THE DOT/FAA AVIATION ENERGY CONSERVATION POLICY
C. J. HOCH *In* DOE Symp. on Com. Aviation Energy Conserv. Strategies p 79-94 Apr. 1981
Avail: NTIS HC A17/MF A01 CSCL 01B

An overview of the FAA aviation energy conservation policy is presented. N.W.

N83-17464# Eastern Air Lines, Inc., Atlanta, Ga. Air Traffic Systems Dept.
AIR TRAFFIC CONTROL: ITS EFFECT ON FUEL CONSERVATION
E. H. PRICE *In* DOE Symp. on Com. Aviation Energy Conserv. Strategies p 147-162 Apr. 1981
Avail: NTIS HC A17/MF A01 CSCL 01B

Air traffic delays and its cost in waste fuel were examined. It is suggested that the most productive way to reduce this huge waste of fuel is to develop a more efficient ATC system, one that minimizes delays and still provides for reasonable growth in air traffic. Ways to resolve air traffic increase are suggested to increase capacity and reduce delays. A number of programs to help the users save fuel are implemented: (1) local flow traffic management; (2) pilot discretion descents; (3) more frequent approval of direct routes; (4) more frequent approval of requested altitudes; and (5) unrestricted climb to altitude. These procedures allow aircraft to remain higher, longer, at the more fuel efficient altitudes. E.A.K.

N83-17468# Eastern Air Lines, Inc., Atlanta, Ga.
A PRACTICAL ECONOMIC CRITERION FOR FUEL CONSERVATION
D. R. FERGUSON *In* DOE Symp. on Com. Aviation Energy Conserv. Strategies p 259-280 Apr. 1981
Avail: NTIS HC A17/MF A01 CSCL 01B

A method to determine the value of time to input into the least cost method of computer flight planning that will optimize the fuel time tradeoffs available over the planning time horizon is proposed. Fuel can be saved by flying the aircraft at slower speeds, however, there is an economic penalty in pursuing this policy to its ultimate limit. No policy decision can possibly encompass all the variables of temperature, wind, wind gradients and payload encountered by the thousands of flights operations. The computer flight plan systems to optimize each flight for the variables of wind, wind gradient, temperature and payload, but can not resolve the value of time to use that allows the computer to optimize each flight consistently and correctly. E.A.K.

N83-17469# United Air Lines, Inc., Denver, Colo.
PILOT/AIRCRAFT FUEL PERFORMANCE EVALUATION
G. A. MCKINZIE *In* DOE Symp. on Com. Aviation Energy Conserv. Strategies p 281-306 Apr. 1981
Avail: NTIS HC A17/MF A01 CSCL 01B

Methods in four areas which determine: (1) the extent of fuel consumption; (2) the manner in which this information is used to forecast fuel usage; (3) present measuring systems; and (4) goals and the ways they can be developed and tracked, are discussed. The four methods for fuel measurement information cover four areas: pilots, flight management, top management, and outside

agencies. The development of accountability systems for how and where all fuel is consumed is recommended. E.A.K.

N83-17562# Technische Hochschule, Aachen (West Germany). Verkehrswissenschaftlichen Inst.
AIDS TO DECISION MAKING IN AIRPORT PLANNING
P. WOLF Dec. 1981 249 p refs In GERMAN; ENGLISH summary
(REPT-34) Avail: NTIS HC A11/MF A01

A computer model designed to serve as an aid to decision-making in operational planning and control of new passenger terminals is described. The methodological procedure, the bases for programming, and the testing of the plausibility of the computer model are described. Applications of the computer simulation procedure are outlined including the effects of various parameter alterations. These parameters include: flight plan and load factor of aircraft based on the use of larger aircraft types; passenger processing procedures based on the processing of all passengers by one processing company; and passengers' behavior on arrival at the terminal in cases where check-in time is brought forward owing to stricter security checks. The effects of these parameters on waiting time for passengers and baggage and utilization of the most important terminal areas and the apron are addressed in relation to the processing procedures involved and the personnel strength available for processing. The effects of parameter alterations are shown and discussed for several examples. J.M.S.

N83-19635# General Accounting Office, Washington, D. C. Automatic Data Processing Group.
QUESTIONS DESIGNED TO AID MANAGERS AND AUDITORS IN ASSESSING THE ADP PLANNING PROCESS
30 Sep. 1982 100 p
Avail: NTIS HC A05/MF A01

Noncompetitive procurements of ADP systems and a case of non-operational MIS development are attributed to deficiencies in the ADP planning process. Fifty-eight elements considered essential to good ADP planning are cited. These elements were amplified by a question and answer format. N.W.

N83-19798# *General Accounting Office, Washington, D. C.*
ISSUES CONCERNING THE FUTURE OPERATION OF THE SPACE TRANSPORTATION SYSTEM
28 Dec. 1982 34 p refs
(GAO/MASAD-83-6) Avail: NTIS HC A03/MF A01

Logistics support, launch and mission control operations, astronaut recruitment and training, cost accounting, launch and landing facilities, launch vehicles, and STS design goals are discussed. Author

N83-20221# Selenia S.p.A., Rome (Italy).
MAINTAINABILITY AND AVAILABILITY IN MODERN ELECTRONIC SYSTEMS: DESIGN FEATURES AND EVALUATION TECHNIQUES
B. FIGLIUZZI and G. A. SPARAGNA *In* ESA Reliability and Maintainability p 305-312 Sep. 1982 refs
Avail: NTIS HC A99/MF A01

The approach of defining a system performance degradation set and of incorporating special maintainability features (like on-line repair and reconfiguration) in the system is introduced and shown, with a practical example, as viable to permit more effective and convenient utilization of the system and to withstand limitations in the capabilities of logistic support organization. Author

N83-20226# Societe Anonyme d'Etudes et Realisations Nucleaires, Limeil-Brevannes (France).
CORRECTIVE MAINTENANCE MANAGEMENT AID PROGRAMS [PROGRAMES D'AIDE A LA GESTION DE LA MAINTENANCE CORRECTIVE]
J. P. MENAGE and J. J. LAULY (Philips, Paris) *In* ESA Reliability and Maintainability p 339-343 Sep. 1982 refs In FRENCH
Avail: NTIS HC A99/MF A01

Three tools for corrective maintenance are presented which are located in the life cycle of a product. The OMPA program, which characterizes a waiting list, requires knowledge of the laws which regulate arrival and service, hypotheses on costs, technicians, and the depot. It computes probabilities. The OPTIMAN program also characterizes a waiting list. It is an approximating tool but has vaster applications. The OPSTO program optimizes techniques and the economics of stock management. Three procedures for different uses are described: optimization with a level of fixed service; optimization of costs; and computing the consequences of an existing policy. Examples are included.
Transl. by A.R.H.

N83-20229# Datelec, Paris (France).
SEARCH FOR A SERVICE LIFE EVALUATION METHOD IN COMPUTER ASSISTED MAINTENANCE SYSTEMS [RECHERCHE D'UNE METHODE D'EVALUATION DE LA DURABILITE UTILISABLE DANS LES SYSTEMES M. A. O. (MAINTENANCE ASSISTEE PAR ORDINATEUR)]
M. TESTYLIER *In* ESA Reliability and Maintainability p 355-361 Sep. 1982 refs In FRENCH
Avail: NTIS HC A99/MF A01

The application to studies of durability of the probabilistic theories relative to constraint and resistance to constraint is considered. This approach, used to evaluate reliability in mechanics, appears transposable to evaluate the economic durability of repairable goods. The method studied is applied under AFNOR standards and CEI specifications which permit parameterization of the elements of durability. Such parameterization should facilitate information for managing computer-aided maintenance.
Transl. by A.R.H.

N83-20230# Centre d'Analyse de Defense, Arcueil (France).
DETERMINATION OF INITIAL SPARE PARTS SUPPLY [DETERMINATION DES APPROVISIONNMENTS INITIAUX EN RECHANGES]
P. LEVY and O. NATTA *In* ESA Reliability and Maintainability p 363-367 Sep. 1982 refs In FRENCH
Avail: NTIS HC A99/MF A01

Various models are presented for determining the stocks of spare parts to be put in maintenance circuits. These supplies are optimized under budgetary constraints. Predicted improvements and extensions of the method are listed. Transl. by A.R.H.

N83-20908# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Systems and Logistics.
A QUALITATIVE ANALYSIS OF SAC AIRCRAFT MAINTENANCE M.S. Thesis
D. P. COOK and H. J. DEVAULT Sep. 1982 124 p refs
(AD-A122815; AFIT-LSSR-17-82) Avail: NTIS HC A06/MF A01 CSCL 15E

Past research efforts in SAC aircraft maintenance have addressed singular issues. Little attention has been given to examine the holistic environment that encompasses SAC aircraft maintenance. The purpose of this study was to examine and identify problems within the SAC aircraft environment from the perspective of its personnel. From interview data obtained from the Air Force Human Resources Laboratory, WPAFB OH, it was found that the SAC aircraft maintenance environment could be categorized as follows: Methods Support, Work Environment, Equipment Support, Personnel Policy, Motivation/Morale, and Technical Support. Further, it was found that the above-mentioned categories could be divided into unique areas for specific analysis. The data revealed that every area and category could be prioritized by the percentage of negative statements within each area and category. A negative

statement indicated that a problem existed in a given area and category. The authors found that all areas and categories contained a highly significant number of problems. Finally, a suggested format was offered by the authors to help SAC units to identify problems within their respective units. GRA

N83-22016# Politecnico di Milano (Italy). Ist. di Elettrotecnica ed Elettronica.
A KNOWLEDGE-BASED CONSULTATION SYSTEM FOR AUTOMATIC MAINTENANCE AND REPAIR
G. GINI, M. GINI, and R. MORPURGO 1982 10 p refs
Avail: NTIS HC A02/MF A01

Unmanned factor, or programmable flexible automation, is a common trend in industrial automation today. Many functions of flexible manufacturing systems now available can be controlled by computers. Manufacturing planning and control, managerial decision making, automated qualify control, automated maintenance, are examples of subsystems for which reliable and flexible software systems are not available. Some of the problems of CAM are explored and how Artificial Intelligence methods may offer good solutions are described. In particular it is demonstrated how expert systems can be applied in some industrial automation problems. A case study is then presented in which the general problem of maintenance (diagnosis and repair) is solved. Author

N83-22019# Naval Postgraduate School, Monterey, Calif.
A FUNCTIONAL COMPARISON OF THE NAVAL AVIATION LOGISTICS COMMAND MANAGEMENT INFORMATION SYSTEM (NALCOMIS) AND THE SHIPBOARD UNIFORM AUTOMATED DATA PROCESSING SYSTEM-REAL TIME (SUADPS-RT) M.S. Thesis
S. W. RODENBARGER Jun. 1982 82 p refs
(AD-A122502) Avail: NTIS HC A05/MF A01 CSCL 15E

Two important Management Information systems currently under development are the Naval Aviation Logistics Command Management Information System (NALCOMIS) and the Shipboard Uniform Automated Data Processing System-Real-Time (SUADPS-RT). Both of these systems address the functions of aviation supply support afloat and are envisioned for implementation on replacement state-of-the-art hardware being procured under the Shipboard Non-Tactical ADP Program (SNAP). Both systems are being developed as on-line, real-time MISs designed to provide maintenance and material managers with information concerning the management of aviation maintenance and supply support. This thesis investigates these two systems and determines those functional areas where duplication exists. Recommendations concerning the incorporation of the functional differences of the two systems are also provided. GRA

N83-22178# Civil Aviation Authority, London (England).
A UK NATS VIEW OF THE AIR TRAFFIC MANAGEMENT REQUIREMENTS IN THE NEXT DECADE
P. H. HEMMING *In* AGARD Air Traffic Control in Face of Users' demand and Econ. Constraints 5 p Feb. 1983
Avail: NTIS HC A06/MF A01

The main categories of user demand in United Kingdom airspace at present and the Air Traffic Management infrastructure currently provided are discussed. Aspects of NATS plans for improvement and modernization of air traffic control and the relationship of these plans to improved economy and fuel conservation are outlined. The main focus of these plans is related to development of ATC capability in the London and South East England area, therefore the redevelopment of the London Air Traffic Control Centre is described in the context of the theme of the Special Session. The relationship applicable to the United Kingdom between financial policy, implementation plans and the cost to system user is discussed in view of the constraints it places on the ability of the ATC system to meet commercial demand for the most economic service. Author

N83-22179# Civil Aviation Authority, London (England).
FUEL CONSERVATION AND ECONOMY CONSTRAINTS
D. BARBER and J. C. MORRALL *In* AGARD Air Traffic Control in Face of Users' Demand and Econ. Constraints 8 p Feb. 1983
Avail: NTIS HC A06/MF A01

Fuel conservation in civil aviation may be achieved by increasing the efficiency of the aircraft themselves, by operating the aircraft more efficiently, and by providing them with a more efficient air traffic environment. Three aspects are discussed briefly, and possible improvements in the air traffic management environment are examined in more detail. Finally, attention is drawn to the Research and Development program needed to achieve fuel conservation by improved air traffic management. Author

N83-22185# Ratcliffe (S.), Malvern (England).
MANAGEMENT AND PLANNING CONCEPTS
S. RATCLIFFE *In* AGARD Air Traffic Control in Face of Users' Demand and Econ. Constraints 6 p Feb. 1983
Avail: NTIS HC A06/MF A01

The processes used for management and control of air traffic are outlined. Some congestion in airspace or at airports is inevitable, the further ahead this congestion is foreseen, the more economically it can be resolved. A limit is set by the accuracy with which the future can be predicted. Existing ATC systems necessarily use human controllers, who often significantly outnumber the aircraft under their control. It is not easy to see how this situation might be improved. Control tasks must be divided up between numerous controllers who, at busy times, cannot discuss each others problems in any detail. Controllers therefore solve only subsets of the total problem, and their solutions are significantly less efficient than theory indicates is possible. The extent to which 'automation' might make possible cheaper or more efficient ATC is safety considerations and difficult 'human factors' problems. Author

N83-23207# Department of Transport (England).
RESEARCH FOR LAND BASED TRANSPORT IN THE UNITED KINGDOM DEPARTMENT OF TRANSPORT
R. J. BRIDLE *In* CSIR Ann. Transportation Conv., Vol. 1 29 p 1982
Avail: NTIS HC A16/MF A01

The changes in transport research, needs and structure of the research and development required to counteract the effects are reviewed. It begins with the need for research and development, identification of who is expected to use the results and ways in which they will be implemented. The method for procurement and the machinery for determining the program of research and development are described. A scenario describing problems in the next 10 years is used for selection of high priority areas of research and development. Closer cooperation with industry and a strategy to expedite commercial exploitation of the results of research and development are emphasized. E.A.K.

N83-23208# California Univ., Berkeley. Inst. of Transportation Studies.
RESEARCH IN TRANSPORTATION ENGINEERING IN THE UNITED STATES
C. L. MONISMITH *In* CSIR Ann. Transportation Conv., Vol. 1 12 p 1982 refs
Avail: NTIS HC A16/MF A01

Determinations for civil engineering research which are considered necessary in the United States are studied. Research needs were examined for societal needs such as shelter, food, air, water, conservation, transportation, energy and public safety. Critical transportation issues were identified as: transportation and energy relationships, transportation system performance and design, bridge design and construction, pavement management and rehabilitation, transport system maintenance, quality control and recycling of material, effective utilization of existing transportation systems, transportation safety, transportation financing, transportation of hazardous materials and the role of transportation during major emergencies. E.A.K.

N83-23210# Supreme Court of South Africa, Pretoria. Commission of Inquiry into Civil Aviation in South Africa.
CO-ORDINATION IN AVIATION IN SOUTHERN AFRICA
C. S. MARGO *In* CSIR Ann. Transportation Conv., Vol. 1 13 p 1982
Avail: NTIS HC A16/MF A01

The principles and economics of transport in the context of an adequate and efficient network of air services in Southern Africa are discussed. Probable future developments in the demand for transport are examined. The advantages of air transport and the use thereof in Southern Africa are analyzed. The economics of air transport in the region are examined and solutions are offered for the effective coordination of a suitable transport network, and for the provision and maintenance of the necessary infrastructure. E.A.K.

N83-23269# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Systems and Logistics.
DECISION SUPPORT SYSTEMS: AN APPROACH TO AIRCRAFT MAINTENANCE SCHEDULING IN THE STRATEGIC AIR COMMAND M.S. Thesis
S. B. HACKETT and S. E. PENNARTZ Sep. 1982 132 p refs (AD-A123039; AFIT-LSSR-42-82) Avail: NTIS HC A07/MF A01 CSCL 05B

Maintaining increasingly complex Air Force weapon systems requires optimum use of all available resources. Timely and accurate resource coordination is vital to ensure continuous mission capability; any improvement in coordination can produce an increase in readiness. Essential to such resource coordination is the aircraft maintenance scheduling function at the unit level. It is hypothesized that the application of computer technology to the maintenance scheduling decision process could result in improved maintenance resource allocation. A promising tool for computer-aided scheduling exists; Decision Support Systems (DSS) are intended to combine the information storage and assimilation powers of the computer with the experienced judgement of the manager to produce more effective decisions. The first requirement of a DSS is to model the current decision process; this research effort has generated a maintenance scheduling model of a SAC wing-level organization. The architecture of the model is based on Integrated Computer-Aided Manufacturing (ICAM) technology, specifically incorporating the structure explained in the ICAM Definition (IDEFO) Function Modeling Manual. GRA

N83-23270# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Systems and Logistics.
A SYSTEM DYNAMICS POLICY ANALYSIS MODEL OF THE AIR FORCE AIRCRAFT MODIFICATION SYSTEM M.S. Thesis
M. Y. FONG and C. F. HISER Sep. 1982 188 p refs (AD-A122894; AFIT-LSSR-91-82) Avail: NTIS HC A09/MF A01 CSCL 05A

The Air Force aircraft modification system has a complex and dynamic nature which continually challenges management's ability to develop effective policy to support decision-making. With the invaluable assistance of key managers within the modification process, a policy model of the process has been developed using the system dynamics concept. The formal and informal system structure and policies which currently exist for the aircraft modification process are addressed in the research. The purpose of the dynamic policy model is to provide a tool to assist Air Force strategic managers in understanding the complex nature of the system and to identify the most important areas that are sensitive to changes in either structure or policy. The model, thus, provides a device for policy development. Author (GRA)

N83-23271# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Systems and Logistics.
AIRCRAFT AVAILABILITY: AN ACQUISITION DECISION STRATEGY M.S. Thesis
L. M. DECKER and S. J. GUILFOOS Sep. 1982 104 p refs (AD-A123060; AFIT-LSSR-14-82) Avail: NTIS HC A06/MF A01 CSCL 01C

Technological complexity in today's USAF weapon systems coupled with the limiting maintenance factors of skilled manpower, ageing aircraft and overburdened logistics support systems have caused aircraft to spend more time in maintenance. By increasing aircraft availability, through decreased maintenance time, additional sorties can be generated, thereby effectively increasing the number of available aircraft. Based on A-10 aircraft data, this thesis determined the statistical significance of relating reduced maintenance time to increased availability. Three measures of availability were investigated: (1) number of sorties generated; (2) number of aircraft waiting to fly; and (3) calculated aircraft availability. Secondly, this thesis quantified the relationship between increased availability and equivalent additional aircraft and investigated the possible use of this relationship as an acquisition decision strategy. Author (GRA)

N83-23272# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Systems and Logistics.
AN ANALYSIS OF THE F-16 AIRCRAFT REQUIREMENTS GENERATION PROCESS AND ITS ADVERSE IMPACT ON CONTRACTOR RATE CAPACITY M.S. Thesis
C. M. REYNOLDS, JR. and R. D. SCHIKORA Sep. 1982 120 p refs
(AD-A123003; AFIT-LSSR-74-82; QTPR-3) Avail: NTIS HC A06/MF A01 CSCL 01C

The United States defense industry is experiencing frustration in agglomerating planned Department of Defense production requirements. One probable source of this frustration is inadequate requirement forecast consolidation by the Department of Defense. Several agencies within the Department of Defense are charged with procuring subassemblies and spares for major weapons systems. In the case of the United States Air Force F-16, the Air Force Logistics Command and the Air Force Systems Command are involved in formulation of production requirement forecasts, and may do so independent of one another. Defense suppliers are then subjected to a myriad of unconsolidated forecasts, none of which they can satisfy without significantly reducing their ability to fulfill other demand requirements. Methods, therefore, should be developed to improve the requirement forecast consolidation process. GRA

N83-23273# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Systems and Logistics.
A STUDY TO DEMONSTRATE THE APPLICATION OF A GRAPHICAL METHOD TO DETERMINE AN OPTIMAL MAINTENANCE TASK INTERVAL FOR AN ITEM IN AIR FORCE INVENTORY M.S. Thesis
D. C. BECKWITH and A. R. ROCLEVITCH Sep. 1982 213 p refs
(AD-A123025; AFIT-LSSR-60-82) Avail: NTIS HC A10/MF A01 CSCL 05A

Determining maintenance task intervals is an important part of any schedule maintenance program. Criteria for determining optimal intervals is usually based on an objective function designed to minimize average long-term (expected) cost. This study demonstrates a graphical method, developed by Bergman in 1977, for determining a maintenance task interval using the KT-73 Inertial Measurement Unit installed on the A7-D. The method establishes intervals on a hard time replacement policy, but can also be used under an on-condition maintenance policy. The authors sought to discuss this study within the context of the Reliability-Centered Maintenance Program, but to deviate from the traditional age exploration concept and cost-benefit analyses. Instead, Bergman's simple, but rigorous, method is employed to find a task interval based on a control strategy which balances cost of replacement with cost of failure and results in a minimum total long-run average

cost per unit time. Among the advantages of Bergman's method are that the underlying failure distribution need not be known and that a sensitivity analysis can be performed to examine the effects of cost uncertainty with regard to changes in the optimal interval. Author (GRA)

N83-25652# Federal Aviation Administration, Washington, D.C. Office of Aviation Policy and Plans.
FAA AVIATION FORECASTS: FISCAL YEARS 1983-1994
Feb. 1983 80 p
(AD-A124611; FAA-APO-83-1) Avail: NTIS HC A05/MF A01 CSCL 01B

This report contains the Fiscal Years 1983-1994 Federal Aviation Administration (FAA) forecasts of aviation activity at FAA facilities. These include airports with FAA control towers, air route traffic control centers, and flight service stations. Detailed forecasts were made for the four major users of the national aviation system: air carriers, air taxi/commuters, general aviation and the military. The forecasts have been prepared to meet the budget and planning needs of the constituent units of the FAA and to provide information that can be used by state and local authorities, by the aviation industry and the general public. The overall outlook for the forecast period is for moderate economic growth, relatively stable real fuel prices, and decreasing inflation. Based upon these assumptions, aviation activity is forecast to increase by Fiscal Year 1994 by 97 percent at towered airports, 50 percent at air route traffic control centers, and 54 percent in flight services performed. Hours flown by general aviation is forecast to increase 56 percent and helicopter hours flown 80 percent. Scheduled domestic revenue passenger miles (RPM's) are forecast to increase 81 percent, with scheduled international RPM's forecast to increase by 80 percent and commuter RPM's forecast to increase by 220 percent. GRA

N83-25655# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Systems and Logistics.
THE EFFECTS OF THE PRODUCTION ORIENTED MAINTENANCE ORGANIZATION (POMO) CONCEPT ON ADTAC AIRCRAFT MAINTENANCE PRODUCTIVITY AND QUALITY M.S. Thesis
J. B. AMEND and L. E. ERIKSEN Sep. 1982 139 p refs
(AD-A123981; AFIT-LSSR-70-82) Avail: NTIS HC A07/MF A01 CSCL 01C

Virtually all USAF tactical fighter and interceptor units work under the AFR 66-5 decentralized POMO concept for aircraft maintenance. This thesis used an aggregation of maintenance data from five ADTAC Fighter Interceptor Squadrons spanning periods preceding and following POMO implementation. Hypotheses reflecting POMO's intended effects on maintenance productivity and quality were then statistically tested using the Analysis of Variance, Duncan'S Multiple Range Test, and the Large Sample Test of Significance. The final research results showed that conversion to POMO generally improved aircraft maintenance performance in the ADTAC FISs, but not to any great extent. These findings may possibly be generalizable to other USAF tactical air force operations. Author (GRA)

N83-25911# Science Management Corp., Washington, D.C.
FEDERAL PROCUREMENT METRICATION APPROPRIATENESS AND METHODS Final Report
M. A. COELLA 18 Sep. 1982 85 p
(AD-A123243; NRC-3581-682) Avail: NTIS HC A05/MF A01 CSCL 15E

This study was designed to provide the USMB with a clearer understanding of the basic relationships between the Federal procurement process and private sector suppliers. This was done to gain an understanding of the ways in which Federal procurement can encourage and accommodate initiatives of the private sector and to ensure that the effects of conversion on the Federal and private sectors are understood prior to implementation of procurement decisions and actions. Author (GRA)

N83-31331# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. Dept. of Electrical Engineering.
AN ANDROID RESEARCH AND DEVELOPMENT PROGRAM M.S. Thesis
R. J. TAYLOR Mar. 1983 149 p refs
(AD-A127359; AFIT/GE/EE/83M-3) Avail: NTIS HC A07/MF A01 CSCL 15E

This report identifies areas requiring further research to develop a detailed research and development plan for an aircraft maintenance android. The general user requirements are defined and the desired android capabilities are addressed to meet the defined user requirements. The user requirements are defined independently of aircraft type. Structured analysis diagrams are used to describe the functional requirements. Specific recommendations are made. Author (GRA)

N83-31417# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. Dept. of Operations Research.
AVAILABILITY OF MAINTAINED SYSTEMS M.S. Thesis
A. A. ELSHANAWANI Mar. 1983 113 p refs
(AD-A127365; AFIT/GOR/MA/82D-7) Avail: NTIS HC A06/MF A01 CSCL 05A

Availability appears to be a more appropriate measure than reliability for measuring the effectiveness of maintained systems because it includes reliability as well as maintainability. This thesis is a survey and a systematic classification of the literature relevant to availability. Emphasis in this thesis is centered on a variety of topics related to availability. The topics discussed are: the definition and concepts of the availability, the probability density functions of failure times and of repair times, system configurations; and the various approaches employed to obtain the availability models; effect of preventive maintenance policies on availability; availability parameters in the model; and system optimization. Author (GRA)

N83-31574# Management Consulting and Research, Inc., Falls Church, Va.
SUMMARY OF ANALYSIS OF SOURCES OF FORECASTING ERRORS IN BP 1500 REQUIREMENTS ESTIMATING PROCESS AND DESCRIPTION OF COMPENSATING METHODOLOGY Interim Report
P. A. INSLEY, W. P. HUTZLER, G. R. MCNICHOLS, and G. H. WORM 25 Apr. 1982 89 p refs
(Contract F33615-81-C-5018)
(AD-A128548; MCR-TR-8104-3) Avail: NTIS HC A05/MF A01 CSCL 15E

The researchers developed a methodology for improving the accuracy of the Air Force Logistics Command (AFLC) forecasts of Aircraft Replenishment Spares (BP 1500) POM requirements. The research was divided into three phases: (1) Develop a program plan for accomplishing the study; (2) Examine the AFLC BP 1500 POM (Program Management Memorandum) forecasting process and identify sources of errors and recommend changes; and (3) Develop and demonstrate a methodology for improving the AFLC forecasting accuracy for BP 1500 POM requirements. GRA

N83-31613# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. Dept. of Civil Engineering.
OPTIMIZATION OF LONG RANGE MAJOR REHABILITATION OF AIRFIELD PAVEMENTS Ph.D. Thesis
D. H. ARTMAN, JR. Jan. 1983 156 p refs
(AD-A127579; AFIT-CI-NR-83-7D) Avail: NTIS HC A08/MF A01 CSCL 01E

The goal of this research has been to develop a methodology for managing pavement networks over prolonged analysis periods. Separate independent methods were devised for project and network level analysis, and the project level procedures were designed to provide inputs into the network level procedures. For the project level analysis, a computer code was written to use dynamic programming methods to optimally select schedule the activities (routine maintenance, reconstruction, and overlays) over the analysis period (20 years), by maximizing the structural performance (area under the utility weighted Pavement Condition Index (PCI) versus time curve). At the network level, the

mathematical representation of choosing those projects that maximize the sum of the user value weighted structural performance of each project, is a zero-one integer linear programming model. Projects are selected using Toyoda's heuristic (each related to a specific feature) that maximizes the objective function with pre-established constraints (network funding limit, etc.). At several funding levels, and a series of management information reports are generated. With these reports, the consequences of selected network funding levels can quantitatively be compared. In addition, an estimate of an appropriate level of funding for the entire system can be made. The simple example shows a substantial difference between a manually developed network program and a program developed with the procedures developed in this research and an application to an existing Air Force base was presented. Author (GRA)

N83-32662# Aeronautical Systems Div., Wright-Patterson AFB, Ohio. Directorate of Equipment Engineering.
BUILDING AND OPERATING THE LOGISTICS COMPOSITE MODEL (LCM) FOR NEW WEAPON SYSTEMS, PART A Final Report, Nov. 1981 - Jul. 1982
E. R. RICHARDS, JR. Feb. 1983 120 p refs Supersedes AFHRL-TR-74-97(2)
(Contract AF PROJ. AFSD)
(AD-A127538; ASD-TR-82-5033; AFHRL-TR-74-97(2)) Avail: NTIS HC A06/MF A01 CSCL 05I

The purpose of this documentation is to update AFHRL-TR-74-97 (II), Simulating Maintenance Manning for Weapon Systems: Building and Operating a Simulation Model, Volume II by incorporating modeling techniques that reflect the Logistics Composite Model (LCOM) Software Revision 4.1, 1 January 1981. This report provides a detailed description of the Aeronautical Systems Division (ASD) procedures for using the LCOM. It is intended to serve as a manual of instructions and procedures needed to build and operate an LCOM data base. The main thrust of this report is in the use of LCOM for the acquisition of new weapon systems; however, these techniques may be used for other purposes. Author (GRA)

N83-32667# Management Consulting and Research, Inc., Falls Church, Va.
POM (PROGRAM OBJECTIVE MEMORANDUM) FY-85 BP 1500 COST GROWTH AND LEADTIME ADJUSTMENTS: RESEARCH RESULTS Final Report, 1 Oct. 1982 - 28 Feb. 1983
P. A. INSLEY and W. P. HUTZLER 28 Feb. 1983 85 p refs
(Contract F33615-81-C-5018)
(AD-A128522; MCR-TR-8229-1) Avail: NTIS HC A05/MF A01 CSCL 05A

This research, Phase 4 of Contract F33615-81-C-5018 (see MCR TR-8104-3), was divided into three tasks: Recommend data sources for FY-85 costs and leadtimes for BP 1500 Federal Supply Classes (FSC). Recommend procedure for incorporating cost and leadtime adjustments in the FY-85 projected budget requirements. Recommend specific price and leadtime adjustments for each Federal Supply Class. The researchers examined cost and leadtime trends, by commodity, and developed factors to be used in refining the BP 1500 cost per flying hour estimates developed by the Logistics Management Institute's Aircraft Availability Model (AAM). In addition to developing factor values to represent projected cost and leadtime trends, the researchers identified sources of data which could be consistently used as part of the requirements estimating process. GRA

N83-32837*# National Aeronautics and Space Administration. John F. Kennedy Space Center, Cocoa Beach, Fla.
SPACE SHUTTLE OPERATIONAL LOGISTICS PLAN
J. W. BOTTS Aug. 1983 19 p
(NASA-TM-85410; K-SMO-12.01; NAS 1.15:85410) Avail: NTIS HC A02/MF A01 CSCL 22A

The Kennedy Space Center plan for logistics to support Space Shuttle Operations and to establish the related policies, requirements, and responsibilities are described. The Directorate of Shuttle Management and Operations logistics responsibilities required by the Kennedy Organizational Manual, and the self-sufficiency contracting concept are implemented. The Space Shuttle Program Level 1 and Level 2 logistics policies and requirements applicable to KSC that are presented in HQ NASA and Johnson Space Center directives are also implemented. Author

N83-34957# Air Force Engineering and Services Center, Tyndall AFB, Fla.
PROGRAM MANAGEMENT PLAN (PMP) FOR RAPID RUNWAY REPAIR (RRR)
15 Apr. 1983 69 p refs
(AD-A128565) Avail: NTIS HC A04/MF A01 CSCL 05A

The objective of the Rapid Runway Repair (RRR) Program is to provide the US Air Force the capability to recover from conventional weapons attacks on USAF runways and airfields, thereby permitting expeditious launch and recovery of operational aircraft. The RRR Program conceives, develops, tests, and validates: methods, materials, and equipment to rapidly repair airfield pavements following an enemy attack; and designs of alternate launch and recovery surfaces. This program is not expected to produce a single, unique solution, but rather several validated concepts and solutions which can be used in combination to significantly improve USAF readiness posture. The scope of this program is limited to developments, testing, and fielding of civil engineering techniques to repair paved surfaces, to improve unpaved surfaces, and to create required support allow aircraft operations from the surfaces in spite of threat attacks. Modification to aircraft will not be attempted even though such modifications may turn out to be more effective that extensive engineering of airfield surfaces. Class 2 aircraft modification will only be accomplished to support instrumentation sensing devices. GRA

N83-34959# Georgia Univ., Athens. Inst. of Government.
SMALL AIRPORT MANAGEMENT HANDBOOK
Jun. 1982 146 p refs
(Contract NSF ISP-79-08955)
(PB83-194043; NSF/ISP-82038) Avail: NTIS HC A07/MF A01 CSCL 01E

Results are presented of a survey undertaken to examine the management needs of small airports. A majority of the respondents reported potential legal problems. To questions pertaining to managerial practices at the airports, a majority of the respondents reported problems associated with safety procedures, as well as problems in adopting revenue charges comparable to those at other airports. A majority of the respondents reported problems associated with petroleum services, and indicated the need for written fire regulations and written emergency weather procedures. Fundamentals of small airport management are noted, as are some of the legal problems that an airport manager may face. Recommendations for airport management practices are supplied. GRA

N83-35199# Office of Technology Assessment, Washington, D.C.
RADIOFREQUENCY USE AND MANAGEMENT. IMPACTS FROM THE WORLD ADMINISTRATIVE RADIO CONFERENCE OF 1979 Summary Report
Jan. 1982 27 p
(OTA-CIT-164) Avail: NTIS HC A03/MF A01

The impacts on the United States of key decisions taken at the general World Administrative Radio Conference (WARC-79) and options for preparation and participation in future international telecommunication conferences were evaluated. Congressional concern for the adequacy of existing machinery and procedures for U.S. policymaking and preparation for such conferences were reflected. WARC-79 and related international conferences demonstrate that contention for access to the radio spectrum and its important collateral element, the geostationary orbit for communication satellites, presents new and urgent challenges to vital U.S. national interests. Given the complexities of spectrum management in a changing world environment and the increased importance of telecommunications to both developed and

developing nations, it is unlikely that traditional U.S. approaches to these issues are sufficient to protect vital U.S. interests in the future. Problems require strategies not yet developed or tested.
Author

N83-35203# Naval Postgraduate School, Monterey, Calif.
SPREAD SPECTRUM FREQUENCY MANAGEMENT M.S. Thesis
R. D. MONTGOMERY Mar. 1983 65 p refs
(AD-A128163) Avail: NTIS HC A04/MF A01 CSCL 05A

Because of the nation's increasing demand for more telecommunications capacity, there is a continuing need for more efficient ways of sharing the radio spectrum. The conventional ways of allocating the spectrum are by frequency, space and time division. However, for systems using new technology this is inefficient. Hence, it is desirable to re-examine alternative procedures that might be necessary if the benefits of telecommunications are to be assured in the face of increased demand. Spread spectrum techniques, which are based on principles different than those currently used in spectrum allocation, seem to offer benefits for spectrum sharing and for some applications superior to those of frequency division. This thesis provides a summary of the principles upon which spread spectrum systems have developed and the progress of frequency management involving spread spectrum systems. This analysis considers several strategies to accommodate spread spectrum in frequency management and its role in future spectrum sharing opportunities. Author (GRA)

08

RELIABILITY AND QUALITY CONTROL

Includes safety, standards, testing, and specifications.

A83-10729
SOME MANAGEMENT VIEWS ON TEST PROGRAM SET /TPS/ SALVAGEABILITY
P. M. TOSCANO (RCA, Automated Systems Div., Burlington, MA) In: AUTOTESTCON '81; Proceedings of the Conference, Orlando, FL, October 19-21, 1981. New York, Institute of Electrical and Electronics Engineers, Inc., 1981, p. 9-12.

Several questions pertaining to TPS salvageability are discussed: (1) whether the TPS must lose its usefulness when the ATE system is upgraded; (2) how much of the TPS continues to be useful independently of the ATE system on which it would be used; (3) whether it is ever most cost effective to develop a translator to salvage TPS's; and (4) whether it is necessary to completely restart TPS's when considering an upgraded ATE. It is suggested that TPS salvageability should be considered at the time of purchase; a good test requirement analysis, English language test documents, and high order language (ATLAS) listings should be specified and received. B.J.

A83-15155
OVERVIEW OF PROBABILISTIC FAILURE PREDICTION AND ACCEPT-REJECT DECISIONS
J. M. RICHARDSON and M. J. BUCKLEY (Rockwell International Science Center, Thousand Oaks, CA) In: Review of progress in quantitative nondestructive evaluation. Volume 1 - Proceedings of the Eighth U.S. Air Force/Defense Advanced Research Projects Agency Symposium on Quantitative Nondestructive Evaluation, Boulder, CO, August 2-7, 1981. New York, Plenum Press, 1982, p. 43-58. refs
(Contract W-7405-ENG-82)

An assessment is given of the development status of NDE decision formalisms, with emphasis on the degree to which the requirements of structural accept-or-reject decisions and managerial decisions such as total costs, liability risks, etc., are successfully addressed. Attention is given to the relative merits of inspection before or after service, the role of physical models of failure, measurement, and a priori defect statistics, the dependence of the nature of the formalism upon the general material category, and the use of the dominant-defect approximation rather than many-defect models. The formulation of optimization criteria and the relative costs of false rejections and acceptances are also considered. O.C.

A83-26610
APPLICATION OF REDUNDANT PROCESSING TO SPACE SHUTTLE
J. T. CAULFIELD (IBM Corp., Owego, NY) In: Control science and technology for the progress of society; Proceedings of the Eighth Triennial World Congress, Kyoto, Japan, August 24-28, 1981. Volume 4. Part B. Oxford, Pergamon Press, 1982, p. 2461-2466.

Space Shuttle subsystem reliability requirements are fail operational/fail safe, so that after the first failure of a given unit, the system will remain fully operational, and will be safe after a second failure. The data processing system is, moreover, fail operational/fail operational, or able to continue full operation after two like failures have occurred. A derivative requirement is that there can be no skew in the time coherence of the input data used by each computer. Redundancy techniques must tolerate transient transmission errors. Withstanding two like failures requires, as a minimum, a quadruple redundant system. In addition, a fifth computer, ordinarily used as a payload management computer, is employed during critical mission phases as an independently programmed backup. The redundancy management of the computers, external sensors, and interfacing equipment is performed by a combination of hardware and software techniques. O.C.

A83-29807#
IMPROVED FATIGUE LIFE TRACKING PROCEDURES FOR NAVY AIRCRAFT STRUCTURES
R. E. PINCKERT (McDonnell Aircraft Co., St. Louis, MO) and P. A. KOZEL (U.S. Navy, Naval Air Development Center, Warminster, PA) IN: Structures, Structural Dynamics and Materials Conference, 24th, Lake Tahoe, NV, May 2-4, 1983, Collection of Technical Papers. Part 2 . New York, American Institute of Aeronautics and Astronautics, 1983, p. 1-14. Navy-supported research. refs
(AIAA 83-0805)

An investigation is performed to establish and optimize three types of potential fatigue life tracking systems. The first is a multichannel system comprising 12 to 14 data recording channels, the second is a limited channel system consisting of 4 to 7 data channels, and the third is a combined system which multichannel recorders are used on 20 percent of the fleet and limited channel recorders are used on 80 percent of the fleet. Analytical techniques are established to determine the damage indices for both crack initiation and crack growth to be used for fleet management and individual aircraft safety. Load truncation criteria are developed on the basis of element tests and analysis. On-board instrumentation and ground based support equipment are conceptually designed for fleet damage tracking. The various candidate systems are evaluated with respect to accuracy and cost, and an optimum multi-channel system, limited channel system, and combined system are selected. Regression equations are developed to convert F/A-18 flight parameters to loads and strains for the inner wing, horizontal tail, and forward fuselage. C.R.

A83-31481
BENEFITS OF MISSION PROFILE TESTING
J. F. WAGNER, III (USAF, Aeronautical Systems Div., Wright-Patterson AFB, OH) and A. H. BURKHARD (USAF, Flight Dynamics Laboratory, Wright-Patterson AFB, OH) IN: Environmental stress impact and environmental engineering methods; Proceedings of the Twenty-seventh Annual Technical Meeting on Emerging Environmental Solutions for the Eighties, Los Angeles, CA, May 5-7, 1981. Volume 1 . Mt. Prospect, IL, Institute of Environmental Sciences, 1981, p. 26-31. refs

Tangible and intangible benefits of combined environment reliability testing (CERT) are described in terms of the perspective of the acquisitor, logistician, and user of avionics equipment. Both

cost saving benefits and operational effectiveness impacts are discussed. When used as a test-analyze-fix growth test program in the acquisition process, CERT benefits all the decision makers in the equipment's life cycle. This benefit is obtained without significant adverse impact on performance as measured against established performance factors used by decision makers. Total acquistion cost comparisons are shown. C.D.

A83-31492
BURN-IN/ACCEPTANCE TEST MODEL USING TGP GROWTH GUIDELINE CONCEPTS
V. H. PELLICIONE (Grumman Aerospace Corp., Bethpage, NY) IN: Environmental stress impact and environmental engineering methods; Proceedings of the Twenty-seventh Annual Technical Meeting on Emerging Environmental Solutions for the Eighties, Los Angeles, CA, May 5-7, 1981. Volume 1 . Mt. Prospect, IL, Institute of Environmental Sciences, 1981, p. 129-133.

A quantitative tool for burn-in and acceptance test planning and control is presented. This tool provides initial guidelines for recommended burn-in and reliability acceptance test failure-free durations, monitoring of data and results to recommend changes in criteria for subsequent lots, formalizing of historical baseline for future test planning, and definition of optimal test duration and criteria. The initial test durations can be derived independently of historical data and, by means of statistical sampling and quality monitoring techniques, results can be verified against lot acceptance criteria based on an allowable percent defective and probability of acceptance. The application and management of the technique is demonstrated with an illustration taken from actual burn-in performance results. C.D.

A83-36174
LIFE PREDICTION FOR TURBINE ENGINE COMPONENTS
T. NICHOLAS and J. M. LARSEN (USAF, Wright Aeronautical Laboratories, Wright-Patterson AFB, OH) IN: Fatigue: Environment and temperature effects . New York, Plenum Press, 1983, p. 353-375. USAF-supported research. refs

An alternate approach to life management of turbine engines is being considered considered by the U.S. Air Force. Whereas most major structural components are currently limited by low cycle fatigue and are retired fro service after their design life has been reached, a 'Retirement for Cause' approach would keep components in service until a fatigue crack has been detected. The approach is based on non-destructive inspection and prediction of fatigue crack growth behavior under engine operating conditions. This paper discusses the concept of retirement for cause and reviews the problems associated with the prediction of crack growth. Several aspects of crack growth under engine spectrum loading including creep crack growth and crack retardation are discussed. Recommendations for future research efforts are presented. Author

A83-36297#
DETERIORATION TRENDING ENHANCES JET ENGINE HARDWARE DURABILITY ASSESSMENT AND PART MANAGEMENT
R. J. BARRETT (United Technologies Corp., Government Products Div., West Palm Beach, FL) and W. R. HARRIS, JR. (U.S. Naval Air Systems Command, Propulsion Div., Washington, DC) AIAA, SAE, and ASME, Joint Propulsion Conference, 19th, Seattle, WA, June 27-29, 1983. 6 p.
(AIAA PAPER 83-1234)

The exposure of a new aircraft engine to the service environment can reveal engine hardware durability limitations not evident during the development or model acceptance phase of an engine program. In connection with the recognition by the Navy of the need for an improved full-scale engine test to assure the long-range durability characteristics of the engine, a new approach for assessing engine hardware durability improvements was initiated in 1978. The approach included Accelerated Simulated Mission Endurance Test (ASMET) and fleet engine hot section hardware deterioration comparisons. Part deterioration 'trending' was initiated during ASMET engine hot section inspections in order to establish a baseline of trending data for comparison with fleet hardware. It is pointed out that jet engine hardware deterioration trending is now a proven method for enhancing long-term durability evaluation of new and improved hardware designs. G.R.

A83-36462#
THE APPLICATION OF LOW-COST DEMONSTRATORS FOR ADVANCEAD FIGHTER TECHNOLOGY EVALUATION
G. ROSENTHAL and G. BRANDEAU (Fairchild Republic Co., Farmindgale, NY) IN: Aircraft Prototype and Technology Demonstrator Symposium, Dayton, OH, March 23, 24, 1983, Proceedings . New York, American Institute of Aeronautics and Astronautics, 1983, p. 63-71.
(AIAA PAPER 83-1052)

A demonstrator aircraft, which unlike a prototype need not match the size, construction, systems, functions, specifications and performance envelope of a prospective production aircraft, is designed to provide high quality, systematic flight research data which can support the design and development of future aircraft at reduced risk. In order to control the costs associated with the development of next-generation fighter aircraft, it is desirable that many competing system and concept categories be evaluated. This may be achieved through the application of principles and program approaches that can reduce individual demonstrator program costs. Attention is presently given to recent experience with a subscale flight demonstrator constructed with a view to the development of the Next Generation Trainer Aircraft. O.C.

A83-37123
REDUNDANCY MANAGEMENT OF SHUTTLE FLIGHT CONTROL RATE GYROSCOPES AND ACCELEROMETERS
H. C. GELDERLOOS and D. J. YOUNG (Honeywell, Inc., Avionics Div., Clearwater, FL) IN: American Control Conference, 1st, Arlington, VA, June 14-16, 1982, Proceedings. Volume 2 . New York, Institute of Electrical and Electronics Engineers, 1982, p. 808-811.

The Space Shuttle primary and backup avionics system is a digital fly-by-wire system. The primary avionics system consists of a centralized quad redundant computer system with a fifth computer as backup in case of generic software failures. The Data Processing System (DPS) detects faults by using Built In Test Equipment (BITE), synchronization checks, and comparing identical outputs with a bit check sum test. The DPS provides communication fault status to the Guidance, Navigation, and Control subsystem Redundancy Management (RM). The present investigation considers the RM software algorithms used on the second Space Transportation System flight (STS-2) to detect and identify Flight Control Subsystem rate gyroscope and accelerator failures. Attention is also given to some of the specialized analytical tools to design and verify the algorithms. G.R.

A83-37289
RELIABILITY ANALYSIS OF A DUAL-REDUNDANT ENGINE CONTROLLER
E. GAI, J. V. HARRISON, and R. H. LUPPOLD (Charles Stark Draper Laboratory, Inc., Cambridge, MA) IEEE Transactions on Reliability (ISSN 0018-9529), vol. R-32, April 1983, p. 14-20. refs

A Markov model is developed to predict the reliability of a full-authority, dual-redundant aircraft engine controller. The effects of failures of any of the controllers sensors, electronic interface modules, processors and actuators, as well as the consequences of redundancy management decisions are modeled. The model issued to study parameter sensitivity and to develop quantitative data in support of design tradeoffs. The effects of scheduled maintenance of the inflight shutdown rate of the engine are determined. Author

A83-37492
FAILURE DETECTION AND CORRECTION IN LOW ORBIT SATELLITE ATTITUDE CONTROL SYSTEM
J. L. MARIE (Matra, S.A., Velizy-Villacoublay, Yvelines, France) IN: Automatic control in space 1982; Proceedings of the Ninth Symposium, Noordwijkerhout, Netherlands, July 5-9, 1982 . Oxford, Pergamon Press, 1983, p. 575-582.

Monitoring, failure detection, and reconfiguration techniques have been employed to provide the French Earth Observation Satellite (Spot) with a high degree of autonomy. A review is conducted of the algorithms which are implemented with the aid of the Spot on-board computer for Attitude Control Subsystem (ACS) monitoring and configuration management. The Spot platform represents the prototype of the 'multimission platform'. The multimission platform is used for earth observation applications at altitudes in the range from 600 to 1200 km. The /ACS/ is essentially designed to meet the goal of 0.001 degree/second stability in connection with image quality considerations. Attention is given to the failure detection and isolation philosophy, technological tests, functional tests, and aspects of reconfiguration. G.R.

A83-38347
CLOSE-RANGE PHOTOGRAMMETRY FOR AIRCRAFT QUALITY CONTROL
D. S. SCHWARTZ (General Dynamics Corp., Forth Worth, TX) IN: American Congress on Surveying and Mapping and American Society of Photogrammetry Convention; APS Annual Meeting, 48th, Denver, CO, March 14-20, 1982, Technical Papers . Falls Church, VA, American Society of Photogrammetry, 1982, p. 353-360.

Close range photogrammetry is applicable to quality assurance inspections, design data acquisition, and test management support tasks, yielding significant cost avoidance and increased productivity. An understanding of mensuration parameters and their related accuracies is fundamental to the successful application of industrial close range photogrammetry. Attention is presently given to these parameters and to the use of computer modelling as an aid to the photogrammetric entrepreneur in industry. Suggested improvements to cameras and film readers for industrial applications are discussed. O.C.

A83-41045#
DURABILITY AND DAMAGE TOLERANCE CONTROL PLANS FOR U.S. AIR FORCE AIRCRAFT
M. A. LANDY and O. L. SMITHERS (USAF, Aeronautical Systems Div., Wright-Patterson AFB, OH) (Structures, Structural Dynamics and Materials Conference, 23rd, New Orleans, LA, May 10-12, 1982, Collection of Technical Papers, Part 2, p. 166-174) Journal of Aircraft (ISSN 0021-8669), vol. 20, Aug. 1983, p. 689-695. refs

Previously cited in issue 13, p. 2021, Accession no. A82-30147

A83-47324#
ORBITAL DEBRIS MANAGEMENT - INTERNATIONAL COOPERATION FOR THE CONTROL OF A GROWING SAFETY HAZARD
D. OLMSTEAD (GTE Sprint Communications Co., Burlingame, CA) International Astronautical Federation, International Astronautical Congress, 34th, Budapest, Hungary, Oct. 10-15, 1983. 9 p. refs
(IAF PAPER 83-254)

Numerical models are investigated for managing the problem of orbital debris. Nonfunctioning satellites in GEO are the particular concern because a GEO-stationed satellite, once turned off, will experience only one kilometer of orbital decay for every 1000 yr. Consequently, the growth in the total GEO debris is a monotonically increasing function because no natural cleansing force exists. It is suggested that GEO be treated as a common property, and that intergovernmental agreements define optimal allocations of the GEO resource, set the level of orbit quality that must be maintained, and assure that individual users of GEO will decide to maintain the GEO quality. Welfare economics are cited as one way an optimal quality target can be determined. Static intratemporal and intertemporal models are formulated, with consideration given to alternative technologies, such as larger satellites. The models, although not complete enough for an orbital debris management system, do indicate the trade-offs between current costs and future safety that are being performed. M.S.K.

N83-13301# Istituto di Studi per la Programmazione dei Sistemi Ambientali s.r.l., Milan (Italy).
PERSONNEL PROTECTION MEANS. PART 3: MANAGEMENT METHODOLOGY [MEZZI PERSONALI DI PROTEZIONE. N. 3: METODOLOGIA PER LA GESTIONE]
1982 55 p In ITALIAN 3 Vol.
Avail: NTIS HC A04/MF A01

A management procedure for the analysis and control of safety activities in an industrial environment is presented. A diagram consisting of ten decision or activity blocks summarizes the proposed method. Each block is analyzed in detail, and worksheets are included, covering the control, evaluation and analysis activities of each step of the procedure. Author (ESA)

N83-14215# British Library Lending Div., Boston Spa (England).
RAISING THE QUALITY OF DESIGNS OF IRON AND STEEL WORKS
S. V. GUBERT, E. M. BORISOV, and L. Y. DONSKOI 7 Oct. 1982 18 p Transl. into ENGLISH from Stal (USSR), v. 8, 1981 p 5-10
(BLL-M-26698-(5828.4)) Avail: British Library Lending Div., Boston Spa, Engl.

The part played by the main Soviet design institute for iron and steel works, Gipromez, in the recent, current and expected future development of the industry is described. Examples of successful design solutions, together with figures on the benefits obtained, and of steps taken to ensure a high quality of design work are given. Author

N83-14346# Erno Raumfahrttechnik G.m.b.H., Bremen (West Germany).
EMC SYSTEM TEST PERFORMANCE ON SPACELAB
F. SCHWAN *In* ESA 2nd ESTEC Spacecraft Electromag. Compatibility Seminar p 3-18 Jul. 1982 refs
Avail: NTIS HC A10/MF A01

Electromagnetic compatibility testing of the Spacelab engineering model is discussed. Documentation, test procedures (including data monitoring and test configuration set up) and performance assessment approach are described. Equipment was assembled into selected representative flight configurations. The physical and functional interfaces between the subsystems were demonstrated within the integration and test sequence which culminated in the flyable configuration Long Module plus one Pallet. Author (ESA)

N83-14793# RAND Corp., Santa Monica, Calif.
CONFLICT AMONG TESTING PROCEDURES
D. F. KOHLER Apr. 1982 57 p refs
(AD-A119475; RAND/P-6765) Avail: NTIS HC A02/MF A01 CSCL 08N

The relationship among the Lagrange Multiplier Test (LM) the Wald test (W), and the Likelihood Ratio Test (LR) is reviewed. The inequality relation is also reviewed. Criteria are derived to determine which test is more appropriate in a given situation. Author

N83-16760# Battelle Columbus Labs., Ohio.
TECHNICAL AND SECRETARIAT SUPPORT OF THE MIL-STD-1515 FASTENER STANDARDIZATION EFFORT Final Report, Jun. 1976 - Mar. 1982
S. C. FORD and O. L. DEEL Wright-Patterson AFB, Ohio Aeronautical Systems Div. May 1982 24 p
(Contract F33615-76-C-0803)
(AD-A119828; ASD-TR-82-5008) Avail: NTIS HC A02/MF A01 CSCL 05B

This report presents the major activities associated with the subject contract. The Aeromechanical Fastener Requirements

Group (AMFRG) composed of the Air Force, Navy, Army, prime aerospace manufacturers, and fastener manufacturers was reorganized in 1976 to efficiently prepare and maintain MIL-STD-1515, Fastener Systems for Aerospace Applications. Twice yearly meetings were arranged, attended, technical support provided, and minutes prepared and distributed. MIL-STD-1515 was completely revised and two change notices to the revised document were completed and published. Research programs involving stress corrosion, fatigue properties of recess head fasteners, and removal torque measurements of fasteners installed in various aircraft were completed during the contract term.
Author (GRA)

N83-16774# *Boeing Co., Seattle, Wash.*
RELIABILITY PARTS DERATING GUIDELINES Final Report, Feb. 1981 - Apr. 1982
S. L. BRUMMETT, D. A. CROSS, R. L. DAVIS, and D. C. TOWNS Griffiss AFB, N.Y. RADC Jun. 1982 259 p refs
(Contract F30602-81-C-0073; AF PROJ. 2338)
(AD-A120367; RADC-TR-82-177) Avail: NTIS HC A12/MF A01 CSCL 09A

Derating can be defined as the practice of limiting electrical, thermal and mechanical stresses on devices to levels below their specified or proven capabilities in order to enhance reliability. If a system is expected to be reliable, one of the major contributing factors must be a conservative design approach incorporating part derating. Realizing a need for derating of electronic and electromechanical parts, many manufacturers have established internal guidelines for derating practices. The Air Force, on the other hand, has no established guide or base line for evaluating the validity of the numerous deratings proposed by industry. Therefore, the objective of this effort was to develop and publish guidelines for part derating to be used as standards for evaluating contractor's design and to establish values to be implemented in system and equipment specifications. This document has established part derating levels based on mission criticality for the majority of devices included in MIL-HDBK-217. Part design application guidelines were also developed. This study indicated that some advanced technology devices (VLSI, bubble memory, microwave semiconductors, etc.) has little or no available derating data and will require a more in-depth follow on report.
Author (GRA)

N83-16776# Department of Defense, Washington, D. C.
TEST AND EVALUATION OF SYSTEM RELIABILITY, AVAILABILITY AND MAINTAINABILITY. A PRIMER
J. C. CONLON, W. A. LILIUS, and F. H. TUBBESING, JR. Mar. 1982 300 p
(AD-A120261; DOD-3235.1-H) Avail: NTIS HC A13/MF A01 CSCL 15E

The acquisition of military weapon systems and equipment requires verification that the candidate systems do, in fact, perform in accordance with previously specified operational requirements. This verification process involves the design of test programs which provide an adequate data base to support realistic assessments of hardware characteristics. This text outlines the various statistical concepts and techniques to be used in structuring such test programs and analyzing the resulting data. GRA

N83-17302# Battelle Nortwest Labs., Richland, Wash.
SURVEY OF SYSTEMS SAFETY ANALYSIS METHODS AND THEIR APPLICATION TO NUCLEAR WASTE MANAGEMENT SYSTEMS
P. J. PELTO, W. K. WINEGARDNER, and R. H. V. GALLUCCI Nov. 1981 114 p *refs*
(Contract DE-AC06-76RL-01830)
(DE82-005594; PNL-4072) Avail: NTIS HC A06/MF A01

This report reviews system safety analysis methods and examines their application to nuclear waste management systems. The safety analysis methods examined include expert opinion, maximum credible accident approach, design basis accidents approach, hazard indices, preliminary hazards analysis, failure modes and effects analysis, fault trees, event trees, cause consequence diagrams, GO methodology, Markov modeling, and a general category of consequence analysis models. Previous and ongoing studies on the safety of waste management systems are discussed along with their limitations and potential improvements. The major safety methods and waste management safety related studies are surveyed. This survey provides information on what safety methods are available, what waste management safety areas have been analyzed, and what are potential areas for future study. DOE

N83-17497*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
THE ENGINEERING INVESTIGATION OF AIRCRAFT ACCIDENTS
S. B. ANDERSON *In* AGARD Human Factors Aspects of Aircraft Accidents 8 p Oct. 1982 refs
Avail: NTIS HC A07/MF A01 CSCL 01C

The organization and plan for an investigation, procedures used at the scene of the accident, engineering aspects covered in the main investigation, use of special analytical techniques and simulation tools, and use of flight recorder data are discussed. Examples of investigations are used to illustrate the processes used. Author

N83-19450# Army Safety Center, Fort Rucker, Ala. Directorate for Aviation System Management.
ANALYSIS OF US ARMY AVIATION MISHAP INJURY PATTERNS
J. E. HICKS, B. H. ADAMS, and D. F. SHANAHAN (Army Aeromedical Research Lab.) *In* AGARD Impact Injury Caused by Linear Acceleration: 12 p Oct. 1982 refs
Avail: NTIS HC A21/MF A01

Recent advances in US Army procedures for the identification and reporting of personnel injuries resulting from aircraft mishaps are reviewed. Mishap injury data requirements based on the needs of retrospective and prospective analyses are discussed. The requirements for these analyses to support engineering management decisions that will implement remedial programs to correct identified crashworthiness deficiencies is discussed. The US Army process for gathering aviation mishap injury data is summarized and modifications to procedures and codes for recording injury data are given. Examples of use of the data resulting in fleet wide improvement programs are discussed.
R.J.F.

N83-20178# European Space Agency, Paris (France).
RELIABILITY AND MAINTAINABILITY
T. D. GUYENNE, ed. Sep. 1982 712 p refs Partly in ENGLISH and FRENCH Proc. of 3rd Inter. Colloq., Toulouse, 18-21 Oct. 1982; sponsored by ESA, CNES, CNET and SEE
(ESA-SP-179; ISSN-0379-6566) Avail: NTIS HC A99/MF A01

The contractual, human factor, and technical aspects of reliability engineering are examined. Topics covered include safety and fault tolerance; software; modeling and estimating; availability and maintainability; mechanics, electromechanics, and pyrotechnics; estimating and selecting components; standardization; and tests and diagnostics.

N83-20179# Societe Generale de Travaux Electriques, Puteaux (France). Dept. Fiabilite.
RELIABILITY CLAUSES IN LARGE EXPORT CONTRACTS: THEIR CONTENTS AND THEIR TRAPS [LES CLAUSES DE FIABILITE DANS LES GRANDS CONTRATS & L'EXPORTATION: LEURS CONTENUS ET LEURS PIEGES]
J. C. LIGERON and A. DELAGE *In* ESA Reliability and Maintainability p 3-10 Sep. 1982 In FRENCH
Avail: NTIS HC A99/MF A01

The neglect of reliability clauses by industrialists can lead to cost overruns in very important projects. The principal reliability clauses found in large international contracts cover safety, maintainability, and availability (MTBF). Precautions to take and penalties to avoid for each of these aspects are underlined.

References for consideration are listed which are based on specifications for equipment and transport. Transl. by A.R.H.

N83-20180# Groupement des Industries Francaises Aeronautiques et Spatiales, Paris (France). Groupe de Travail Fiabilite-Maintenance.

RECOMMENDATIONS AS TO THE ELABORATION OF OPERATIONAL RELIABILITY, MAINTENANCE COST AND AVAILABILITY CLAUSES IN AERONAUTICAL EQUIPMENT SUPPLY CONTRACTS [RECOMMANDATIONS POUR L'ELABORATION DE CLAUSES DE FIABILITE OPERATIONNELLE, DE COUT DE MAINTENANCE, DE DISPONIBILITE DANS LES CONTRATS DE FOURNITURE D'EQUIPMENTS AERONAUTIQUES]

J. N. BASMAISON *In* ESA Reliability and Maintainability p 11-13 Sep. 1982 In FRENCH

Avail: NTIS HC A99/MF A01

The fundamental notions it is advisable to keep in mind during the negotiation of clauses covering reliability, availability, and even the cost of maintenance discussed include: (1) shared responsibilities of the equipment supplier, the aircraft manufacturer, and the user in an operational evaluation of a material; (2) necessary and sufficient knowledge of the operational environment; (3) precise definition of and aptitude for measuring characteristics whose operational control is the object of these clauses; and (4) clarity of the contract in all technical, commercial, and administrative aspects. Transl. by A.R.H.

N83-20212# Societe Nationale Industrielle Aerospatiale, Toulouse (France). Dept. Electronique.

RESULTS OF A QUALITY PRINCIPLE ON THE MTBF OF AN EQUIPMENT DEVELOPED FOR THE A-300 [RESULTATS D'UNE ACTION QUALITE SUR LE MTBF D'UN EQUIPEMENT DEVELOPPE POUR L'A-300]

N. VOISIN *In* ESA Reliability and Maintainability p 249-254 Sep. 1982 In FRENCH

Avail: NTIS HC A99/MF A01

The structure of quality control at the level of the equipment supplier is presented and applied in studies of the MTBF of the master warning controller of the A-300 aircraft. A plan is included for following the quality and reliability of onboard digital equipment and software configuration management. Transl. by A.R.H.

N83-20224# Standard Elektrik Lorenz A.G., Stuttgart (West Germany).

FAULT-TOLERANCE ALLOWING DEFERRED MAINTENANCE TECHNIQUES

J. DUTT and H. MALEC (ITT-Programming, Stratford, Conn.) *In* ESA Reliability and Maintainability p 327-331 Sep. 1982 refs

Avail: NTIS HC A99/MF A01

Cost effective maintenance concepts can be developed for systems that incorporate deferred maintenance concepts, such as those used in the communications industry. Specific implementations of such design philosophies for advanced communications systems are discussed. The fault tolerant aspects of fully distributed communications switching systems allowing for several redundancy techniques such as memory error correcting, automatic control, modular software design, redundant user interfaces, etc., are analyzed. The modeling techniques for both hardware and software implemented fault tolerance are presented. M.G.

N83-20926*# Draper (Charles Stark) Lab., Inc., Cambridge, Mass.

RELIABILITY ANALYSIS AND FAULT-TOLERANT SYSTEM DEVELOPMENT FOR A REDUNDANT STRAPDOWN INERTIAL MEASUREMENT UNIT Final Report

P. MOTYKA Mar. 1983 70 p refs

(Contract NAS1-16887)

(NASA-CR-166050; NAS 1.26:166050; CSDL-R-1588) Avail: NTIS HC A04/MF A01 CSCL 17G

A methodology is developed and applied for quantitatively analyzing the reliability of a dual, fail-operational redundant strapdown inertial measurement unit (RSDIMU). A Markov evaluation model is defined in terms of the operational states of the RSDIMU to predict system reliability. A 27 state model is defined based upon a candidate redundancy management system which can detect and isolate a spectrum of failure magnitudes. The results of parametric studies are presented which show the effect on reliability of the gyro failure rate, both the gyro and accelerometer failure rates together, false alarms, probability of failure detection, probability of failure isolation, and probability of damage effects and mission time. A technique is developed and evaluated for generating dynamic thresholds for detecting and isolating failures of the dual, separated IMU. Special emphasis is given to the detection of multiple, nonconcurrent failures. Digital simulation time histories are presented which show the thresholds obtained and their effectiveness in detecting and isolating sensor failures. Author

N83-21875# Regensburg Univ. (West Germany). Fachberetch Mathematik.

THEORY OF GAME MODELS FOR SAFEGUARD SYSTEMS AGAINST DIFFERENT KINDS OF ILLEGAL ACTIVITY [SPIELTHEOREMSCNE MODELLE FUER SAFEGUARDS-SYSTEME GEGEN UNTERSCHIEDLICHE ARTEN ILLEGALER AKTIVITAET]

D. BIERLEIN *In* Hochschule der Bundeswehr Seminar on Stochastics p 12-26 Oct. 1982 refs In GERMAN

Avail: NTIS HC A05/MF A01

The game theory model for decision making situations by the manager of a guarded location, in which the quality of the strategy of the oponent is determined by its budget, is outlined. The model is examined for the following situations: (1) one manager with one installation; (2) x-independent managers with one installation; (3) one manager with x-installations which are vulnerable to illegal activity. Criteria for the reliability of a control strategy are outlined and the necessary and extensive conditions for a budget under which a financial reliable strategy can be maintained are enumerated. Transl. by E.A.K.

N83-23108# California Univ., Berkeley. Operations Research Center.

AN INCENTIVE APPROACH TO ELICITING PROBABILITIES

R. D. SHACTER Jul. 1982 15 p refs

(Contract AF-AFOSR-0122-81; AF PROJ. 2304)

(AD-A122599; ORC-82-9) Avail: NTIS HC A02/MF A01 CSCL 05J

A decision-maker (e.g., the Nuclear Regulatory Commission) seeks an expert's probabilities for uncertain quantities of interest (e.g., a seismologist's forecast of earthquakes), and wants the expert's reward to depend on the accuracy of the predictions. Assume that the expert compares compensation schemes on the basis of the expected utility of the dollar payoffs, and is willing to reveal his utility function for money. A reward is called proper if the expert is never encouraged to state probabilities he does not truly believe. It is strictly proper if he is, in fact, encouraged to state his beliefs. The reward procedure suggested in this paper uses the expert's stated probabilities and utility function to select from a set of possible payoffs. This procedure is always proper, but may not be strictly proper . If the preferred payoff is independent of the outcome whenever the decision-maker and expert agree on the probabilities, then they are said to be jointly risk-averse. (For example, if the decision-maker agrees to play bookie to a risk-averse expert, then they are jointly risk-averse.) In this case, the reward is shown to be strictly proper, as long as they don't disagree too much, so the expert can gain from researching the problem and carefully assessing his probabilities. In addition, the expert would prefer to make the bet more detailed, distinguishing between finer grain events, whenever such detail exposes new differences of opinion. Author (GRA)

N83-23623# Centro Informazioni Studi Esperienze, Milan (Italy). Documentation Service.

SOME ASPECTS OF THE INTERACTION BETWEEN NEW NON-DESTRUCTIVE TESTING TECHNIQUES AND INDUSTRIAL PROBLEMS

F. TONOLINI and G. NARDONI (ATB, Brescia, Italy) 1982 14 p refs Presented at 10th World Conf. on Non-Destructive Testing, Moscow, 23-27 Aug. 1982

(CISE-1941) Avail: NTIS HC A02/MF A01

The main aspects of the interface between NDT methodologies and industry are investigated and receptivity and didactis problems enhanced. As an example, only some nonconventional NDT methods as acoustic emission and ultrasonic signal processing techniques are considered. Their application in some significant industrial workshop tests are also described. S.L.

N83-25428# California Univ., Livermore. Lawrence Livermore Lab.

A METHODOLOGY FOR ASSESSING THE SECURITY RISKS ASSOCIATED WITH COMPUTER SITES AND NETWORKS. PART 1: DEVELOPMENT OF A FORMAL QUESTIONNAIRE FOR COLLECTING SECURITY INFORMATION

G. C. CORYNEN 23 Jun. 1982 81 p refs

(UCRL-53292-PT-1) Avail: NTIS HC A05/MF A01

A new methodology has been developed for the assessment of security risks associated with the operation of computer complexes. It is designed to assist computer security managers and their risk assessment teams in obtaining an overall risk figure for their computer site or network. This report emphasizes the determination of harms to computation assets due to various natural and human threats. Natural threats include earthquakes, floods, fires, and other disasters. Human threats include intentional harms such as asset theft or data modification, and unintentional harms such as errors and omissions. A group of individuals assisting each other in reaching a collective goal is also discussed. In addition to asset damages, the effects of damaging the countermeasures protecting the assets, or the supports which allow the operation of the assets, can be determined. The effects of damage to countermeasures which protect other countermeasures or supports can be analyzed also. Propagation of the effects of threats through the computer complex involves time, and often a competition for time between a threat and a security system arises. Such timing issues can also be treated. The flexibility of the methodology allows the analysis of a computer complex at any level of detail. A coarse analysis could be conducted for exploratory or guidance purposes, and a detailed analysis conducted for definitive purposes. This generally of approach allows risk analyses in other areas such as safety, safeguards, reliability, privacy, and military engagements. B.W.

N83-26728# CONCAWE, Hague (Netherlands).

METHODOLOGIES FOR HAZARD ANALYSIS AND RISK ASSESSMENT IN THE PETROLEUM REFINING AND STORAGE INDUSTRY

S. HOPE, E. N. BJORDAL, H. M. DIACK, B. W. EDDERSHAW, and L. JOANNY 1982 96 p

(PB83-146084; CONCAWE-10/82) Avail: NTIS HC A05/MF A01 CSCL 05A

The report provides readers both within and outside the petroleum industry with an overview of the methodologies already in use or being developed, to assist and supplement risk management practices. The report briefly describes the consecutive steps in the identification, assessment and comparison of hazards and associated risk. These techniques can be helpful in setting the priorities for the decision on measures to reduce risk. When quantifying risk e.g., for the comparison of alternative design cases, the use of a consistent data base is stressed. It is pointed out that the risk assessment techniques described in the report, although potentially valuable tools for improving overall safety performance, have shortcomings particularly in dealing with human factors. Author (GRA)

N83-28469# Defence Quality Assurance Board, London (England).

DESIGN CONTROL

F. E. BARTHOLOMEW (Hunting Engineering Ltd.) *In its* Sem. on Quality Assurance in Design and Develop. p 5-14 1982

Avail: NTIS HC A04/MF A01

The role of a prime contractor in design control is outlined. The organization needed in order to exercise design control, the documentation by which the organization controls the design, the control of subcontractors, and the function of design reviews are discussed. Author (ESA)

N83-30512# MATRA Espace, Paris-Velizy (France).

EFFECTS OF LONG LIFE REQUIREMENTS ON SPACECRAFT DESIGN AND TECHNOLOGY Final Report

C. COUGNET, C. FLOCH, J. F. ARNOULT, G. BERGER, Y. DUBOIS, M. HORBLIN, B. SCHIETECATTE, and C. VIALET Paris ESA Nov. 1982 467 p refs

(Contract ESA-4847/81/NL-PP(SC))

(DM-51/C/CC/FL/0138-82; ESA-CR(P)-1725) Avail: NTIS HC A20/MF A01

The impact on spacecraft design and technology of service life requirements of 15 yr in geostationary and 10 yr in low Earth orbit are summarized. Factors which limit service life are reviewed. The effects of improved technology, onboard computers and in space servicing are discussed. Control of the exposed area of spacecraft radiators to meet instantaneous requirements is suggested. Analysis of parameters which affect battery performance, annealing of solar arrays, and management of thermal control and other subsystems are considered. Author (ESA)

N83-31036# Siemens A.G., Munich (West Germany). Unternehmensbereich Bauelemente.

OPTIMIZATION OF QUALITY ASSURANCE PROCEDURE, SCREENING AND BURN IN OF COMPLEX MICROCIRCUITS: STUDY

R. KAPPELMEYER, F. BECK, and W. GERLING Paris ESA Dec. 1981 121 p refs

(Contract ESTEC-3809/78/NL-HP)

(ESA-CR(P)-1726) Avail: NTIS HC A06/MF A01

The effectiveness of LSI quality assurance procedures was assessed from life test results on 6500 16 k bit dynamic RAM devices, operated up to 4000hr. Modes and frequency of the failure-causing defects were determined by analysis of the life test failures. Major failure modes are related to defects at oxide structures, contact holes, metallization lines and input protective devices, to surface contamination and wire bonded contacts. Improvements in design, material control, processing and process control were derived from the failure analysis. A second test phase on a similar number of devices and subsequent failure analysis confirm the intended improvements. Quality assurance procedures remained unchanged. For procurement, the definition of a reliability standard for the effectiveness of manufacturers' quality assurance procedures is proposed. Author (ESA)

N83-31037# Environmental Protection Agency, Washington, D.C. Office of Exploratory Research.

INTERIM GUIDELINES AND SPECIFICATIONS FOR PREPARING QUALITY ASSURANCE PROJECT PLANS

T. W. STANLEY and S. S. VERNER Feb. 1983 36 p refs

(PB83-170514; EPA-600/4-83-004; OER-QAMS-005-80) Avail: NTIS HC A03/MF A01 CSCL 13H

The Agency-wide quality assurance policy stipulates that every monitoring and measurement project must have a written and approved Quality Assurance (QA) Project plan. This applies to extra-mural as well as internal projects. All successful applicants for financial assistance must therefore prepare and submit a quality Assurance Project Plan. This document describes the sixteen elements which must be considered for incusion in all Quality Assurance Project Plans and establishes criteria for plan preparation, review, and approval. All project plans must describe procedures which will be used to document and report precision,

accuracy, representativeness, comparability, and completeness of environmental measurements. Author (GRA)

N83-31062# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio.
EVALUATION OF SMALL CRACKS IN AIRFRAME STRUCTURES
H. A. WOOD (Aeronautical Systems Div.), J. L. RUDD, and J. M. POTTER *In* AGARD Some Considerations on Short Crack Growth Behaviour in Aircraft Struct. 12 p Mar. 1983 refs
Avail: NTIS HC A03/MF A01

Small crack technology applications to airframe structures are discussed. Cracks with the size range of 1/10mm to 1mm have been used as the starting point for evaluating the safe and durable operational limits of older in-service aircraft and as criteria for the design of new structures. The development of these criteria are presented. Evidence of service cracking obtained from teardown inspections is presented to illustrate the characteristic sizes and shapes of cracks at structural fastener holes. Current methods for predicting growth are judged to be less developed than for cracks in larger size ranges. A limited comparison of test and prediction is included. Finally, the influence of small cracks on residual strength and the potential degradation of fail safety are discussed with specific reference to a large transport aircraft. The authors conclude that the analysis of small crack growth behavior is far more complex than for intermediate and large sizes, and suggest additional research particularly the development of experimental data to support methodology development. Author

N83-31570# Hughes Aircraft Co., El Segundo, Calif. Electro-Optical and Data Systems Group.
STUDY OF THE CAUSES OF UNNECESSARY REMOVALS OF AVIONIC EQUIPMENT Final Technical Report, 7 Jul. 1979 - 30 Sep. 1980
H. D. RUE and R. O. LORENZ Griffiss AFB, N.Y. RADC Jan. 1983 213 p refs
(Contract F30602-79-C-0200; AF PROJ. 2338)
(AD-A127546; RADC-TR-83-2; HAC-FR-80-70-1135R3) Avail: NTIS HC A10/MF A01 CSCL 05A

This study investigated and verified the causes of unnecessary removals of suspect items from selected avionic equipment. During the study, the selected equipment average unnecessary removal rate was found to be 32.7% of all removals. The study report contains conclusions and recommendations useful in minimizing unnecessary removals. Author (GRA)

N83-32666# Aeronautical Systems Div., Wright-Patterson AFB, Ohio.
PLANNING AND SCHEDULING ENHANCEMENT IN THE AQUISITION PROCESS 2TT THE AERONAUTICAL SYSTEMS DIV. Final Report
H. E. DAVIS and R. W. YOUNG Nov. 1982 36 p refs
(AD-A128521) Avail: NTIS HC A03/MF A01 CSCL 05A

This report reviews the current acquisition management environment at ASD. Consideration is given to such factors as the significance of the environment influencing factors and standards which are being set as a result of this environment. The report documents those opportunities which now exist to enhance planning and scheduling within this environment and some current developments which further describe it. Based on these observations some specific recommendations and concerns that may require further study are identified. This report expands upon ASD Reserve Project 78-25, Planning and Scheduling at ASD - A Review and Preliminary Assessment. Author (GRA)

N83-32816# Societe Nationale Industrielle Aerospatiale, Paris (France).
CLIENT-TEST LABORATORY RELATIONS [LES RELATIONS CLIENTS-LABORATOIRES D'ESSAIS]
M. ROSENAU 1982 8 p In FRENCH Presented at 7th Journees Sci. et Tech. de l'ASTE 1, Paris, 12-13 Oct. 1982
(SNIAS-831-422-107) Avail: NTIS HC A02/MF A01

All services expected from a testing laboratory must be clearly and completely defined. A viable dialog is necessary for establishing test documents, techniques, and costs. The services required can be written by the client or prepared with the tester if the client does not know what must be done to demonstrate the quality of the test item. Test objectives; norms; material to be tested; conditions for mounting and safety; measurement and verification; presentation of results; and various practical information obtained are considered. Documentation to be provided to and by the testing laboratory, data acquisition procedures, test sequences, and client-tester relations are discussed. Transl. by A.R.H.

N83-33214 Royal Aircraft Establishment, Farnborough (England). Materials/Structures Dept.
THE ROLE OF A FATIGUE DAMAGE ACCUMULATION PLOT IN STRUCTURAL LOADS DATA ANALYSIS
D. M. HOLFORD 23 Dec. 1982 23 p refs
(RAE-TR-82125; RAE-MAT/STRUCT-24; BR87777) Avail: Issuing Activity

The concept of displaying the accumulation of fatigue damage against time into flight is described. Ground mode presentation is suitable for use in ground analysis of load time histories; the snapshot mode can be used in real time. Examples from operational aircraft loads data demonstrate the usefulness of the display. The damage accumulation plot permits a ready identification of flight conditions/flight activities which provoke substantial fatigue damage. It can be used to identify the structurally relevant flight data and so reduce the quantity of data that needs to be analyzed in an operational loads measurement program. It is particularly important in advanced fatigue load monitoring systems, fleet management from a fatigue standpoint, and in the specification of fatigue test loading sequences. Author (ESA)

N83-36050# Boeing Aerospace Co., Seattle, Wash. Logistics Design Support Dept.
MISSILE AND SPACE SYSTEMS RELIABILITY VERSUS COST TRADE-OFF STUDY Final Technical Report, 27 Oct. 1981 - 26 Oct. 1982
R. C. HALL, T. G. MILLIREN, and R. C. SCHNEIDER Griffiss AFB, N.Y. RADC Jan. 1983 156 p
(Contract F30602-81-C-0195; AF PROJ. 2338)
(AD-A129328; RADC-TR-83-13; D194-30065-1) Avail: NTIS HC A08/MF A01 CSCL 16D

This report consisting of a user's guide (Part 1) and back-up data (Part 2), was developed to provide reliability program/task cost guidelines to DoD program reliability managers and monitors. The primary use of the guidelines is for assistance in tailoring task provisions of MIL-STD-785 and MIL-STD-1543 (USAF) as applied to space and missile systems. Displayed data includes program/task cost statistics developed as a function of program/system phase and other significant characteristics. The study data base includes program/task cost statistics developed as a function of a program/system phase and other significant characteristics. The study data base includes program/task costs derived from 13 space/missile programs and results from a program/system characteristic cost impact survey. These data along with the associated analyses are summarized in Part 2 of the study. Author (GRA)

N83-36722# University of Southern California, Marina del Rey. Information Sciences Inst.
THREE DIMENSIONS OF DESIGN DEVELOPMENT
N. M. GOLDMAN Jul. 1982 14 p refs
(Contract MDA903-81-C-0335)
(AD-A130588; ISI/RS-83-2) Avail: NTIS HC A02/MF A01 CSCL 09B

Formal specifications are difficult to understand for a number of reasons. When the developer of a large specification explains it to another person, he typically includes information in his explanation that is not present, even implicitly, in the specification itself. One useful form of information presents the specification in terms of an evolution from simpler specifications. Typically a specification was actually produced by a series of evolutionary steps reflected in the explanation. This paper suggests three dimensions of evolution that can be used to structure specification developments: structural granularity, temporal granularity, and coverage. Their use in a particular example is demonstrated.
Author (GRA)

N83-36996# Polytechnic Inst. of New York, Brooklyn. Dept. of Electrical Engineering and Computer Science.
SCHEDULING MAINTENANCE OPERATIONS WHICH CAUSE AGE-DEPENDENT FAILURE RATE CHANGES
B. EBRAHIMIAN and L. SHAW 1 Jun. 1983 123 p refs
(Contract N00014-75-C-0858)
(AD-A130076; POLY-EE/CS-83-002) Avail: NTIS HC A06/MF A01 CSCL 05A

This report studies the optimization of schedules for maintenance or repairs, for repairable stochastically failing systems. The novelty here is that the failure rate after a maintenance operation is a function of the system's previously expended lifetime. This generalizes earlier work by others on the simpler case where the future failure rate depends on the number of previous repairs, but not on the times when they took place. Two major preventive strategies are considered: (1) age replacement or policy 1; (2) periodic replacement with minimal repair at failure or policy 2.
GRA

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LEGAL, LEGISLATIVE, REGULATORY

Includes insurance and liability, directives, appropriations, and national and international policy.

A83-16374#
HIGHLIGHTS OF THE NEW NATIONAL AERONAUTICAL RESEARCH AND TECHNOLOGY POLICY
V. H. REIS and L. T. MONTULLI (Executive Office of the President, Office of Science and Technology Policy, Washington, DC) *Astronautics and Aeronautics, vol. 20, Dec. 1982, p. 10, 12, 13, 16, 129.*

A83-21386
INTELLECTUAL PROPERTY RIGHTS IN SPACE VENTURES
G. J. MOSSINGHOFF (U.S. Department of Commerce, Washington, DC) *Journal of Space Law, vol. 10, Fall 1982, p. 107-138.* refs

A survey of existing patent laws, regulations, and policies relevant to space activities is presented. Public Law No. 96-517, approved in 1980, allowed NASA to permit small businesses and nonprofit firms to retain the rights to inventions arising from space-oriented undertakings. Furthermore, all users of the Shuttle are guaranteed all patent and data rights. One exception is for inventions affecting the public health and safety. Shuttle users must also give sufficient data to NASA to ensure that the payload contracted for Shuttle flight has peaceful purposes and does not endanger the Shuttle. It is noted that only the U.S., Canada, and the Philippines have 'first-to-invent' patent laws. Should a Shuttle user infringe on a patent with a contracted payload, then the user, rather than NASA, is held liable if litigations arise. NASA will avoid internal reception of data from contractor payloads, thus removing the data from Freedom of Information jurisdiction. NASA policy is described as protecting all patent and trade secret incentives which can encourage the commercial development of space. D.H.K.

A83-30137
UNITED STATES SPACE LAW: NATIONAL AND INTERNATIONAL REGULATION. I
S. GOROVE, ED. Dobbs Ferry, NY, Oceana Publications, Inc., 1982, 882 p.

This volume includes the following booklets: the National and Aeronautics and Space Act, as amended, and Related Legislation, December 1978; the Communications Satellite Act of 1962, as amended; the Code of Federal Regulations, Title 14, Chapter V; National Aeronautics and Space Administration; and other U.S. national space and regulation policy. Also included are the following reports: (1) Aeronautics and Space Report of the President: 1980 Activities; (2) U.S. Report to the U.N. on Civil Programs for the Exploration and Use of Outer Space during 1980; and (3) U.S. Senate Committee Reports (list); and the Agreement between the United States of America Represented by the National Aeronautics and Space Administration and Satellite Business Systems for Launch and Associated Services, dated June 17, 1980. B.J.

A83-31808#
THE ROLE OF INSURANCE IN UNITED STATES AUTHORIZATION AND SUPERVISION OF NON-GOVERNMENTAL SPACE ACTIVITIES
D. D. SMITH (Schnader, Harrison, Segal and Lewis, Washington, DC) American Institute of Aeronautics and Astronautics, Annual Meeting, Long Beach, CA, May 11, 1983, Paper. 20 p. refs

The implications of Article VI of the Outer Space Treaty are discussed in terms of their effect on U.S. policies. Article VI mandates that signatory states require authorization and continued supervison of activities in space carried out by nongovernmental bodies. This is taken to mean that governments can prohibit all nongovernmental space activities originating within national boundaries or exercise a range of constraints down to only assuring that nongovernmental space activities comply with international responsibilities. U.S. government legal considerations are confined to intervene with private activities only when justified on national defense or public welfare grounds. Economic forces currently regulate communications satellite operations, and private launch services are confined to unpopulated areas. It is suggestd that legislation be written to require insurance coverage commensurate with the possible damage a launch vehicle may cause. Finally human passengers on nongovernmental space vehicles are viewed with no special status since they would be fully cognizant of the risks, and the insurance regulations can treat the enterprise like an unmanned vehicle. M.S.K.

A83-32951
LEGAL FRAMEWORK OF ECONOMIC ACTIVITY IN SPACE [ENCUADRE JURIDICO DE LA ACTIVIDAD ECONOMICA EN EL ESPACIO]
A. A. COCCA, W. L. CHAPMAN, M. A. FERRER, J. F. PUNTURO, and A. SERENELLI Cordoba, Argentina, Consejo de Estudos Internacionales Avanzados, 1982, 183 p. In Spanish and English.

A cost-benefit economic framework is applied to the assessment of orbital, planetary and lunar exploitation, in the context of international law. Private enterprises in space have been recognized as licit activities by both the Space Treaty and the Agreement on the Moon and Other Celestial Bodies. Such enterprises ratify the principle forbidding national appropriation, since they are barred from claiming sovereignty over outer space or celestial bodies. It is suggested that priorities conforming to the most urgent international requirements be established in order to rationally determine the material and social advantages that may be derived from the exploitation of outer space resources. O.C.

A83-39043
LEGISLATIVE DEVELOPMENTS AFFECTING THE AVIATION INDUSTRY 1981-1982
C. E. DUBUC and L. B. DOCTOR (Finley, Kumble, Wagner, Heine, Underberg, Manley and Casey, Washington, DC) Journal of Air Law and Commerce (ISSN 0021-8642), vol. 48, Winter 1983, p. 263-285. refs

Attention is given to three major legislative actions taken in 1981-1982 in the United States which may significantly affect future aviation insurance practices as well as aviation litigation. The Product Liability Risk Retention Act of 1981 may affect the insurance formats of some aircraft and component parts manaufacturers. The Senate Foreign Relations Committee recommended that the Senate give its advice and consent to the Montreal Protocols, which are the proposed amendments to the international treaties governing procedures and limitations of liability. The Civil Aeronautics Board adopted new rules which increase the insurance coverage required by U.S. and foreign carriers operating air transportation to and from the U.S., thereby affecting the cost and sources of insurance coverage for the airline industry. O.C.

A83-39045
STRICT LIABILITY IN MILITARY AVIATION CASES - SHOULD IT APPLY?
F. FINN and J. H. MARTIN (Thompson and Knight, Dallas, TX) Journal of Air Law and Commerce (ISSN 0021-8642), vol. 48, Winter 1983, p. 347-379. refs

Military aircraft manufacturers and government purchasers are treated differently in lawsuits brought to recover damages for injuries caused by product defects. While the doctrine of sovereign immunity shields the government against claims by injured military personnel or the survivors of deceased servicemen, manufacturers are not accorded similar protection. A question then arises as to whether the manufacturer should bear the risk of loss alone, when culpability may reside entirely with the federal government. An examination of the six most frequently cited reasons supporting the imposition of strict liability on manufacturers indicates that none provides sufficient justification for imposing this doctrine in cases involving military aircraft or components, especially in the context of aircraft design. O.C.

A83-39693
PRIME CONTRACTOR/SUBCONTRACTOR PRODUCT LIABILITY EXPOSURE UNDER GOVERNMENT CONTRACTS
I. BECKER (System Development Corp., Santa Monica, CA) Northrop University Law Journal of Aerospace, Energy, and the Environment (ISSN 0196-1489), vol. 4, no. 1, 1983, p. 29-49. refs

The liability for injuries arising from use of government equipment supplied by a third party is examined, with the focus on the responsibility for product reliability resting with the manufacturer. Service personnel are effectively prohibited from gaining damages from the government from accidental injuries sustained while in the normal course of duty. However, consumer protection, product liability, and antideficiency laws imperil the manufacturer if the product, e.g., a grenade or ejection seat, can be shown to have been defective in any way that could have contributed to injury to the user. No uniform defense has been defined to protect manufacturers of government equipment for liability or undefined side-effects of the products they sell (such as Agent Orange). It is suggested that a defense doctrine may be developed along the lines of strict product review to assure that the product satisfies all the procurement performance objectives, so that the government will be supported in underwriting indemnification insurance for the manufacturer or supplier.
M.S.K.

A83-39696
MANUFACTURER'S LIABILITY IN INTERNATIONAL AEROSPACE - A VIEW FROM THE UNITED STATES
E. S. BRASLOW Northrop University Law Journal of Aerospace, Energy, and the Environment (ISSN 0196-1489), vol. 4, no. 1, 1983, p. 127-143. refs

Aspects of national laws and international agreements to determine liability for aerospace activities that result in personal injuries are examined. Yugoslavian law governing proportional liability has been applied in California courts to define a limited settlement for a mid-air crash over Yugoslavia involving an American-built aircraft. The plaintiff must satisfy burden-of-proof provisions when suing a manufacturer, who is required to have provided a state-of-the-art product, including crash-worthiness, when vending the aircraft. National governments are responsible for spacecraft launched from within their boundaries. NASA acts mainly as a self-insurer, and allows manufacturers to make whatever third-party insurance arrangements necessary, while in some instances offering damage limitation provisions in contracts it issues. International law only indicates which laws are applicable in any given instance. M.S.K.

A83-40304#
EIGHT STEPS NEEDED TO REACH THE AERONAUTICAL POLICY GOALS
H. H. ALBUM (SRI International, Menlo Park, CA) Astronautics and Aeronautics (ISSN 0004-6213), vol. 21, July-Aug. 1983, p. 22, 24, 26, 27. refs

A summary of the eight courses of action submitted to Congress as recommendations for a national aeronautical policy by the AIAA advisory committee is presented. The manufacture of three prototype advanced aircraft per year is recommended in order to maintain strong industrial experience in development. A restructuring of the process by which new military aircraft are chosen is indicated, as are more thorough front-end design studies to establish more lasting constraints on new aircraft design. The steps include raising the NASA aeronautical budget since NASA already performs most long-range aeronautical research for other agencies. The step could possibly extend to the reestablishment of a NACA-like organization for selecting and guiding research and research goals. Tax incentives and government funding of private aeronautical research can equalize domestic development activities with foreign competition in the civil aircraft market. The two final recommendations include expansion of the subsidization of export financing and increased aid to educational facilities, research, and students and faculties. M.S.K.

A83-45807#
COMFORT CRITERIA AND/OR NATIONAL REQUIREMENTS IN THE ISSUANCE OF A LICENSE FOR AIR SERVICE IN CANADA [LES CRITERES DE COMMODITEET/OU NECESSITEPUBLIQUES DANS LA DELIVRANCE D'UN PERMIS DE SERVICE AERIEN AU CANADA]
G. RICHARD IN: Annals of air and space law. Volume 7 . Montreal/Paris, McGill University/Editions A. Pedone, 1982, p. 161-169. In French. refs

A83-45816#
SPACECRAFT INSURANCE
J.-L. MAGDELENAT (McGill University, Montreal, Canada) IN: Annals of air and space law. Volume 7 . Montreal/Paris, McGill University/Editions A. Pedone, 1982, p. 363-377. refs

The relationship between the peaceful, practical, and commercial uses of space technology and the insurance industry are examined. Risks of space activities include third party damages, damages to launch facilities, and damages to satellites. The amount that insurance companies are willing to cover is dependent on the level return relative to other investments and prospects for future development and expansion. Liability for third party damages currrently resides with the launching state, whether or not the launch was performed by the government of that nation, unless the damages are conclusively demonstrated to have occured because of negligence or intent on the part of the launching party.

NASA currently subscribed to $300-500 million per Shuttle flight, and would pay for any additional charges beyond those amounts if necessary. The three main categories of spaceflight insurance comprise prelaunch, launch, and spacecraft life insurance. Despite recent losses, insurance companies are expanding the amounts they will cover as a result of growing confidence in space technology. M.S.K.

A83-45826
ESSAYS IN AIR LAW
A. KEAN, ED. (International Civil Aviation Organization, Montreal, Canada) The Hague, Martinus Nijhoff Publishers, 1982, 382 p.

Consideration is given to topics in national and international aerospace law, with particular attention to long-lasting legal problems. The penalties and international agreements and procedures to lessen the occurrences and punish the perpetrators of hijacking are investigated. Damage liability is examined in terms of limits imposed by the Warsaw Convention of 1929, increases in the limit since then, and to the assignation of liability when cargo is delivered internationally by means of multimodal transport. The effects of deregulation of airlines in the U.S. are discussed, as are attempts by the CAB to force deregulation of international traffic and the impact that the Freedom of Information Act has had on U.S. civil aviation regulatory agencies. Finally, licensing appeal practices in the U.K. are described, as are attempts to formulate international agreements defining the legal status of aircraft commanders. M.S.K.

A83-45827
THE WARSAW CONVENTION - PAST, PRESENT AND FUTURE
R. P. BOYLE IN: Essays in air law . The Hague, Martinus Nijhoff Publishers, 1982, p. 1-17. refs

Modifications to the limits of liability defined by the Warsaw Convention of 1929 are discussed. The Convention established a liability limit of about $8300 for damages, a figure that was increased to about $16,000 by the Hague Protocol in 1955, which also removed the limit if the plaintiff could prove negligence or malfeasance on the part of the carrier. However, the U.S. did not ratify the Hague Protocol, although an interairline agreement did raise the limit to $75,000, which was accepted by the U.S. and became known as the Montreal Convention. The Guatemala Protocol of 1971 set a limit of $100,000, with each country able to adjust the total to meet its own requirements. Separate settlement of the lawyer's fees was also permitted, together with 5-yr increases in the base liability limit. A surcharge was added to U.S. tickets to cover the liability insurance. M.S.K.

A83-45834
DEREGULATION OF AVIATION IN THE UNITED STATES
A. F. LOWENFELD (New York University, New York, NY) IN: Essays in air law . The Hague, Martinus Nijhoff Publishers, 1982, p. 155-179. refs

The background events, theory, and early results of airline deregulation in the U.S. are surveyed. The move toward deregulation was spurred by questions of the necessity for price uniformity and the philosophy of a free market economy, and a lack of confidence in the regulators. Regulation was originally imposed as an adjunct to awarding certificates and routes. Tarriffs were submitted and the CAB ruled on their validity. Scientific cost-based ratemaking was instituted in 1970, just before the oil embargo invalidated several basic assumptions. In the mid-1970s it was claimed that competition would, if allowed, produce lower fares. Novelty fare schemes were permitted in the late 1970s as an experiment, and led to the passage of the Airline Deregulation Act of 1978, which permitted any air carrier to serve any market within the U.S. The results of the first 18 mos of regulation are taken as evidence that competitive situations are workable, and that subsidies may be necessary on little-used routes in order to guarantee air travel to cities without large populations. M.S.K.

A83-45838
THE 'LEGISLATIVE HEARING' ON IATA TRAFFIC CONFERENCES CREATIVE PROCEDURE IN A HIGH STAKES SETTING
B. W. REIN and B. L. MCDONALD (Kirkland and Ellis, Washington, DC) IN: Essays in air law . The Hague, Martinus Nijhoff Publishers, 1982, p. 235-259. refs

A Show Cause Order was delivered to the IATA by the U.S. CAB in 1978 soon after the U.S. deregulated airlines. The move was seen as an attempt on the part of the U.S. to force international deregulation and increase competition among world airlines. The Show Cause Order suggested that regulation of international air traffic constituted a violation of the Sherman antitrust act through collective agreements among the international carriers. The order precipitated 17 mos of hearings on price fixing, standardized baggage tags, ticket stock, and airport designation codes, and other cooperative arrangements. Intergovernmental regional meetings were held with representatives of other countries at different sites around the world. The results, when the proceedings were terminated, gave antitrust immunity to IATA traffic coordination and excluded U.S. carriers from participation in rate coordination in the North Atlantic. M.S.K.

A83-45839
THE FREEDOM OF INFORMATION ACT - ITS IMPACT ON CIVIL AVIATION
J. T. STEWART, JR. (FAA, Chief Counsel's Office, Washington, DC) IN: Essays in air law . The Hague, Martinus Nijhoff Publishers, 1982, p. 261-286. refs

The effects of the Freedom of Information Act on various areas of civil aviation are assessed. Particular note is taken of impacts on the regulators, the CAB, the FAA, the DOT, and the National Transportation Safety Board. The Act contains provisions for refusal to release information, including protection of trade secrets and in the interests of national security, as well as revealing procedures by which an agency of the government performs its internal affairs, e.g., the release of information may prejudice the effective performance of the agency. The latter provision may include policy planning recommendations, investigative reports, and the possibility that personal privacy may be violated. Finally, it is noted that other western governments were encouraged to pass their own freedom of information acts several years after the U.S. M.S.K.

A83-45840
THE RIGHT TO FLY - REVIEW AT RANDOM
J. G. THOMKA-GAZDIK (Doheny, Mackenzie, Grivakes, Gervais, and Lemoyne, Montreal, Canada and Geneva, Switzerland) IN: Essays in air law . The Hague, Martinus Nijhoff Publishers, 1982, p. 287-296.

The implications of bilateral air traffic agreements between the U.S. and other nations are discussed. The large volume of air traffic between the U.S. and the U.K. was built on the Bermuda I agreement, which allowed each country to regulate tariffs, and an extension of the agreement in 1977 permitted the U.S. the fifth freedom to pick up cargo and passengers in London for carriage to further points while giving the British new routes. The U.S. made it a policy, in 1978, to seek multiple entry, price competition, liberal capacity provisions, and liberal charter rules in any negotiations with other countries. A subsequent U.S.-Israel Agreement required that both governments reject a tariff before it was ruled invalid. The International Air Transportation Act of 1979 mandated the CAB to set international air fares and increase rates at a moment which coincided with the termination of the attempt by the CAB to force the IATA into a totally free market approach to tariffs and routes. M.S.K.

A83-46309
LAW AND SECURITY IN OUTER SPACE; PROCEEDINGS OF THE WORKSHOP, UNIVERSITY OF MISSISSIPPI, UNIVERSITY, MS, MAY 21, 22, 1982
Workshop sponsored by the American Bar Association and University of Mississippi. Journal of Space Law, vol. 11, Spring-Fall 1983, 193 p.

Topics involved in the legal and technical developments, spurred by the operational status of the Shuttle, in space technologies are discussed. The transition of the viewpoint of space as a working environment has significantly complicated various legal and political issues which at one time were concerned only with sovereignty and security. Attention is given to the hazards of nonfunctional satellite collisions faced by private sector projects, and to political issues which surround the proposed development of space solar power satellites. Legal issues raised by the Spacelab and the question of third party liability are explored, as are topics such as the GEO resource and the available radio spectrum. Direct broadcast televisioon satellites and national boundaries are considered, together with the effects of satellite remote sensing of countries without space capabilities. M.S.K.

A83-46311
LAW AND SECURITY IN OUTER SPACE: INTERNATIONAL REGIONAL ROLE FOCUS ON THE EUROPEAN SPACE AGENCY
R. GIBSON Journal of Space Law, vol. 11, Spring-Fall 1983, p. 15-20. refs

The development of ESA expertise at international management, negotiation, and administration is briefly reviewed, with some attention given to expanding international legal problems introduced by the Shuttle. ESA is under continual pressure to define its role to the member states as well as to arrange international agreements. As a launching authority, ESA is signatory to the Outer Space Treaty provision on the rescue of astronauts, although it is not considered the owner of any of the satellites it launches. Participation by the ESA in formulations of new international regulations occurs through meetings with the member states and during COPUOS and other international meetings. It is suggested that the ESA and other, similar organizations, such as the partners in the Shuttle missions and COPUOS, concentrate on solving GEO and frequency problems, then move on to large space structures, antenna farms, and space stations, and stay away from devoting time to nearly-philosophical questions like 'common heritage'. M.S.K.

A83-46320
LAW AND SECURITY IN OUTER SPACE - IMPLICATIONS FOR PRIVATE ENTERPRISE
E. R. FINCH, JR. Journal of Space Law, vol. 11, Spring-Fall 1983, p. 107-110. refs

Current factors influencing the outer space nuclear balance of power are discussed. It is asserted that the presence of surveillance spacecraft, both manned and unmanned, has maintained the world peace through vigilance, and an international satellite monitoring agency is under discussion at COPUOS as a tool to verify treaty compliance for world peace. It is further suggested that negotiations to ban ASATs will not progress until the technological appeal of lasers and particle beam weapons have been further explored. The U.S. may be moving toward a manned space station defense system, while the Salyut station is used as a missile alert platform. Reaching an agreement to ban ASATs in the near future is stressed as a necessary step in removing space from development as an aggressive military arena. M.S.K.

A83-46321
LAW AND SECURITY IN OUTER SPACE - PRIVATE SECTOR INTERESTS
I. M. PIKUS (NSF, Div. of Planning and Policy Analysis, Washington, DC) Journal of Space Law, vol. 11, Spring-Fall 1983, p. 111-114. refs

The areas of legal concern which will expand as private sector involvement in space activities expands are examined. The Outer Space Treaty assigned the responsibility for activity in space to the nation of origin, including police power and civil liability. Private sector participation in space development has thus far been confined to communications satellites, which are an irreplaceable part of international communications. Manufacturing activities are presently in the earliest stages of experimentation, and large capital expenditures will be involved in full scale projects. Although no agency is currently vested with powers of security and peace in space, treaties exist to mandate communication of any activities which might be interpreted as antagonistic. However, most agreements are of a political nature, and do not protect private sector activities. It is suggested that representatives from the private sector be present on further international negotiations in order to have an appropriate input. M.S.K.

A83-46322
LAW AND SECURITY IN OUTER SPACE FROM THE VIEWPOINT OF PRIVATE INDUSTRY
R. K. HOOVER (Lockheed Missiles and Space Co., Inc., Austin, TX) Journal of Space Law, vol. 11, Spring-Fall 1983, p. 115-124. refs

The security of industry is defined as the freedom from danger, fear, anxiety, and deprivation of the right to conduct business, operate equipment, have employees, use technology, and make profits. International law as practiced on earth has permitted business to exist, produce, and thrive. The Outer Space Treaty recognizes the participation in space activities by nongovernmental organizations, which remain under the jurisdiction of the state of origin. The proposed Moon Treaty, as well as the Outer Space Treaty, prohibit national expropriation of properties in space, and the Rescue Treaty guarantees that employees in transit to and from space facilities will receive available assistance if their spacecraft is damaged. However, if the damages are instigated by another person the liability is unclear, as it would be if the disabling collision occurs with a satellite that has been out of service for years. Further development of international legal guarantees is recommended if the private sector is to risk the large capital investments necessary to develop space resources. M.S.K.

A83-47323*# National Aeronautics and Space Administration, Washington, D. C.
THE LAW APPLICABLE TO THE USE OF SPACE FOR COMMERCIAL ACTIVITIES
S. N. HOSENBALL (NASA, Washington, DC) International Astronautical Federation, International Astronautical Congress, 34th, Budapest, Hungary, Oct. 10-15, 1983. 6 p.
(IAF PAPER 83-253)

The general principles of space law that have an impact on commercial space activities are discussed. The Outer Space Treaty guaranteed the right of private enterprise in space, with jurisdiction over the participating parties residing in the country of origin. The liability for damages caused to a third party is also assigned to the country of origin. Government consent is necessary in the U.S. before a private firm is permitted to launch an object into space, with the relevant statute sections being part of the Arms Export Control Act; launches are legally treated as exports. FAA regulations define the safe area and flight conditions that must be satisfied for a private launch, although NASA, in the 1958 act which formed the agency, potentialy has the power to regulate space launch activities. The DoD must be notified of any launches in order to notify the U.S.S.R., filings must be made with the Bureau of Alcohol, Tobacco, and Firearms, and fees must be paid to the IRS. It is presently U.S. government policy to encourage and facilitate private sector development of commercial launch services. M.S.K.

A83-49200
INTERNATIONAL RELATIONS IN CIVIL AVIATION [MEZHDUNARODNYE OTNOSHENIIA V OBLASTI GRAZHDANSKOI AVIATSII]
V. G. AFANASEV Moscow, Izdatel'stvo Mezhdunarodnye Otnosheniia, 1983, 232 p. In Russian. refs

The international-law foundations of bilateral and multilateral relations in civil aviation are examined. The basic international aagreements between airlines as well as on the intergovernmental level are analyzed. Finally, detailed consideration is given to the regulation mechanism of economic relations in civil aviation as well as to the principles and features of the commercial cooperation between airlines. B.J.

N83-10989# Committee of Conference (U. S. Congress).
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
In its Making Appropriations for the Dept. of Housing and Urban Develop., and for Sundry Independent Agencies, Boards, Comm., Corporations, and Offices p 11-12 1982
Avail: US Capitol, House Document Room

Recommendations for resolving disagreements concerning Senate amendments to the House bill covering appropriations to NASA are presented. Changes in budget allocations are listed for space shuttle; Centaur upper stage development; and advanced communications satellite; planetary mission operations and data analysis; technology transfer and/or technology utilization; and for operation of the infrared telescope facility at Mauna Kea, Hawaii. Of the $280,000,000 available for aeronautical research and technology, $192,000,000 is to be available for the design, development, and procurement of liquid hydrogen-liquid oxygen upper stages. Appropriations for construction of facilities and for program management are included. A.R.H.

N83-11678# National Climate Program Office, Washington, D.C.
BUDGET REQUESTS, RECOMMENDATIONS AND GOALS OF THE NATIONAL CLIMATE PROGRAM FOR FISCAL YEAR 1980 Annual Report
1981 65 p refs
(PB82-193939; NOAA-82032209) Avail: NTIS HC A04/MF A01 CSCL 04B

A statement of significant achievements during fiscal year 1980 for the National Climate Program is given. An evaluation of progress toward the goals of the program, and summary of the FY 1982 budget requests by involved federal agencies, and recommendations for additional legislation needed to ensure achievement of the goals of the program are given. The first five-year plan emphasizes use of current knowledge to develop and disseminate climate information and also expansion of understanding of climate and its effects of society. (Sinha - OEIS) Author (GRA)

N83-11881*# National Aeronautics and Space Administration, Washington, D. C.
MASTER LIST AND INDEX TO NASA DIRECTIVES
1 Aug. 1982 88 p
(NASA-TM-84871; NHB-1410.4F; NAS 1.15:84871) Avail: NTIS HC A05/MF A01 CSCL 05B

All NASA management directives in force as of August 1, 1982 are listed by major subject headings showing number, effective data, title, responsible office, and distribution code. Delegations of authority in print by that date are listed numerically as well as by the installation or office to which special authority is assigned. Other consolidated lists show all management handbooks, directives applicable to the Jet Propulsion Laboratory, directions published in the Code of Federal Regulations, complementary manuals, and NASA safety standards. Distribution policies and instructions for ordering directives are included. A.R.H.

N83-13935# Committee on Science and Technology (U. S. House).
NATIONAL ENGINEERING AND SCIENCE POLICY
Washington GPO 1982 84 p Hearing before the Subcomm. on Sci., Res., and Technol. of the Comm. on Sci. and Technol., No. 80, 97th Congr., 1st Sess., 14 Dec. 1981
(GPO-90-942) Avail: Subcommittee on Science, Research and Technology

A report on a hearing before the House of Representatives Subcommittee on Science, Research, and Technology is presented. Special attention is given to the training of engineers, mathematicians, and scientists, and the facilities now available for their education. L.F.M.

N83-14019# National Telecommunications and Information Administration, Washington, D.C.
PRIVACY PROTECTION LAW IN THE UNITED STATES
R. ALDRICH May 1982 108 p refs
(PB82-231440; NTIA/REPT-82-98) Avail: NTIS HC A06/MF A01 CSCL 05B

Privacy law in the United States is characterized by unusual diversity as compared with the unitary schemes of regulation adopted by many countries of continental Europe. This report is not intended to be an exhaustive survey of U.S. laws. Instead, the purpose of the report is to illustrate the salient categories of privacy law in the United States, and to explain some of the factors contributing to its great variety and its differential treatment of governmental and private information practices. Particularly for readers who are unfamiliar with the development of U.S. privacy law, an awareness of its varied roots and diverse functions may help in understanding how this complex body of law applies to specific privacy problems and to implementation of the Guidelines principles. Author (GRA)

N83-14307# Newman and Hermanson Co., Washington, D.C.
THE IMPACT OF LAWS ON METRIC CONVERSION: A SURVEY OF SELECTED LARGE US CORPORATIONS Final Report
Feb. 1982 94 p Sponsored by the US Metric Board
(AD-A118602) Avail: NTIS HC A05/MF A01 CSCL 05C

The purpose of the study was to determine the extent to which a sample of the Fortune 1000 firms perceived that legal impediments to metric conversion exists. The Fortune 1000 firms included in the study were: (a) the 41 firms which identified legal impediments to metric conversion in an earlier study report commissioned by the Board, U.S. Metric Board 1979 Survey of Selected Large U.S. Firms and Industries; and (b) 10 additional firms from the industry groups indicating some problems with laws and regulations. This study attempted to make several determinations among which were: whether or not legal impediments or perceptions of legal impediments to metric conversion exist; the correlation between metric planning and the perception that impediments exist; the distribution of perceived impediments among Federal, State and local laws; the nature of corporate lobbying activities; and corporate experiences in addressing legal impediments to conversion. GRA

N83-15173# International Development Research Centre, Ottawa (Ontario).
INTERNATIONAL COOPERATIVE INFORMATION SYSTEMS
1980 111 p refs In FRENCH and ENGLISH
(IDRC-156E) Avail: NTIS (US Sales Only) HC A06/MF A01; DOE Depository Libraries

Developing countries need mechanisms by which the information they generate themselves and development information from the rest of the world can be retrieved. The international cooperative information system is such a mechanism. Delegates to the Seminar on International Cooperative Information Systems were informed about various existing systems (INIS, AGRIS, INFOTERRA, TCDC/INRES, POPIN, DEVSIS, and INPADROC), some specialized information systems and services (CDS/ISIS and the Cassava Information Centre), and computer programs for information processing (INIS/AGRIS, CDS/ISIS, and MINISIS). The participants suggested some changes that should be made on

both the national and the international levels to ensure that these systems meet the needs of developing countries more effectively. DOE

N83-17452# Office of Science and Technology, Washington, D. C.
AERONAUTICAL RESEARCH AND TECHNOLOGY POLICY. VOLUME 1: SUMMARY REPORT
Nov. 1982 39 p For Volume 2, see N83-23268
Avail: NTIS HC A03/MF A01

Policies on aeronautical research and technology (R&T) are reviewed including current and future needs, capabilities, and incentives in both government and private industry. The appropriateness and effectiveness of U.S. aeronautical R&T policies, and the U.S. government's role in support of aeronautical R&T are discussed. The findings and recommendations are presented in the framework of an historical review of government policies and world events that influenced the development of U.S. aeronautics, and the civil competition and military threat resulting from R&D efforts in Europe and in the Soviet Union. It is concluded that significant potential improvement gains exist to warrant future research investment in both government and private industry; U.S. aeronautical facilities are adequate, however continued maintenance, improved productivity, and modernization are required; and procedures to control dissemination of DOD/NASA unclassified aeronautical technology data require further analysis and development. J.M.S.

N83-19650# Committee on Science and Technology (U. S. House).
NATIONAL SCIENCE FOUNDATION AUTHORIZATION, 1983
Washington GPO 1982 681 p refs Hearings before the Subcomm. on Sci., Res. and Technol. of the Comm. on Sci. and Technol., 97th Congr., 2d Sess., 23, 25 Feb., 4 Mar. 1982
(GPO-96-381) Avail: Subcommittee on Science, Research and Technology

The activities of the National Science Foundation (NSF) particularly in biological, behavioral, and social sciences and the science, technology and international affairs directorates are reviewed. The NSF education budget is considered. N.W.

N83-19765*# George Washington Univ., Washington, D.C. Graduate Program in Science, Technology, and Public Policy.
SPACE STATIONS: A POLICY HISTORY Final Report
J. M. LOGSDON Dec. 1982 80 p refs
(Contract NAS9-16461)
(NASA-CR-167801; NAS 1.26:167801) Avail: NTIS HC A05/MF A01 CSCL 22A

The space station concept was studied, and the program was defined. The project planning efforts are described. S.L.

N83-20827# Committee on Science and Technology (U. S. House).
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION AUTHORIZATION ACT, 1983
1983 11 p A bill referred to the Comm. on Sci. and Technol., 98th Congr., 1st Sess., 7 Mar. 1983
Avail: US Capitol, House Document Room

Appropriations for research and development, construction of facilities, and research and program management, and other purposes are presented. Funding for the space transportation system, physics and astronomy, planetary exploration, life sciences, space applications, technology utilization, and aeronautical research and development are included. S.L.

N83-20839# Committee on Science and Technology (U. S. House). Subcomm. on Transportation, Aviation and Materials.
ADVANCED RAIL TECHNOLOGY
Washington GPO 1982 50 p Presented to the Comm. on Sci. and Technol., 97th Congr., 2d Sess., Sep. 1982
(GPO-97-792) Avail: US Capitol, House Document Room

The technological needs and opportunities of American rail transportation were assessed in order to lay the basis for a national transportation policy. Although the general focus was on rail technology, interrelated economic and regulatory issues were also discussed. Subjects considered included conventional high speed rail technology and magnetic levitation rail technology, technology transfer and rail industry innovation, the technological and economic feasibility of establity of establishing dedicted high speed rail corridors in the United States, and the proper role of the federal government in promoting the development of a balanced national transportation system. S.L.

N83-22169# Committee on Commerce, Science, and Transportation (U. S. Senate).
NATIONAL AIRSPACE SYSTEM PLAN
Washington GPO 1982 93 p Hearing before the Subcomm. on Aviation of the Comm. on Com., Sci. and Transportation, 97th Congr., 2d Session, 24 Jun. 1982
(GPO-98-029) Avail: Subcommittee on Aviation

Four pertinent issues were addressed: the adequacy of the National Airspace System (NAS) as a planning document, FAA's management capability, the mode S data link and transponder, and replacement of the en route computer replacement. B.G.

N83-23198* National Aeronautics and Space Administration, Washington, D. C.
NASA PATENT ABSTRACTS BIBLIOGRAPHY. A CONTINUING BIBLIOGRAPHY (SUPPLEMENT 22). SECTION 1: ABSTRACTS
Jan. 1983 79 p
(NASA-SP-7039(22)-SECT-1; NAS 1.21:7039(22)-SECT-1) Avail: NTIS HC $10.00 CSCL 05B

Abstracts are cited for 234 patents and patent applications introduced into the NASA scientific and technical information system during the period July 1982 through December 1982. Each entry consists of a citation, an abstract, and in most cases, a key illustration selected from the patent or patent application. Author

N83-23199* National Aeronautics and Space Administration, Washington, D. C.
NASA PATENT ABSTRACTS BIBLIOGRAPHY. A CONTINUING BIBLIOGRAPHY (SUPPLEMENT 22). SECTION 2: INDEXES
Jan. 1983 364 p
(NASA-SP-7039(22)-SECT-2; NAS 1.21:7039(22)-SECT-2) Avail: NTIS HC $20.00 CSCL 05B

Entries for over 4000 patents and patent applications citations for the period May 1969 through December 1982 are listed. Subject, invention, source, number, and accession number indexes are included. Author

N83-23268# Office of Science and Technology, Washington, D. C.
AERONAUTICAL RESEARCH AND TECHNOLOGY POLICY, VOLUME 2 Final Report
Nov. 1982 665 p refs For Volume 1 see N83-17452
Avail: NTIS HC A99/MF A01

Policy options on aeronautical research and technology (R&T) are reviewed including current and future needs, capabilities, and incentives in both government and private industry. The evolution of the U.S. aeronautics industry and the efforts of the foreign aeronautics industries, militarily and in the civil marketplace, are examined along with long range U.S. military aeronautical needs, projections of the worldwide civil aviation market, and potential benefits resulting from continued military and civil aeronautical R&T. Within this framework, NASA's institutional role and current NASA/DOD programs and resources (facilities and manpower) are examined. National goals, government and agency roles, and policy alternatives for operation of aeronautical facilities and dissemination and control of research results are recommended and discussed. It is concluded that an advanced aeronautics capability is a unique and vital national and economic asset. Military excellence in aeronautics, the significance of aviation in the national transportation system, and the position of civil transport aircraft in international marketing efforts, coupled with the foreign efforts in

aviation, warrant government support for aeronautical R&T.
J.M.S.

N83-24151# Moshman Associates, Inc., Bethesda, Md.
ALTERNATIVE STRATEGIES FOR DEVELOPING RELIABLE ESTIMATES OF NATIONAL ACADEMIC BASIC RESEARCH EXPENDITURES BY FIELD OF SCIENCE AND ENGINEERING Final Report, 1981 - 1982
D. E. TREVETT and J. MOSHMAN Jun. 1982 40 p
(Contract NSF SRS-81-14521)
(PB83-132779) Avail: NTIS HC A03/MF A01 CSCL 05A

The contractor researched and evaluated alternative approaches for gathering data with sufficient reliability to generate estimates of basic research expenditures, at disaggregated science and engineering levels from the 500 to 600 academic R and D performers. A wide range of contacts were made to evoke and discuss all suggestions and comments. The study recommended using existing university computerized recordkeeping systems and that by informing institutions sufficiently in advance of needed information, the basic research expenditures query could be made a part of the annual NSF Survey of Scientific and Engineering Expenditures at Universities and Colleges. GRA

N83-24427# Committee on Science and Technology (U. S. House).
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION AUTHORIZATION ACT, 1984
Washington GPO 1983 14 p A bill referred to the Comm. on Sci. and Technol., 98th Congr., 1st Sess., 15 Apr. 1983
(H-REPT-98-65-PURPOSES) Avail: US Capitol, House Document Room

Authorization of appropriations to the National Aeronautics and Space Administration for research and development, construction of facilities, research and program management, and other purposes was presented. Author

N83-25622# Committee on Commerce, Science, and Transportation (U. S. Senate).
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION AUTHORIZATION ACT, 1983
Washington GPO 1983 14 p An act, H.R. 2065, referred to the Comm. on Com., Sci. and Transportation, 98th Congr., 1st Sess., 27 Apr. 1983
Avail: US Capitol, Senate Document Room

Appropriations for research and development, construction of facilities, and research and program management, and for other purposes were authorized. The amounts of authorizations are presented. S.L.

N83-25623# Committee on Commerce, Science, and Transportation (U. S. Senate).
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION AUTHORIZATION ACT, 1983
1983 13 p Bill S. 1096 referred to the Comm. on Com., Sci. and Transportation, 98th Congr., 1st Sess., 19 Apr. 1983
Avail: US Capitol, Senate Document Room

A bill to authorize appropriations for research and development, construction of facilities, and research and program management is presented. Author

N83-26640# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio.
AIR FORCE TECHNICAL OBJECTIVE DOCUMENT, FISCAL YEAR 1984
Jan. 1983 93 p Supersedes AFWAL-TR-81-2129
(Contract AF PROJ. 9991)
(AD-A125075; AFWAL-TR-83-2001; AFWAL-TR-81-2129) Avail: NTIS HC A05/MF A01 CSCL 21E

This Technical Objective Document (TOD) has been prepared by the Aero Propulsion Laboratory to provide science and industry with specific technical objectives which the Air Force feels are critical to maintain aerospace superiority in the future. The TOD contains eight technology planning objectives which cover the technical disciplines of airbreathing propulsion, aerospace vehicle power, fire protection, and aircraft and missile fuels and lubrication. Author (GRA)

N83-26752# Committee on Commerce, Science, and Transportation (U. S. Senate).
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION AUTHORIZATION ACT
Washington GPO 1983 45 p Rept. to accompany S. 1096 presented to the Comm. on Com., Sci., and Transportation, 98th Congr., 1st Sess., 16 May 1983
(S-REPT-98-108) Avail: US Capitol, Senate Document Room

The Committee on Commerce, Science, and Transportation favorably reported on Senate bill 1096 which authorizes to NASA for 1984 a total of $7,278,100,000. Of this amount, $5,888,500,000 is for research and development, $142,100,000 for construction of facilities, and $1,246,500,000 for research and program management. The total space transportation systems budget is $3,558 million. some $833 million is provided for space science programs and $321 million is provided for space applications.
A.R.H.

N83-26753# Committee on Science and Technology (U. S. House).
AUTHORIZING APPROPRIATIONS TO THE NATIONAL AERONAUTICS AND SPACE ADMINISTRATION FOR FISCAL YEAR 1984
GPO 1983 213 p Report on H.R. 2065 presented to the Comm. of the Whole House on the State of the Union, 98th Congr., 1st Sess., 15 Apr. 1983
(GPO-17-041; H-REPT-98-65) Avail: US Capitol House Document Room

Appropriations for the National Aeronautics and Space Administration are authorized for fiscal year 1984 for research and development, construction and facilities, and research and program management. Appropriations are also authorized for the National Oceanic and Atmospheric Administration to operate a land remote sensing system and to provide limitations on the operation of the system. L.F.M.

N83-28468# Defence Quality Assurance Board, London (England).
SEMINAR ON QUALITY ASSURANCE IN DESIGN AND DEVELOPMENT
1982 53 p Seminar held in London, 24 Mar. 1982
Avail: NTIS HC A04/MF A01

Design control of defense projects, computer aided design techniques for reliability and maintainability, the influence of software on product quality, and configuration management were discussed.

N83-29134# Committee on Appropriations (U. S. Senate).
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION RESEARCH AND DEVELOPMENT, INCLUDING SPACE FLIGHT, CONTROL AND DATA COMMUNICATIONS
In its Dept. of Housing and Urban Develop.-Independent Agencies Appropriation Bill, 1984 p 60-66 1983
Avail: US Capitol, Senate Document Room

A research and development appropriation is recommended. The Space Transportation System, space science and application, technology utilization, aeronautics and space technology, and tracking and data acquisition are described. Construction of facilities and research and program management are also described.
N.W.

N83-30301# Deputy Chief of Staff for Research Development and Acquisition (Air Force), Washington, D.C.
DEPARTMENT OF THE AIR FORCE SUPPORTING DATA FOR FISCAL YEAR 1984 BUDGET ESTIMATES SUBMITTED TO CONGRESS, JANUARY 31, 1983. DESCRIPTIVE SUMMARIES, RESEARCH, DEVELOPMENT, TEST AND EVALUATION Final Report, 1 Oct. 1983 - 30 Sep. 1984
B. T. BENTLEY Jan. 1983 995 p
(AD-A125932; RDXJ-RD-84-1) Avail: NTIS HC A99/MF A01 CSCL 05A

This document has been prepared to provide information on the United States Air Force (USAF) Research, Development, Test and Evaluation (RDT/E) Program to Congressional Committees during the Fiscal Year 1984 hearings. This information is in addition to the testimony given by DOD witnesses. A Descriptive Summary is provided for each program element within the USAF FY 1984 RDT/E Program. A Test and Evaluation section is provided for major weapon systems. The formats and contents of this document are in accordance with the guidelines and requirements of the Congressional Committees insofar as possible. The 'RESOURCES' portion of the Descriptive Summaries includes, in addition to RDT/E funds, procurement funds and quantities, Military Construction Appropriation funds on specific development programs, Operation and Maintenance Appropriation funds where they are essential to the development effort described, and where appropriate, Department of Energy (DOE) costs. The last section of the Fiscal Year 1984 Descriptive Summaries, entitled 'Facilities Exhibits,' contains information on major improvements to and construction of government owned facilities funded by RDT/E. GRA

N83-30323# Committee on Science and Technology (U. S. House).
ENGINEERING AND SCIENCE MANPOWER ACT OF 1982
Washington GPO 1982 240 p refs Hearings on H.R. 5254 before the Subcomm. on Sci., Res. and Technol. of the Comm. on Sci. and Technol., 97th Congr., 2d Sess., no. 107, 27, 29 Apr. 1982
(GPO-96-196) Avail: Subcommittee on Science, Research and Technology

A national policy which will ensure an adequate supply of scientists and engineers necessary to meet the needs of our country in the future is addressed. Author

N83-31546# Committee on Science and Technology (U. S. House).
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION AUTHORIZATION ACT, 1983
Washington GPO 1983 6 p H.R. 2065 enacted into law by the 98th Congr., 15 Jul. 1983
(GPO-11-139; PUB-LAW-98-52) Avail: US Capitol, House Document Room

Appropriations to NASA for research and development, facilities construction, and program management are provided. Author

N83-32679# Committee on Appropriations (U. S. Senate).
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION RESEARCH AND DEVELOPMENT
In its Dept. of Housing and Urban Develop.-Independent Agencies Appropriations Act, 1984 5 p 1983
Avail: US Capitol, Senate Document Room

Appropriations for research and development construction of facilities, maintenance, and program management are presented. Funding for the space transportation system, expendable launch vehicles, spaceborne telescopes, TDR satellites, and space communication are included. B.G.

N83-32684# Committee on Science and Technology (U. S. House).
AUTHORIZING APPROPRIATIONS TO THE NATIONAL SCIENCE FOUNDATION
Washington GPO 1983 93 p Rept. to accompany H. R. 2066 presented to the 98th Congr., 1st Sess., 26 Apr. 1983
(H-REPT-98-73; GPO-19-560) Avail: US Capitol, House Document Room

Appropriations for National Science Foundation programs in Science and engineering education; behavioral, social, and information sciences; proposed policy changes; research instrumentation; U.S. - India joint research program; research to aid the handicapped, Antarctic/arctic reseach policy; women and minorities; earthquake research; scientific computing and networking are authorized. Author

N83-33790# Committee on Science and Technology (U. S. House).
THE NATIONAL SCIENCE BOARD: SCIENCE POLICY AND MANAGEMENT FOR THE NATIONAL SCIENCE FOUNDATION 1968-1980
G. KNEZO and K. BOGEN Washington GPO 1983 750 p refs Presented to the Subcomm. on Sci., Res. and Technol. of the Comm. on Sci. and Technol., 98th Congr., 1st Sess., Jan. 1983 Prepared by the Library of Congr., Congr. Res. Serv.
(GPO-80-976) Avail: Subcommittee on Science, Research and Technology

The evolution of the National Science Board's responsibilities and procedures, the executive committee, the programs committee, the planning and policy committee, budget making, annual reports, national science policy-related activities, the National Science Foundation, (NSF) membership, advisory committees, the NSF advisory council, audit and oversight, the NSF in basic research, big and little science, science education, and science and society are addressed. Author

N83-33791# Committee on Science and Technology (U. S. House).
SEVENTH BIENNIAL CONFERENCE ON NATIONAL MATERIALS POLICY
J. E. MIELKE and L. G. KRUGER Washington GPO 1983 169 p Presented to the Comm. on Sci. and Technol., 98th Congr., 1st Sess., Mar. 1983 Prepared by the Library of Congr., Congr. Res. Serv.
(GPO-16-627) Avail: Committee on Science and Technology

The importance of a secure supply of materials and minerals at reasonably stable prices was addressed. While it was generally acknowledged that actions such as stockpiling, materials substitution, expanding domestic minerals production, and enhanced materials R&D can help reduce the nation's materials vulnerability, debate centered on the nature and extent of the Federal Government's role in facilitating and coordinating these actions. The task forces were charged with the responsibility of examining the major critical materials issues and developing an action oriented set of recommendations for government, industry, and academia. These issues are research and development; engineering education, manpower, and training; materials availability; institutional and industrial factors related to national materials policy; and materials as a technological force in productivity. Author

N83-35924# Joint Publications Research Service, Arlington, Va.
UNIFIED SCIENTIFIC-TECHNICAL POLICY DISCUSSED
Y. SIMONOV *In its* USSR Rept.: Sci. and Technol. Policy, No. 16 (JPRS-84352) p 55-60 19 Sep. 1983 refs Transl. into ENGLISH from Ekon. Nauki (Moscow), no. 5, May 1983 p 88-90
Avail: NTIS HC A05

In the process of the transition to a primarily intensive type of socialist reproduction, there is put forward the urgent task of increasing the effectiveness of management of scientific-technical progress, which serves as the material basis for intensification. The socialist state acts as a unified economic center, and in particular as a united scientific-technical center, one of whose

most important functions is to develop and implement a unified scientific-technical policy. In the developed socialist society this policy is an even more important component of economic policy, and at the same time it exerts a growing influence on all state policy. This is because the opportunities for achieving a complex of economic, social and defense goals which face our society are determined to a significant degree by the state of science and technology. Author

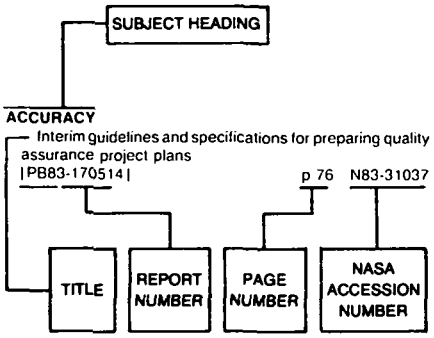
N83-35928# Joint Publications Research Service, Arlington, Va.
POLITICAL AND LEGAL ASPECTS OF REGIONAL SCIENTIFIC-TECHNICAL POLICY
V. L. KVINT *In its* USSR Rept.: Sci. and Technol. Policy, No. 17 (JPRS-84366) p 6-16 20 Sep. 1983 refs Transl. into ENGLISH from Sovet. Gosudarstvo Pravo (USSR), no. 4, Apr. 1983 p 28-36
Avail: NTIS HC A06

Intensification of production and effective utilization of the achievements of scientific and technical progress serves as a basis for the implementation of the broad social program for satisfying the growing needs of the Soviet people and a basis for the rapid development of the country's national economy. Under conditions whereby the main increase in the raw material, fuel, and energy resources is provided through their assimilation in the eastern regions of the country, the role of scientific and technical progress becomes especially great. The implementation of such large scale regional programs of unionwide significance as the economic development of the zone of the Baykal-Amur railroad mainline, the assimilation of the natural resources of the Northern Krasnoyarsk territorial production complex and the Kansk-Achinsk fuel and energy complex, and the development of the petroleum and gas regions of Western Siberia lead to a qualitatively new phenomenon--the influence of scientific and technical progress on the natural and technogenic environment of immense regions. This process also takes place in regions of intensive revamping of industry and agriculture. Author

N83-37026# General Accounting Office, Washington, D. C. General Government Div.
FREEDOM OF INFORMATION ACT OPERATIONS AT SIX DEPARTMENT OF JUSTICE UNITS. REPORT TO THE CHAIRMAN, SUBCOMMITTEE ON GOVERNMENT INFORMATION, JUSTICE AND AGRICULTURE, COMMITTEE ON GOVERNMENT OPERATIONS HOUSE OF REPRESENTATIVES
23 May 1983 18 p
(PB83-222356; GAO/GGD-83-64; B-211683) Avail: NTIS HC A02/MF A01 CSCL 05A

The Freedom of Information Act states that agencies have 10 days to respond to a request for information. In general, the six Department of Justice units GAO reviewed took longer than 10 days. Decentralized records, the volume of requested material, the need to carefully review sensitive records, and the resulting backlogs were the primary causes of delayed responses. Without completely automating or centralizing records or making responses a top Department priority, however, significant improvements in the timeliness of responses do not seem feasible. The report also discusses other FOIA issues of concern to the subcommittee.
Author (GRA)

Typical Subject Index Listing



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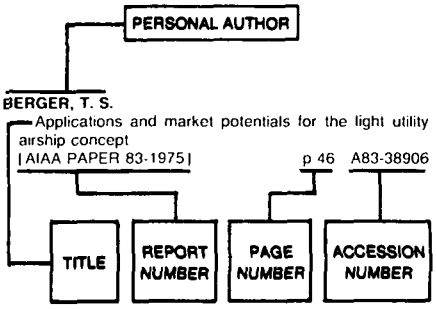

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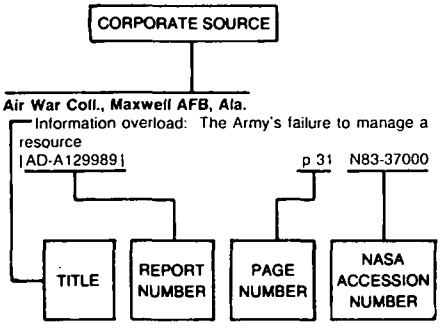

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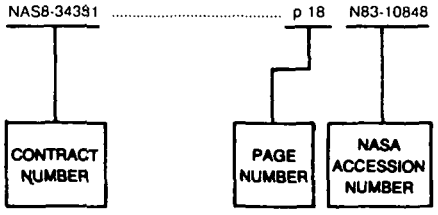

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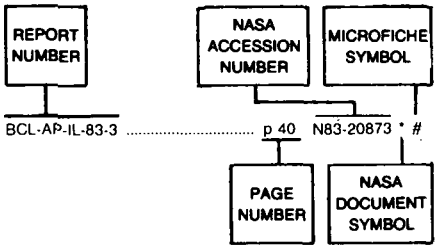

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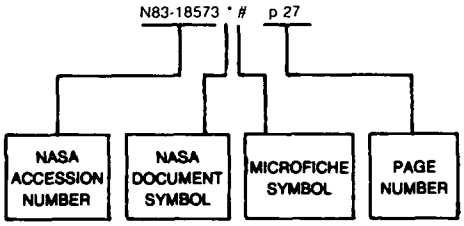

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