NASA

Management
A Continuing
Bibliography
with Indexes

NASA SP-7500(17)
March 1983

National Aeronautics and
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NASA SP-7500(17)

MANAGEMENT

A CONTINUING BIBLIOGRAPHY WITH INDEXES

A selection of annotated references to unclassified reports and journal articles that were introduced into the NASA scientific and technical information system during 1982.

NASA Scientific and Technical Information Branch 1983
National Aeronautics and Space Administration
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INTRODUCTION

COVERAGE

Management is a compilation of references to selected reports, journal articles, and other documents on the subject of management. This publication lists 960 documents originally announced in the 1982 issues of *Scientific and Technical Aerospace Reports (STAR)* or *International Aerospace Abstracts (IAA).*

SCOPE

This publication series includes references on the management of research and development, contracts, industry, production, personnel, projects, systems, and logistics. It contains references on management of urban problems and management tools and techniques, including decisionmaking, modeling, forecasting, inventory controls, robots, and automation. It also covers safety, reliability, quality control, risks, failure analysis, warranties, guarantees, and maintenance, as well as cost effectiveness, budgeting, and other financial or economic factors of interest to managers. Management planning, policies, and philosophy, pertinent legislation, government/industry relations, and technology assessments are also included.

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Each entry in the bibliography consists of a standard bibliographic citation accompanied in most cases by an abstract. The entries are arranged in ten major categories, with *IAA Entries* preceding *STAR Entries* in each category. The citation, and abstracts when available, are reproduced exactly as they appeared originally in *IAA* or *STAR* including the original accession numbers from the respective announcement journals.

Six indexes -- subject, personal author, corporate source, contract number, report number, and accession number -- are included.

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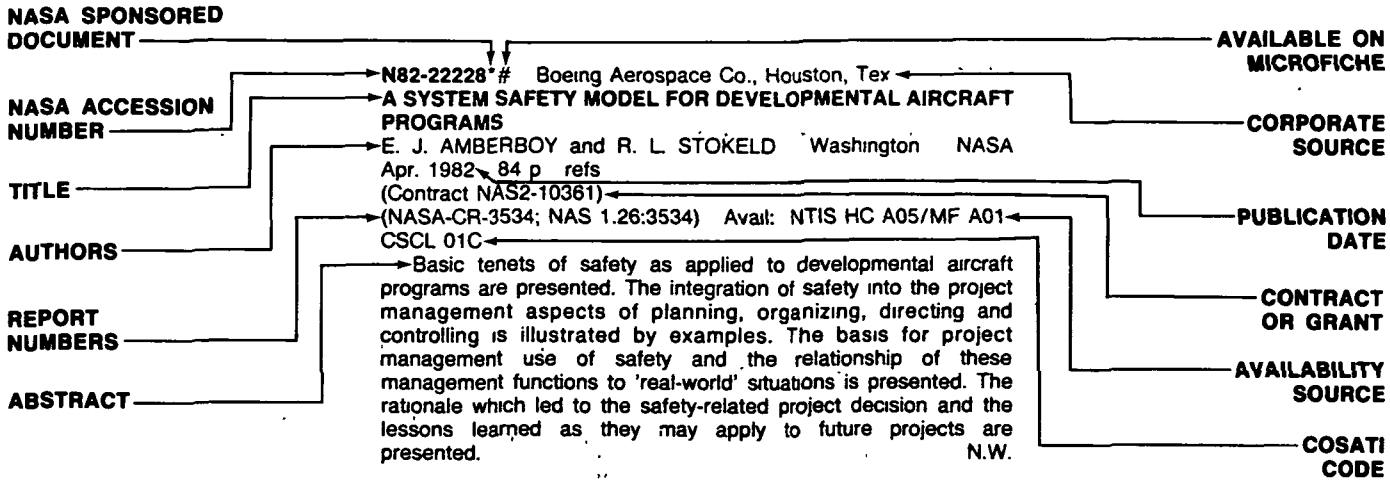

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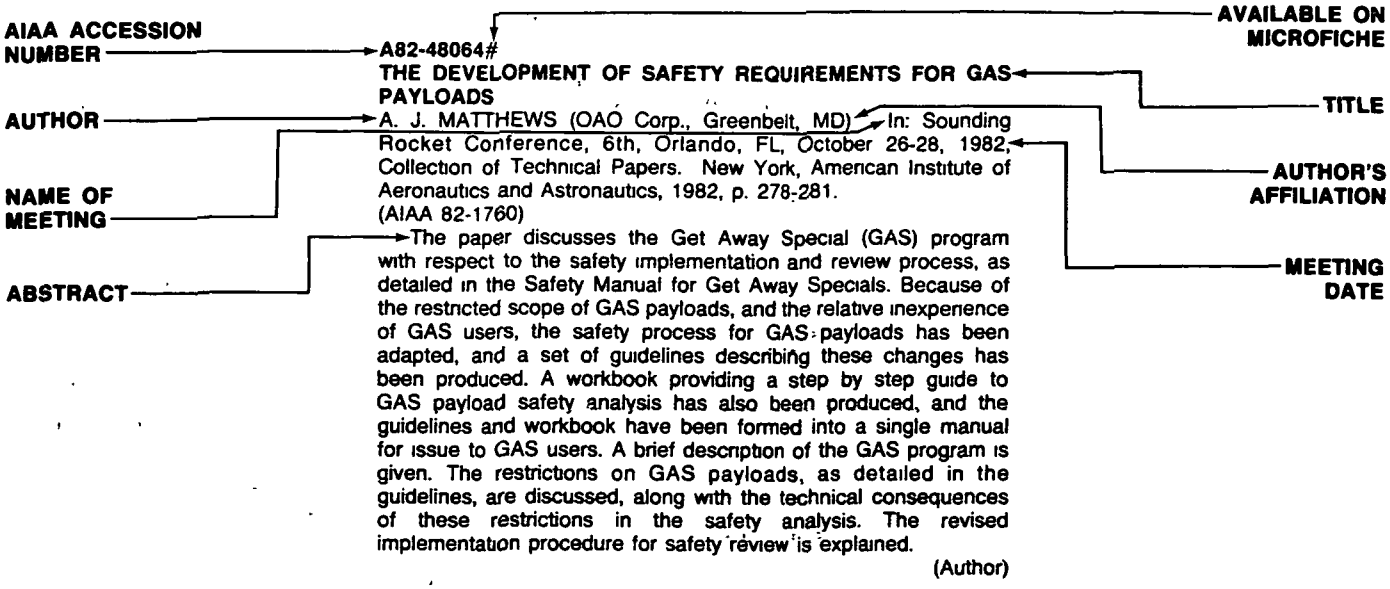

MANAGEMENT

A Continuing Bibliography

MARCH 1983

01

RESEARCH AND INDUSTRIAL MANAGEMENT

Includes management of contracts, procurement, production, personnel, and general documents on management

A82-13856#
ORGANIZING AND TRAINING FOR INNOVATIVE FLIGHT TEST MANAGEMENT
J. D. LANG (USAF, Wright-Patterson AFB, OH) AIAA, SETP, SFTE, SAE, ITEA, and IEEE, Flight Testing Conference, 1st, Las Vegas, NV, Nov. 11-13, 1981, AIAA 8 p. refs
(AIAA PAPER 81-2416)

The organization and training for innovative flight test management by the 4950th Test Wing is reported Current wing structure, methods, planned changes, and employer/employee relationships are discussed. An in-house training program to assist in the transition from old to new by enhancing attitudes and clarifying roles for improved leadership in test project and test engineering management is presented. Future emphasis is also discussed, and is to be on organizational attitude to encourage innovation and motivation to make each project succeed D.L.G

A82-13877#
GOVERNMENT TESTING
J. C. OCONNOR (U S. Army, Aviation Research and Development Command, St. Louis, MO) AIAA, SETP, SFTE, SAE, ITEA, and IEEE, Flight Testing Conference, 1st, Las Vegas, NV. Nov. 11-13, 1981, AIAA 4 p
(AIAA PAPER 81-2443)

The Department of Defense Directive on Test and Evaluation establishes the policy of conducting test and evaluation throughout the acquisition process of a defense weapon system. The acquisition process consists of four distinction phases, with each phase requiring a particular scope and type of test This paper addresses the flight testing required for each acquisition phase during the development and production of Army aircraft The test objectives, scope of tests, and test methodology are presented for the Preliminary Airworthiness Evaluation, Developmental Tests, Operational Tests, artificial/natural inflight icing, climatic laboratory tests, and the Airworthiness and Flight Characteristics Tests.
(Author)

A82-13944#
FLIGHT TEST CONCEPT EVOLUTION
L. G. VAN PELT (USAF, Eglin AFB, FL) AIAA, SETP, SFTE, SAE, ITEA, and IEEE, Flight Testing Conference, 1st, Las Vegas, NV, Nov 11-13, 1981, AIAA 11 p.
(AIAA PAPER 81-2375)

A chronicle of progress in flight test philosophy is very revealing. Ever-increasing emphasis has been placed upon the need for flight test to be thorough and still meet the need for timely introduction of effective new aircraft into the operational inventory. Major flight test concepts (Phase Testing, Category Testing, and Development Test and Evaluation/Operational Test and Evaluation) have been influenced by nuances such as concurrency, fly-before-buy, total package procurement, prototyping, competitive fly-off, etc. An understanding of these experiences and lessons learned will help in today's preparation of effective and efficient test programs.
(Author)

A82-14368*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
USING CAD/CAM TO IMPROVE PRODUCTIVITY - THE IPAD APPROACH
R. E. FULTON (NASA, Langley Research Center, Hampton, VA) Mechanical Engineering, vol. 103, Nov 1981, p. 64-69. refs

Progress in designing and implementing CAD/CAM systems as a result of the NASA Integrated Programs for Aerospace-Vehicle Design is discussed. Essential software packages have been identified as executive, data management, general user, and geometry and graphics software. Data communication, as a means to integrate data over a network of computers of different vendors, provides data management with the capability of meeting design and manufacturing requirements of the vendors. Geometry software is dependent on developmental success with solid geometry software, which is necessary for continual measurements of, for example, a block of metal while it is being machined. Applications in the aerospace industry, such as for design, analysis, tooling, testing, quality control, etc., are outlined. M.S.K.

A82-19266#
PROCUREMENT OF THE NEW FLIGHT AND TACTICS SIMULATORS - EXPERIENCE, PROBLEMS, MEANING [BESCHAFFUNG DER NEUEN FLUG- UND TAKTIKSIMULATOREN ERFAHRUNGEN, PROBLEME, SINN]
H.-J BALKE (Bundesamt fuer Wehrtechnik und Beschaffung, Koblenz, West Germany) Deutsche Gesellschaft fuer Luft- und Raumfahrt, Symposium ueber Schulung mit Flug- und Taktiksimulatoren, Cologne, West Germany, May 20, 21, 1981, 8 p. In German.
(DGLR PAPER 81-095)

The stationary flight and tactics simulator is used for the training of flight crews. An aircraft cockpit is employed, while electronic computers simulate the behavior of the aircraft, the characteristics of the aircraft equipment, and the operation of the engine A number of similar appearing names are employed for simulators and other training devices. It is, therefore, sometimes difficult to distinguish between training devices for ground personnel and the simulators for flight crews. A description of the meaning of the various terms employed in this connection is provided as an aid for the appropriate identification of a device Attention is given to market considerations regarding the purchase of simulators, details concerning the simulator procurement process, and the benefits obtained by an employment of flight and tactics simulators. G.R.

A82-19268#
THE PROCUREMENT OF FLIGHT SIMULATORS AT THE GERMAN LUFTHANSA [DIE BESCHAFFUNG VON FLUGSIMULATOREN BEI DER DEUTSCHEN LUFTHANSA]
W.-D. HASS (Deutsche Lufthansa AG, Frankfurt am Main, West Germany) Deutsche Gesellschaft fuer Luft- und Raumfahrt, Symposium ueber Schulung mit Flug- und Taktiksimulatoren, Cologne, West Germany, May 20, 21, 1981, 10 p. In German.
(DGLR PAPER 81-093)

Flight simulators have become indispensable for the training of airline pilots. Questions regarding the requirements for flight

simulators arise, therefore, in connection with the introduction of new aircraft types or the enlargement of the fleet of existing aircraft types. Decisions have to be made concerning the placing of an order for a simulator or the purchase of simulator time on devices of the aircraft manufacturer or other companies. It is advisable to specify in the contract covering the purchase of the aircraft that the aircraft manufacturer has to provide data and components to a flight simulator producer. With respect to the Lufthansa, during the last 15 years there was almost always a relationship between the orders for an aircraft and a simulator. Price and delivery information from simulator manufacturers is obtained as soon as the negotiations regarding the purchase of aircraft appear to lead to a concrete agreement Attention is given to procurement specifications, evaluation criteria, and a point system for an evaluation. G.R.

A82-21239
A UNIFIED APPROACH TO THE ACQUISITION OF SUBJECTIVE DATA IN R & D
T. E. GEAR (Trent Polytechnic, Nottingham, England), A. G. LOCKETT (Manchester, Victoria University, Manchester, England), and A. P. MUHLEMANN (University of Manchester Institute of Science and Technology, Manchester, England) IEEE Transactions on Engineering Management, vol. EM-29, Feb. 1982, p. 11-19. refs

Many quantitative models have been developed and tried in the R&D management environment. Although very successful in providing insight framework, their actual everyday use appears to have been limited. Although there could be many reasons for this, one of the main ones is the general problem of data collection. The subjective nature of the topic makes this inherently difficult. A new approach to this problem is presented here which is based on a method of prioritized hierarchies, backed up by a simple procedure of pairwise comparisons. A case study is presented of a group decision-making activity based in a research environment. Numerical results are given which show how the participants behaved in practice. (Author)

A82-21240
REALIGNING AN R & D ORGANIZATION FROM R-INTENSIVE TO D-INTENSIVE - A CASE EXAMPLE
N O. JOHNSON (Volvo Car Corp , Goteborg, Sweden) and D. B. DAVIDSON (Nitro Nobel AB, Gyttorp, Sweden) IEEE Transactions on Engineering Management, vol. EM-29, Feb. 1982, p. 19-27. refs

Actions taken in one company in order to speed the transition of R&D results to commercial use are described and evaluated. A useful analysis framework taken from technological forecasting is presented. Conclusions drawn from this analysis are used as a basis for a systematic realignment work, comprising changes in formal organization, communication channels, hiring practices, and introduction of systematic R&D methods. (Author)

A82-21375*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
CAD/CAM APPROACH TO IMPROVING INDUSTRY PRODUCTIVITY GATHERS MOMENTUM
R. E. FULTON (NASA, Langley Research Center, Hampton, VA) Astronautics and Aeronautics, vol 20, Feb. 1982, p. 64-70. refs

Recent results and planning for the NASA/industry Integrated Programs for Aerospace-Vehicle Design (IPAD) program for improving productivity with CAD/CAM methods are outlined. The industrial group work is being mainly done by Boeing, and progress has been made in defining the designer work environment, developing requirements and a preliminary design for a future CAD/CAM system, and developing CAD/CAM technology. The work environment was defined by conducting a detailed study of a reference design process, and key software elements for a CAD/CAM system have been defined, specifically for interactive design or experiment control processes. Further work is proceeding on executive, data management, geometry and graphics, and general utility software, and dynamic aspects of the programs being developed are outlined M.S.K.

A82-23003*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
SETI - THE SEARCH FOR EXTRATERRESTRIAL INTELLIGENCE - PLANS AND RATIONALE
J. H. WOLFE, J. BILLINGHAM (NASA, Ames Research Center, Moffett Field, CA), R. E. EDELSON (GTE Laboratories, Inc., Waltham, MA), R. B. CROW, S. GULKIS, E. T. OLSEN (California Institute of Technology, Jet Propulsion Laboratory, Pasadena, CA), B. M. OLIVER (Hewlett-Packard Corp., Palo Alto, CA), and A. M. PETERSON (Stanford University, Stanford, CA) C. L. Seeger (San Francisco State University, San Francisco, CA), and J. C. Tarter (California, University, Berkeley, CA). In: Life in the universe; Proceedings of the Conference, Moffett Field, CA, June 19, 20, 1979. Cambridge, MA, MIT Press, 1981, p. 391-417. refs

The methodology and instrumentation of a 10 yr search for extraterrestrial intelligence (SETI) program by NASA, comprising 5 yr for instrumentation development and 5 yr for observations, is described. A full sky survey in two polarizations between 1.2 and 10 GHz with resolution binwidths down to 32 Hz, and a two polarization can between 1.2-3 GHz with resolution binwidths down to 1 Hz of 700 nearby solar type stars within 20 light years of earth will extend the sensitivity of previous surveys by 300 times and cover 20,000 times more frequency space. EM signals are perceived as the only means for detecting life outside the solar system, and the SETI effort is driven by the empirical experience that once a physical process has been observed to occur, its occurrence elsewhere is assured. Further discussion is given of the history of searches for life in the Universe, the SETI search strategy, instrumentation, and signal identification. M.S.K.

A82-23310
EFFECTS OF ATTITUDES ON THE PERFORMANCE OF SUPERVISORS
G. C. KINNEY (Mitre Corp , McLean, VA) In: Air Traffic Control Association, Annual Fall Conference, 25th, Arlington, VA, October 19-24, 1980, Proceedings. Arlington, VA, Air Traffic Control Association, 1980, p 25-30.

The effects of certain mental attitudes of team supervisors on the job are considered. Each attitude discussed is related to motives for the attitude. For helpful attitudes, management actions are considered which would support the attitude. For attitudes which are not helpful, actions are suggested which could help to remedy the attitude, or at least diminish its effects on job performance. An attitude, according to the meaning of this term in the investigation, is a tendency for a person to respond favorably or unfavorably to persons, situations, objects, or events The responses are essentially automatic once an attitude has developed Attitudes are formed by a person's social class, social groups, schools, families, experiences, and goals. Relations between attitudes and performance are discussed. G.R.

A82-24337#
NEGOTIATING AN AIRCRAFT PURCHASE CONTRACT
J.-L. MAGDELENAT (McGill University, Montreal, Canada) In: Annals of air and space law. Volume 5. Toronto, Carswell Co., Ltd ; Paris, Editions A. Pedone, 1980, p. 155-170. refs

The negotiation of an aircraft purchase contract is examined with attention given to pro forma agreements, delivery and delay, certification, and warranties. A number of recommendations on the practical aspects of negotiation are presented. B.J.

A82-24371
MANAGING COMPUTER AIDED DESIGN; PROCEEDINGS OF THE CONFERENCE, LONDON, ENGLAND, NOVEMBER 19, 1980
Conference sponsored by Institution of Mechanical Engineers. London, Mechanical Engineering Publications, Ltd. (I Mech E Conference Publications 1980-8), 1980. 51 p
$30

Papers are presented on the problems encountered by the incorporation of computer-aided design and computer-aided manufacturing (CAD/CAM) systems into the process industries, such as aircraft manufacture and chemical production, in Britain.

Attention is given to the use of CAD graphics by a mechanical engineering firm, the successful management of CAD, the use of CAD/CAM electronic data transfer to integrate geographically distributed aircraft production, experience with computer-aided building design system in an architectural firm, the acceptance of interactive graphics by industry, and the relation between the financial productivity impact of CAD/CAM and labor relations.
O.C.

A82-24372
WHY CAN'T WE MANAGE CAD
B GOTT (Computer Aided Design Centre, Cambridge, England) In: Managing computer aided design; Proceedings of the Conference, London, England, November 19, 1980. London, Mechanical Engineering Publications, Ltd., 1980, p. 1-7.

Consideration is given to the range of topics discussed at the conference on computer aided design (CAD) management held at Britain's Institution of Mechanical Engineers on November 19, 1980. Although the papers presented are of frequent interest to industrial process engineering, many of the technical and managerial problems that arise in that field are believed to obtain throughout the contemporary industrial system to which computer aided engineering (CAE) is to be applied Interactive computing methods and graphics and the 'remote job entry' method by which data is sent to the computer for either immediate or deferred processing are discussed, and the roles played by keyboards, electronic tablets and pens, joysticks and thumbwheels in CAE work are described. Attention is also given to the financial justification of CAE systems.
O.C.

A82-24394
MANAGEMENT OF POWERPLANT MAINTENANCE AND RESTORATION PROGRAMS FOR FUEL CONSERVATION
C. REID (General Electric Co., Fairfield, CT) Society of Automotive Engineers, Aerospace Congress and Exposition, Anaheim, CA, Oct. 5-8, 1981, 15 p.
(SAE PAPER 811052)

Powerplant operational and maintenance procedures are reviewed to minimize fuel consumption and total operating costs of existing large turbofan engines. Recommendations are made to reduce the rate of on-wing performance deterioration and to define cost effective performance refurbishment. Measures being taken to increase fuel and cost savings include the development of performance diagnostic/analytical systems to permit better management control of engine operating costs. On-wing performance retention can be improved by the observance of line maintenance and operational procedures minimizing the impact of the major causes of performance deterioration, such as increased clearances, erosion, contamination and leakage
D.L.G.

A82-26599* Stanford Univ., Calif
RESTRUCTURING THE US TELECOMMUNICATIONS INDUSTRY - IMPACT ON INNOVATION
C. E. AGNEW (Stanford University, Stanford, CA) and A. A. ROMEO (Connecticut, University, Storrs, CT) Telecommunications Policy, Dec 1981, p. 273-288. Office of Technology Assessment refs
(Contract OTA-933-3810-0; NASW-3204)

The Communications Act of 1934, which regulates the United States telecommunications industry, is becoming less able to deal with the changes brought by modern technology. Therefore, proposals are being made to restructure the industry. Breaking up AT&T into smaller firms would have only minor effects, since its ratio of R and D to sales has been near the median for large telephone companies Restructuring AT&T into subsidiaries dealing at arms' length might cause a reordering of priorities toward more directly marketable and useful products, but too extensive a break-up could endanger Bell Labs' commitment to basic research. Regulation leads a firm to ignore true social value of possible products, expand into low profit markets, and favor capital-intensive over labor-intensive innovation. If regulatory lag occurs, a firm will produce cost-reducing innovation in order to increase its profit.
C.D.

A82-27043#
LAUNCH SERVICE CONTRACTS
W. THOMA (ESA, Contracts Dept., Paris, France) ESA Bulletin, no. 29, Feb. 1982, p. 33-37

Legal and economic details of launching services, particularly for NASA launches of ESA satellites and ESA-Ariane launches of privately owned satellites, are discussed. NASA currently maintains a reimbursement-based service, with margins for unexpected costs and some liability coverage. The ESA introduction of fixed-cost launches with adjustments for inflation is being copied by NASA for both conventional and Shuttle launches. Failures are the customer's risk, although NASA is offering a reflight with the Shuttle if, through no fault of the customer, the intended orbit is not achieved Greater costs are connected to arrangements for conventional back-up launch vehicles with both ESA and NASA, and the question of delays due to late arrivals of part of a multiple payload package are as yet unresolved.
M S.K.

A82-32625
ROLLS-ROYCE IMPLEMENTING NEW PRODUCTION SYSTEM
,Aviation Week and Space Technology, vol. 116, May 17, 1982, p. 91, 95, 97, 99.

An advanced, integrated manufacturing systems system is being implemented in Rolls-Royce production facilities in order to cut unit production costs by reducing lead times, manning levels and inventories. The topics discussed include the program outline, planned subcontracting, the machining operation that includes isothermal forming of wide-chord hollow blades, carbon fiber production of subsystems including thrust reversers, continuous dress creep feed grinding, the directionally solidified casting facility that can produce single-crystal blades without modification to the casting furnaces, and a robot machining line
C.D.

A82-33648
ESSENTIALS OF AVIATION MANAGEMENT /2ND EDITION/
J. D RICHARDSON (Appalachian State University, Boone, NC) Dubuque, IA, Kendall/Hunt Publishing Co., 1981. 689 p. refs
$10.95

This book is intended to focus on the management of aviation businesses and to provide assistance to managers as they strive to overcome the problems of a rapidly changing and complex business environment. The contents of this book represent a mixture of generally accepted business procedures, practical 'how-to-do-it' material, applied research findings, sophisticated 'tools' and techniques as well as accepted history. A brief review is provided of aviation history and its impact upon the modern manager. Attention is given to management functions, profit orientation, business organization, regulatory impact, manpower management, physical facilities, operational activities, flight operations, aviation maintenance, marketing, problem administration, information systems, aspects of decision making, and the future for aviation business.
G.R.

A82-38812
PROJECT LEADER'S LOCUS OF CONTROL AND TASK CERTAINTY AS ANTECEDENTS OF MEMBERS' SATISFACTION WITH LEADERSHIP AND R&D TEAM PERFORMANCE
R. C DAILEY (Tulane University, New Orleans, LA) Engineering Management International, vol. 1, July 1981, p. 41-47. refs

The research presented here details a path analysis of R&D team members' satisfaction with leadership and team performance. Antecedent predictors were task certainty and the locus of control of project leaders. It was found that both task certainty and the project leader's locus of control were antecedents of members' satisfaction with leadership Also members' satisfaction with leadership was a significant antecedent of team performance. These results are discussed relative to the group dynamics literature in general and the management of R&D teams in particular.
(Author)

A82-40825
THE MECHANIZATION OF DESIGN AND MANUFACTURING
T G. GUNN (Arthur D. Little, Inc., Cambridge, MA) Scientific American, vol 247, Sept. 1982, p. 114-130.

Applications of data-processing technology in discrete-products manufacturing to link design, management, and manufacturing into a single information network are discussed. Attention is given to methods of controlling and coordinating the work, parts, and sequence of operations as a means to increasing efficiency and productivity Information flow within a factory is categorized into design, storage and retrieval of data on the manufactured part, management and control of available resources, materials handling, the control of machine tools, and the control of robots. Electronically stored data can be recalled and/or hard copy can be produced, and computer guided machining proceeds with significantly greater accuracy and speed than is possible with human efforts. M.S.K.

A82-40935#
A ONE-SHOT AUTOCLAVE MANUFACTURING PROCESS FOR CARBON EPOXY COMPONENTS
M. KAITATZIDIS, R. RENZ (Dornier GmbH, Friedrichshafen, West Germany), and D. WURZEL (Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Stuttgart, West Germany) In: International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 1. New York, American Institute of Aeronautics and Astronautics, 1982, p. 579-585.

For the Alpha-Jet aircraft Dornier has developed and fabricated a carbon/epoxy horizontal stabilizer, which has already successfully completed its qualification tests This paper presents the requirements and goals of this development and describes the structural design of the horizontal stabilizer. For its leading and trailing edges a new one-shot manufacturing technique has been developed. The toolings are described, weight and cost savings are reported. This technique is now being applied for series production of ailerons for the Do 228 Commuter Aircraft. A brief presentation of the results of the qualification tests under various environmental conditions (humidity and temperature) is given. (Author)

A82-40990#
CATIA - A COMPUTER AIDED DESIGN AND MANUFACTURING TRIDIMENSIONAL SYSTEM
F. BERNARD (Avions Marcel Dassault-Breguet Aviation, Suresnes, Hauts-de-Seine, France) In: International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 2. New York, American Institute of Aeronautics and Astronautics, 1982, p 1147-1154.

A properietary computer graphics-aided, three-dimensional interactive application (CATIA) design system is described. CATIA employs approximately 100 graphics displays, which are used by some 500 persons engaged in the definition of aircraft structures, structural strength analyses, the kinematic analysis of mobile elements, aerodynamic calculations, the choice of tooling in the machining of aircraft elements, and the programming of robotics. CATIA covers these diverse fields with a single data base. After a description of salient aspects of the system's hardware and software, graphics examples are given of the definition of curves, surfaces, complex volumes, and analytical tasks. O.C.

A82-41828
MEASUREMENTS TECHNICIAN'S PRODUCTIVITY INCREASED THROUGH THE USE OF A COMPUTER-BASED DATA SYSTEM
T. D. NIELSEN and C. P. WRIGHT (TRW Defense and Space Systems Group, Redondo Beach, CA) In: International Instrumentation Symposium, 28th, Las Vegas, NV, May 3-6, 1982, Proceedings. Part 1. Research Tnangle Park, NC, Instrument Society of America, 1982, p. 93-97.

The evaluation of productivity with respect to the conduction of tests or measurements is based on the consideration of labor costs as an indicator of 'test productivity', because the principal part of the incurred test costs are labor costs rather than hardware costs. Questions regarding the use of automation as a productivity solution are discussed. The approach which was found to be most effective involves the development of systems which are as technician-onented as possible. Factors responsible for the need to increase productivity in aerospace mechanical testing are examined, taking into account increasing spacecraft complexity, stiffness testing, and increasing emphasis on component-level testing. In order to attain the required increase in productivity, an automated mechanical test data system was developed to perform medium-sized low frequency mechanical and structural tests on spacecraft components. G.R.

A82-42230
TRAINING AND PERSONNEL IMPACT ON INCREASED PRODUCTIVITY
C. H. DUFFEE (Martin Marietta Aerospace, Orlando, FL) In. Annual Reliability and Maintainability Symposium, Los Angeles, CA, January 26-28, 1982, Proceedings. New York, Institute of Electrical and Electronics Engineers, 1982, p. 497-503. refs

Test data are presented from an evaluation of the impact of novel training methods on operation and maintenance personnel performance. Extension Training Material (ETM) lessons allowed the test group to overcome the experience advantage of a control group, and then outperform the control group in every criterion measured A 31% reduction in performance time and a 59% error reduction is reported. The ETM lessons are multimedia, programmed instructional training materials which include audiovisual, highly illustrated print, and audio tape components. Media selection for each lesson is based on audience learning skill as well as task charactenstics. Learning retention is enhanced as a result of the integration of more of the user's five senses into the learning process. O.C.

A82-42544
AIRCRAFT R&D IN EUROPE - A PERSPECTIVE VIEW
J C. WIMPENNY (British Aerospace Public, Ltd., Co., Aircraft Group, Kingston-upon-Thames, Surrey, England) (European Pioneer's Day Conference, Toulouse, France, May 6, 7, 1982.) Aeronautical Journal, vol. 86, Aug.-Sept. 1982, p. 243-251.

Research and development in European civil air transport is considered. It is suggested that industry growth depends primarily on fare reduction, resulting in an increased actual passenger per km figure. A high rate of product improvement implies a reasonable growth rate, but a low rate may reduce the amount of competition. If an excessive rise in fuel prices occurs, R&D will still have to be high in order to reduce direct operating cost (DOC) penalties. A high or low improvement rate for DOC can influence whether future developments are primanly reorders or new types. A steady R&D is essential in order to ensure high DOC reductions, and R&D effectiveness requires precise definition and management. R&D growth must be accompanied by improved profitability of manufacturers and operators. Air traffic management (ATM) can be a major improvement as it provides a 6% potential DOC reduction, and further investigation of ATM is needed. R.K.R.

A82-43093
FIRMS JOCKEYING FOR SHUTTLE CONTRACTS
E. H. KOLCUM Aviation Week and Space Technology, vol. 117, Sept. 13, 1982, p 77, 78, 83, 86, 91.

A comprehensive Space/Shuttle processing contract is being considered by NASA to replace the nearly two dozen existing individual contracts. It is expected to be awarded in three year periods, and the initial value will be $2.7 billion. Assessments by potential bidders generally view the processing in one of two ways: either as a complex technical operation on a developing system requiring experienced element contractors, or as essentially a task of managing a mature system. Nonetheless, companies holding both views are critical of NASA's management techniques, and frequently note the need for better definition of roles for the participants, of lines of responsibility and of liability, and note the need for increased processing facilities and materiel. A.B.

A82-43170#
AN INVESTIGATION OF THE USE OF NETWORK TECHNIQUES IN RESEARCH AND DEVELOPMENT MANAGEMENT
E. J DUNNE, JR. (USAF, Institute of Technology, Wright-Patterson AFB, OH) and L. J. KLEMENTOWSKI (USAF, Aeronautical System Div., Wright-Patterson AFB, OH) IEEE Transactions on Engineering Management, vol. EM-29, Aug. 1982, p. 74-78. refs

Network management techniques were at one time mandatory for aerospace R&D projects. This study investigates the current extent to which network management techniques - the basic PERT/CPM (program evaluation and review techniques/critical path method) network, cost duration analysis, and critical resource analysis - are being used as part of aerospace R&D management. Ninety-eight interviews with individuals in government and industry gathered data about usage and effectiveness. The results indicate wide use of the basic network techniques, about 50 percent of the organizations contacted, and a very high rating of networks as an R&D planning tool. On the other hand, cost duration analysis and critical resource analysis have low use rates (Author)

A82-46269#
AN ORGANIZATION DEVELOPMENT APPROACH TO RESOURCE MANAGEMENT IN THE COCKPIT
L. O RINGS (Ohio State University, Columbus, OH) In: Symposium on Aviation Psychology, 1st, Columbus, OH, April 21, 22, 1981, Proceedings. Columbus, OH, Ohio State University, 1981, p 248-253.

The usefulness of applying an organization development (OD) model for cockpit resource management in general aviation aircraft is described OD presents an integrated approach which utilizes the full flight crew. Pinch-hitter courses are noted, such as training passengers in the right seat how to land should the pilot become incapacitated Airlines may have copilots or instructor pilots in the right seat who are motivated to upgrade to the left seat, thereby causing potential crew conflicts. A diagnostic approach to resource management is presented. Resources are classed at task, technology, structure, and people, with structure being the communication and authority framework. The people factor is discussed, and an exchange of information relating the degree of competency of the left and right seat flyers is recommended. Methods of determining the utility of the four variables are examined. M.S.K

A82-48264
AIRFIELD CONSTRUCTION - A REFERENCE BOOK [STROITEL'STVO AERODROMOV - SPRAVOCHNIK]
B. I. DEMIN, V. P. EGOZOV, and IU. A. RATIUK Moscow, Izdatel'stvo Transport, 1980. 248 p. In Russian refs

The basics of airfield construction are reviewed with reference to construction work organization, management, and execution, construction materials, and machinery and equipment. Consideration is given to the construction of drainage systems, unpaved airfields, concrete pavements, the manufacture of organic binders, concrete and cement products, quality control in airfield construction, and maintenance. Finally, the fundamentals of safety engineering are discussed in relation to the various stages of airfield construction. V.L.

N82-10117# Department of Energy, Washington, D. C Div. of Chemical Sciences.
SUMMARIES OF FY 1981 RESEARCH IN THE CHEMICAL SCIENCES
Aug. 1981 273 p
(DE81-030000; DOE/ER-0105) Avail: NTIS HC A12/MF A01

Information useful to chemist, physists, chemical engineers, and others who are considering the possibilities of proposing research for support by the DOE is presented. The information is intended to provided a rapid means of becoming aquainted with the chemical sciences program to members of the scientific and technological community. R.C.T.

N82-11274# TRW, Inc., McLean, Va. Energy Systems Group.
ENVIRONMENTAL RESEARCH PLAN FOR GAS SUPPLY TECHNOLOGIES. VOLUME 2: ENVIRONMENTAL RESEARCH PLAN Final Report
L. M. TIPTON 29 May 1981 168 p refs 2 Vol.
(Contract GR1-5080-351-0316)
(PB81-222317, GRI-80/0013.2) Avail: NTIS HC A08/MF A01 CSCL 21D

Federal environmental regulations affecting gas supply technologies are reviewed. The technological and environmental state of the art of each gas supply technology was analyzed with the help of a series of experts, in gas supply technology Based on regulatory requirements technology status, and current environmental knowledge, the environmental issues associated with each technology area were identified. Environmental research being performed by government, industry and educational institutions was identified by computerized literature search and reviewed applicability recommended research activities for GRI funding were developed and a suitable prioritization methodology was devised. GRA

N82-11303*# Jet Propulsion Lab, California Inst. of Tech., Pasadena.
NETWORKS CONSOLIDATION PROGRAM: MAINTENANCE AND OPERATIONS (M&O) STAFFING ESTIMATES
J. P. GOODWIN *In its* The Telecomm. and Data Acquisition Rept. p 167-174 15 Oct. 1981 refs
Avail: NTIS HC A11/MF A01 CSCL 22D

The Mark IV-A consolidate deep space and high elliptical Earth orbiter (HEEO) missions tracking and implements centralized control and monitoring at the deep space communications complexes (DSCC). One of the objectives of the network design is to reduce maintenance and operations (M&O) costs. To determine if the system design meets this objective an M&O staffing model for Goldstone was developed which was used to estimate the staffing levels required to support the Mark IV-A configuration. The study was performed for the Goldstone complex and the program office translated these estimates for the overseas complexes to derive the network estimates T.M.

N82-11692# National Center for Atmospheric Research, Boulder, Colo.
NATIONAL CENTER FOR ATMOSPHERIC RESEARCH Annual Report, fiscal year 1980
Mar. 1981 90 p
(NCAR/AR-80) Avail. NTIS HC A05/MF A01

Research and development highlights of the Advanced Study Program, the Atmospheric Analysis and Prediction Division, the Atmospheric Chemistry and Aeronomy Division, the Convective Storms Division, and the Monsoon Experiment are presented. Administrative support for the projects is discussed. A financial summary for the center is provided A list of publications for the calendar year 1979 is given. T.M

N82-11704# Air Force Geophysics Lab, Hanscom AFB, Mass.
REPORT ON RESEARCH AT AFGL Interim Report, Jul. 1976 - Dec. 1978
J. F. DEMPSEY, ed. Nov. 1980 224 p refs
(Contract AF PROJ. 9993)
(AD-A104513; AFGL-TR-80-0365, AFGL-SR-227) Avail: NTIS HC A10/MF A01 CSCL 14B

This report continues a series of eight reports on Research at the Air Force Geophysics Laboratory This report covers a two-and-one-half-year interval It was written primarily for Air Force and DOD managers of research and development and more particularly for officials in Headquarters Air Force Systems Command, for the Director of Laboratories (DL), and for the Commanders of and the Laboratories within DL. It is intended that the report will have interest to an even broader audience. Author (GRA)

01 RESEARCH AND INDUSTRIAL MANAGEMENT

N82-11978# National Training and Development Service for State and Local Government, Washington, D.C
APPLYING SCIENCE AND TECHNOLOGY TO IMPROVE LOCAL GOVERNMENT PRODUCTIVITY
K. JANKA, K. D. RAINEY, F. KNIGHT, and T. URBAN Dec. 1980 110 p refs Prepared in cooperation with International City Management Association
(Contract NSF ISP-77-19055)
(PB81-217986; NSF/RA-800488) Avail: NTIS HC A06/MF A01 CSCL 05A

Some insights are outlined for ways to improve productivity and decrease the cost of local government service by making more effective use of science and technology (S&T). Results of a survey of 205 cities indicated the high priority items to be: predict ramifications and weight consequences; work with other departments; train personnel; employee and labor relations; and human relations. Steps involved in the process include preparation, or understanding the problems of the organization; formulation, or clarifying the issues; designing solutions; making plans and taking action; and evaluating the changes resulting from the actions taken. Early involvement of workers in identifying problems and implementing solutions is stressed GRA

N82-12751*# BioTechnology, Inc., Falls Church, Va.
BIOMEDICAL RESEARCH
Washington NASA Nov. 1981 20 p
(Contract NASW-3469)
(NASA-CR-3487) Avail: NTIS HC A02/MF A01 CSCL 06B

Biomedical problems encountered by man in space which have been identified as a result of previous experience in simulated or actual spaceflight include cardiovascular deconditioning, motion sickness, bone loss, muscle atrophy, red cell alterations, fluid and electrolyte loss, radiation effects, radiation protection, behavior, and performance. The investigations and the findings in each of these areas were reviewed. A description of how biomedical research is organized within NASA, how it is funded, and how it is being reoriented to meet the needs of future manned space missions is also provided. T.M.

N82-12775# Institute for Perception RVO-TNO, Soesterberg (Netherlands).
CYBERNETICS AND CAR DRIVING: A MATHEMATICAL (COMPUTER) MODEL FOR THE SYSTEM TO BE CONTROLLED
G. J. BLAAUW 1980 27 p refs
(IZF-1980-4; TDCK-75004) Avail: NTIS HC A03/MF A01

A mathematical representation of the system controlled by a car driver is presented. This system is defined by combinations of lateral and longitudinal vehicle dynamics, course following, and the execution of an arbitrary additional task. A linearized model is developed and implemented in subroutines on a digital computer. The model based on control theory uses state vector notation. The description results in a six-dimensional state vector and involves three lead variables (course of the road, velocity of the lead car and the stimulus of the additional task) and one disturbance variable (side-wind gusts or road irregularities). The routines calculate future values for the course of the road and the velocity of the lead car in order to make anticipation possible by the driver. Driver's actions are modeled by the position of the accelerator, the brake force and the steering wheel angle. Several routines are extended with additional procedures to allow for an independent use in other applications. For example, the mathematical representation of the vehicle dynamics is extended with nonlinear equations to cover the complete range of variables and can be used in specific studies of the effects of vehicle parameters. Author (ESA)

N82-12787# Nederlands Inst. voor Praeventieve Gezondheidszorg TNO, Leiden.
HUMAN CONTROL AND REGULATION TASKS [MENSELIJKE STUUR-EN REGELTAKEN]
C L. EKKERS, A. A. F. BROUWERS, C. K. PASMOOIJ, and P. M. DEVLAMING Delft Netherlands Organization for Applied Scientific Research TNO Sep 1980 246 p refs In DUTCH
Avail: NTIS HC A11/MF A01

The effects of technological development, defined as automation, on the nature and quality of human work in industrial process control systems and computer systems were investigated. Twenty four man machine systems with different degrees of automation and complexity were compared for characteristics of technical, organizational and individual tasks. It is noted that sharing of tasks between man and machine is more unfavorable at higher levels of automation. The operator's abilities are only occasionally utilized and the opportunity to do meaningful work is limited. Teamwork is more positive, but it limits the individual operator's autonomy, even more in highly automated systems. In administrative computer systems, the routine nature of the work and its rigid procedures are considered negative. A clear correlation is found between these problems, job satisfaction and sickness rate. Author (ESA)

N82-12828# Centre Technique des Industries Mecaniques, Senlis (France).
TECHNOLOGY OF TOMORROW: COMPUTER ASSISTED DESIGN AND FABRICATION Final Report [VEILLE TECHNIQUE CFAO]
M. CHAUSSIER 28 Nov. 1980 45 p refs In FRENCH
(CETIM-1-4A-32-3) Avail: NTIS HC A03/MF A01

The potentials of computer assisted design and fabrication (CADF) are analyzed for mechanical applications in industry. Adaptation of CADF systems to the specific needs of industrial companies is seen as problematical. The linking of many systems through ever more sophisticated data bases is suggested in order to improve CADF efficiency. The impact of interactive man machine techniques and of automated decision making are taken into account. Interactive graphics, a successful application of CADF, is cited for its contribution to mechanical engineering. Increased development and diffusion of CADF technology is forecast.
Author (ESA)

N82-13011# Danish Research Center for Applied Electronics, Hoersholm.
PATENT LICENSING CONTRACTS IN THE ELECTRONIC INDUSTRY [PATENT-LICENSKONTRAKTER I ELEKTRONIKINDUSTRIEN]
O RING Dec. 1980 50 p refs In DANISH; ENGLISH summary
(ECR-104) Avail. NTIS HC A03/MF A01

Licensing conditions are discussed and a check list provided. Licensing agreement problems for the Danish electronic industry are exposed. An annotated bibliography is provided. Use of an expert is recommended for contract negotiations. Author (ESA)

N82-13123*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
GUIDELINES FOR LINE-ORIENTED FLIGHT TRAINING, VOLUME 2
J. K. LAUBER and H. C. FOUSHEE 1981 156 p refs Proceedings of conf. held at NASA Ames Research Center, Calif., 13-15 Jan. 1981
(NASA-CP-2184-VOL-2) Avail: NTIS HC A08/MF A01 CSCL 05I

Current approaches to line-oriented flight training used by six American airlines are described. This recurrent training methodology makes use of a full-crew and full-mission simulation to teach and assess resource management skills, but does not necessarily fulfill requirements for the training and manipulation of all skills.

N82-13133*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
GROUP 3: PERFORMANCE EVALUATION AND ASSESSMENT
A. FRINK *In its* Guidelines for Line-oriented Flight Training, Vol. 2 p 122-126 1981
Avail: NTIS HC A08/MF A01 CSCL 05I

Line-oriented flight training provides a unique learning experience and an opportunity to look at aspects of performance other types of training did not provide. Areas such as crew coordination, resource management, leadership, and so forth, can be readily evaluated in such a format. While individual performance is of the utmost importance, crew performance deserves equal emphasis, therefore, these areas should be carefully observed by the instructors as an rea for discussion in the same way that individual performane is observed. To be effective, it must be accepted by the crew members, and administered by the instructors as pure training-learning through experience. To keep open minds, to benefit most from the experience, both in the doing and in the follow-on discussion, it is essential that it be entered into with a feeling of freedom, openness, and enthusiam. Reserve or defensiveness because of concern for failure must be inhibit participation. A.R.H.

N82-14026* Jet Propulsion Lab, California Inst. of Tech., Pasadena.
THE INTERNATIONAL HALLEY WATCH: A PROGRAM OF COORDINATION, COOPERATION AND ADVOCACY
L. FRIEDMAN and R. L. NEWBURN *In its* Mod. Observational Tech. of Comets p 313-314 1 Oct. 1981
(Contract NAS7-100)
Avail: SOD HC $16.00 CSCL 03A

To prevent a repetition of the lack of reporting and dissemination of the data obtained during the 1910 observations of Comet Halley, a mechanism is proposed for coordinating the work of scientists and amateurs, including government, industrials, and academic personnel during the 1985-86 apparition of Comet Halley. Specialists from each discipline, in consultation with other experts in the field, would recommend specific objectives, standards, data format, and priorities for observations in that discipline. Following time for individual publication, scientists would be invited to contribute results to a multivolume compilation containing as complete as possible a record of the apparition. It is suggested that the discipline specialists be selected jointly by the IHW leader an by an international steering group with members from COSPAR, the IAU, etc, perhaps in response to some form of international announcement of opportunity. A.R.H.

N82-14638# Texas Technological Univ., Lubbock. Plasma and Switching Lab
PULSED POWER RESEARCH COLLOQUIUM Annual Report
M. KRISTIANSEN, A. H. GUENTHER (Kirtland AFB, Albuquerque, N.M.), J. UNGVARSKY (AFWL, Kirtland AFB, Albuquerque, N.M.), F. C. BROCKHURST (Air Force Inst. of Technology, Wright-Patterson, AFB, Ohio), R D FRANKLIN (AFWAL), A. K. HYDER (AFOSR), and R. L. GULLICKSON (Defense Nuclear Agency) 9 Jul. 1981 10 p refs
(Contract AF-AFOSR-3675-78; AF PROJ. 2301)
(AD-A105770, AFOSR-81-0686TR) Avail: NTIS HC A02/MF A01 CSCL 10B

A Pulsed Power Lecture Series is being conducted by Texas Tech University for the U.S Air Force Modular instructional material for use in this lecture series is being developed. Each module is a self consistent discussion of some aspect of pulsed power technology. The contents range from the very basic (e g. basic EM field theory) to advanced, modern topics, such as magnetic switching. The lectures are delivered every two weeks at the Air Force Institute of Technology and the Air Force Weapons Laboratory. The speakers then provide a written text of their lecture, which is edited and published in modular form by Texas Tech University. It is planned to reissue these modules in report or book form at a later date. A total of about 50 modules are planned. Some 30 lecturers have been presented, to date, and about 12 modules have been issued. Author (GRA)

N82-15992*# Rensselaer Polytechnic Inst., Troy, N. Y. Dept. of Language, Literature, and Communication
A CASE STUDY OF THE INFLUENCES OF AUDIENCE AND PURPOSE ON THE COMPOSING PROCESSES OF AN ENGINEER
B J. STALNAKER *In* NASA. Langley Research Center Tech. Commun., Pt. 2 p 401-411 Dec. 1981 refs
Avail: NTIS HC A14/MF A01 CSCL 05B

The design and preliminary findings of a study of composing processes (on the job) of engineers, managers, and scientists is presented. The influences of audience and purpose on the composing process of engineers was of concern, specifically, the cognitive processes, physical behaviors, and factors that influence the evoluton of a piece of writing. An overview of the study, related literature, outlines of research design, and preliminary findings from a case study of engineers are given. It is suggested that teaching be adapted to help students learn to represent rhetorical problems to guide composing for effective writing. M.D.K.

N82-16013# Applied Decision Analysis, Inc., Menlo Park, Calif
EVALUATING R AND D OPTIONS UNDER UNCERTAINTY. VOLUME 3: AN ELECTRIC-UTILITY GENERATION-EXPANSION PLANNING MODEL Final Report
A. B. BORISON, B. R. JUDD, P. A. MORRIS, and E. C. WALTERS Aug 1981 114 p refs Sponsored by Electric Power Research Inst.
(Contract EPRI PROJ. 1432-1)
(DE81-904237; EPRI-EA-1964-VOL-3) Avail: NTIS HC A06/MF A01

An electric utility generation expansion model developed for use in research and development (R and D) planning under uncertainty is described. The model provides a framework for examining broad utility and R and D planning issues, rather than the specific generation expansion decisions of individual utilities. Unlike existing approaches, the model focuses directly on the demand, technological, and regulatory uncertainties and the long term dynamics that affect the impact of R and D achievements The model's somewhat aggregate approach to electric utility decision making (to allow repeated application at low cost) can be modified, as needed, for more detailed utility planning. When fully implemented, the model can be applied to the analysis of issues such as technology adoption, reserve margin, unit size, reliability, storage and load management effects, lead time, and government regulation. DOE

N82-16304# Massachusetts Inst. of Tech., Cambridge. Lab. for Manufacturing and Productivity.
EXPLORATORY STUDY OF CONSTRAINTS ON DESIGN BY FUNCTIONAL REQUIREMENTS AND MANUFACTURING Annual Report, 1979 - 1980
N. P. SUH, A. C. BELL, D R. WILSON, and J R. RINDERLE Jan. 1981 146 p refs
(Contract NSF DAR-77-13296)
(PB82-101858; LMP/AXM-81-02; NSF/MEA-81008) Avail: NTIS HC A07/MF A01 CSCL 13H

Some of the concepts and terminology of the axiomatic approach to design and manufacturing are presented. The manner in which this approach fits into the overall design process is illustrated. Two axioms are derived: maintain the independence of functional requirements; and minimize the information content. Coupling in a design as it relates to the first axiom is discussed Some quantitative measures of coupling are presented with examples to illustrate the concepts of coupled and uncoupled designs. The issue of complexity in design and manufacturing is considered, including the relativity and consequences of a particular measure of complexity. Author

01 RESEARCH AND INDUSTRIAL MANAGEMENT

N82-17068*# Alabama Univ., Huntsville. Dept. of Education.
ASSESSMENT OF MSFC'S SUPERVISORY TRAINING PROGRAMS AND COURSES
T. A. BRINDLEY *In its* The 1981 NASA/ASEE Summer Fac. Fellowship Program 13 p Jan. 1982 refs
Avail: NTIS HC A25/MF A01 CSCL 05I

Courses and special programs to train supervisors at Marshall Space Flight Center (MSFC) were to determine the adequacy of the present MSFC Supervisory Training Program and to recommend changes, if appropriate. The content, procedures, and student evaluations of the required Office of Personnel Management (OPM) 80 hours training for supervisors, the optional 120 hours, the MSFC Management Development Program (MDP), NASA's Management Education Program (MEP), various OPM and special contract programs, pertinent procedural guidelines, regulations, and letters, as well as various MSFC computer reports which indicate who took what training were analyzed. Various interviews with MSFC personnel involved in training are included Recommendations consist of: (1) the choice of courses selected for the basic required OPM 80 hours be improved; (2) the optional 120 hours be discontinued and a shorter module be developed dealing with managerial decision making and human relations skills; (3) the MDP and MEP be continued as at present; and (4) that a broad array of developmental strategies be incorporated to provide a variety of opportunities for supervisory improvement. N.W.

N82-17397# American Farmers' Marketing Cooperative, Mayfield, Ky Ethanol Div.
FEASIBILITY STUDY FOR ALTERNATIVE FUELS PRODUCTION: BIOMASS TECHNOLOGY. VOLUME 2: ADDENDUM, ECONOMIC AND FINANCIAL ANALYSIS
15 Dec. 1980 198 p refs
(Contract DE-FG07-80RA-50333)
(DE82-000030; DOE/RA-50333/T1-VOL-2) Avail: NTIS HC A9/MF A01

The feasibility of constructing and operating a motor-fuel ethanol plant is investigated. Detailed results are presented. The results of site surveys and area surveys are presented. Site preparation plans are outlined. Energy and material balances and equipment requirements are established as a part of the overall procedure to validate costs. Process flow sheets are included. Detailed diagrams of the plant design are also included The management plan for the operation of the plant is discussed. DOE

N82-18872# Messerschmitt-Boelkow-Blohm G.m.b H., Ottobrunn (West Germany) Unternehmensbereich Flugzeuge.
FLIGHT ERGONOMICS IN THE AIRCRAFT INDUSTRY PERSONNEL-ERGONOMIC DEVELOPMENT [FLUGERGONOMIE IN DER LUFTFAHRTINDUSTRIE MIT BESONDERER BERUECKSICHTIGUNG PERSONAL-ERGONOMISCHER ENTWICKLUNGEN]
R. SEIFERT 4 Jun. 1981 23 p refs In GERMAN
(MBB-FE-301/S/PUB/44) Avail: NTIS HC A02/MF A01

Management systems applied to evaluate qualitative and quantitative personnel requirements for maintaining the man machine system (MMS) were determined. Qualitative personnel requirements are plant operation, attendance, maintenance/placement of the MMS needed, professional specialty, and job qualification. In quantitative personnel requirement the number of needed manpower is determined for every professional specialty and area. Personnel selection is recommended for activities, special abilities, performance, and skills. Personnel selection should be made according to these criteria. It is concluded that ergonomic measures are necessary in the development process of the MMS. Transl. by E.A.K.

N82-18873# Boeing Aerospace Co., Seattle, Wash Engineering Technology Div.
HUMAN ENGINEERING PROCEDURES GUIDE Final Report, 2 Apr. - 2 Dec. 1979
C. W. GEER Sep. 1981 245 p refs
(Contract F33615-79-C-0520)
(AD-A108643; D180-25471-1) Avail: NTIS HC A11/MF A01 CSCL 05E

Human engineering (HE) procedures during the system acquisition process are presented for the assistance of various Air Force and industry personnel. The guide is divided into three parts. The first part of the guide is introductory material which scopes the effort and defines HE and human factors engineering (HFE). The second part provides guidance to Air Force and industry management. The third, and last part is the largest section and it provides assistance to both Air Force and industry persons assigned direct responsibility for HE The management portion shows current management aspects of the HE process utilizing directives, specifications, regulations and pamphlets. HE activities are described in general terms of both what should be done and when it should be accomplished. GRA

N82-18874# National Academy of Sciences - National Research Council, Washington, D C. Committee on Human Factors.
ACTIVITIES OF THE COMMITTEE ON HUMAN FACTORS: OCTOBER 1, 1980 - SEPTEMBER 30, 1981 Annual Summary Report
R. T. HENNESSY 30 Nov. 1981 22 p
(Contract N00014-81-C-0017; NR PROJ. 196-167)
(AD-A108606) Avail: NTIS HC A02/MF A01 CSCL 05A

The Committee on Human Factors was established and held its first meeting in December 1980. The three principal accomplishments of the committee during the reporting period were: (a) identifying critical problems in human factors and formulating preliminary statements defining the nature of these problems and the basic research needed to alleviate these problems; (b) establishing membership and guidelines for a special working group on simulation, and (c) planning the conduct of a workshop on applied methodologies that will identify some methodologies suitable for presentation at a tutorial symposium and other methodologies deserving research support. GRA

N82-19079*# Hampton Inst., Va.
THE 1981 SUMMER RESEARCH FELLOWSHIP PROGRAM Final Report, 1 Jun. - 7 Aug. 1981
J H. SPENCER, comp. Oct. 1981 36 p refs
(Contract NAS1-16455)
(NASA-CR-165814) Avail: NTIS HC A03/MF A01 CSCL 05I

The NASA-Hampton Institute Summer Research Fellowship Program, offering capable scientists and engineers at traditionally black institutions an opportunity to participate in research activities in an environment at the Langley Research Center where basic research is of primary importance is considered. The Summer Research Fellowship Program, specifically designed to assist these faculty members in identifying areas of research which correlate positively with their individual interest and capabilities is discussed It is also designed to help them to initiate viable research which increases their technical knowledge about how research efforts at their institutions might be increased. Author

N82-19089# Oxford Univ. (England). Dept. of Engineering Science.
CORPORATE ORGANIZATIONAL DESIGN AND ITS EFFECT ON INNOVATION
K. ABEL 1981 77 p refs
(PB82-108903; OUEL-1356/81) Avail: NTIS HC A05/MF A01 CSCL 05A

The factors which appear to influence the success for failure of technology innovation in today's large corporation and highly regulated environment were examined. The following topics are discussed: (1) why new products fail; (2) ventures and venturing; (3) the entrepreneur; (4) the organizational structure of successful

innovation corporations; and (5) venture management and matrix concepts and their implementation. GRA

N82-19161# *Aeronautical Research Labs., Melbourne (Australia).*
AERONAUTICAL RESEARCH LABORATORIES STRUCTURES DIVISION Annual Report, 1979 - 1980
F. H. HOOKE, ed. Apr. 1981 46 p
(AD-A109049, ARL/STRUC-NOTE-473) Avail: NTIS HC A03/MF A01 CSCL 01C

This report describes the functions, organization, staffing, unclassified research activities and ad-hoc investigations in progress in the Structures Division, Aeronautical Research Laboratories during the year 1979/80. Author (GRA)

N82-19627*# Public Technology, Inc., Washington, D. C.
REMOTE SENSING PROCUREMENT PACKAGE: A MANAGEMENT REPORT FOR STATE AND LOCAL GOVERNMENTS
Jun. 1981 21 p ERTS
(Contract NAS13-129)
(E82-10052; NASA-CR-168633) Avail: NTIS HC A02/MF A01 CSCL 05B

An overview of the remote sensing procurement process is presented for chief executives, senior administrators, and other local and state officials responsible for purchasing remote sensing products, services, or equipment. Guidelines are provided for planning, organizing, staffing, and implementing such a procurement project. Other sections of the four-volume package are described and their benefits examined A.R.H.

N82-19844# *Research Inst. of National Defence, Karlstad (Sweden).*
WORK PARADIGMS IN HUMAN FACTORS RESEARCH
H. FURUSTIG *In its* Human Factors in System Develop. Experiences and Trends p 123-135 Jun 1981 refs
Avail: NTIS HC A08/MF A01

Reasons for studying the systems development process from a behavioral standpoint are put forward. The complexity of factors influencing systems development is examined. Indications of irrational systems development are listed. The work paradigm is defined in terms of hardware factors, personnel factors, and procedures. Means of studying systems development are outlined, i.e., participation in systems development, historical documentation, and simulation. The results of such studies can be of significant assistance in optimizing the efficiency of the development process. Author (ESA)

N82-20005*# Stanford Univ., Calif. Dept. of Engineering-Economic Systems.
AN INVESTIGATION OF THE LAG BETWEEN THE START OF RESEARCH AND THE DEVELOPMENT OF NEW TECHNOLOGY Final Report
S. E. GLASS Feb 1982 31 p refs
(Contract NASW-3204)
(NASA-CR-168583; REPT-40) Avail: NTIS HC A03/MF A01 CSCL 05A CSCL 05A

The lag which occurs between the start of NASA-sponsored research and the development of new technology is addressed. A possible common gestation period is examined. The lags vary from one to zero years. The observed lag as it relates to patent applications is shorter than the lag as it relates to invention disclosures. The sequential hypothesis testing showed that invention disclosures correlated better to the measures of research effort used then did patent applications. N.W.

N82-20010# Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany) Betriebsbereich
IMPROVING COMMUNICATION IN ORGANIZATION OPERATION: PREPARING COMMUNICATION RESOURCES IN A LARGE ENTERPRISE [VERBESSERN DER KOMMUNIKATION IN DER BETRIEBSORGANISATION - EINSATZ VON KOMMUNIKATIONSMITTELN IN EINEM GROSSUNTERNEHMEN]
W. BOCHNIG 1981 6 p refs Reprint from VDI-Berichte, no. 404, 1981 p 11-13 In GERMAN
(MBB-BB-499-81-O) Avail: NTIS HC A02/MF A01

The adaptation of a large organization to the increasing use of communication methods is discussed. It is shown that with the right use of modern means of communication considerable cost reduction and time saving can be accomplished. The profit an organization can make through acceleration of information, especially when communication is a condition for production success is enumerated. Transl. by E.A.K

N82-20871# Navy Personnel Research and Development Center, San Diego, Calif
COMPUTER-MANAGED INSTRUCTION IN NAVY TECHNICAL TRAINING: AN ATTITUDINAL SURVEY Final Report, Jun. 1980 - Mar. 1981
C. A. ROBINSON, E. A. TOMBLIN, and A. HOUSTON Dec. 1981 53 p refs
(AD-A109664; NPRDC-TR-82-19) Avail: NTIS HC A04/MF A01 CSCL 05I

Relatively little reliable data exist concerning the attitudes of students and instructors toward computer-managed instruction. This study attempted to determine attitudes of students and instructors and to identify factors related to these attitudes It was found that students were favorable toward CMI while instructors were generally not favorable. Also, the trainee's experiences with the Navy are related to attitudes toward the CMI system. The longer the trainee is in the service, the more negative the individual tends to be toward the system. Author (GRA)

N82-21086# Council for Scientific and Industrial Research, Pretoria (South Africa). Production Engineering Advisory Service.
MINI-SEMINAR ON VALUE ENGINEERING
Apr. 1981 61 p refs Presented in Pretoria, 1981; sponsored by the Value Engineering and Management Society of South Africa
(CSIR-TSD-0002/81; ISBN-0-7988-2078-0) Avail. NTIS HC A04/MF A01

Various aspects of value engineering are considered.

N82-21088# Value Engineering Ltd., Pretoria (South Africa).
ANALYSIS OF PROBLEMS AND IDENTIFICATION OF PRIORITIES
H K VANHEERDEN *In* CSIR Mini-Seminar on Value Eng. 10 p Apr. 1981
Avail. NTIS HC A04/MF A01

The implicit identification of functions is addressed. These functions are objectively analyzed to establish their relative descending order of importance, providing a different way of looking at what is under consideration and establishing a Pareto-type curve. Numerical evaluation is used N.W.

N82-21089# National Productivity Inst., Pretoria (South Africa). Human Resources Div
CREATING MORE EFFECTIVE ALTERNATIVES
T. TAYLOR *In* CSIR Mini-Seminar on Value Eng 7 p Apr 1981
Avail. NTIS HC A04/MF A01

Overcoming barriers to creative thinking is discussed. Barriers include pressures to conform, to be logical, appearance, security, authority, and fear of failure Procedures include forming a value team, withholding judgement, and imagination. A poem by S. W. Foss entitled 'The Calf Path' is included. N.W.

N82-21090# Kimex (Proprietary) Ltd., Pretoria (South Africa).
ORGANIZING TEAM THINKING
G. J SCHOLTZ *In* CSIR Mini-Seminar on Value Eng. 23 p Apr. 1981 refs
Avail: NTIS HC A04/MF A01

Organized group thinking is considered. The importance of communication is emphasized with a biblical quotation. N.W

N82-21091# Joy Mfg. Co (Proprietary) Ltd., Pretoria (South Africa). Value Engineering Dept.
BENEFITS ACHIEVED THROUGH THE APPLICATION OF VALUE ANALYSIS
R. A. STRINGER *In* CSIR Mini-Seminar on Value Eng. 7 p Apr. 1981 refs
Avail: NTIS HC A04/MF A01

Four phases, under which value analysis operates, are considered. These are the information phase, the function phase, the creation phase, and the implementation phase. N.W.

N82-21093# Texas Univ., Arlington.
RAPID RESPONSE ALGORITHMS FOR OPTIMIZING THE UTILIZATION OF HUMAN RESOURCES IN FLIGHT CREWS: SCHEDULING AIRCREWS TO AIRCRAFT
R. ARMSTRONG, A. CHARLES, M. KRESS, and S. SAMN Jul. 1981 16 p refs Sponsored in part by Texas A&M Univ.
(AD-A109149; CCS-400) Avail: NTIS HC A02/MF A01 CSCL 05A

Consider an airlift operation which consists of several routes, each having missions which are subject to given time schedules. The aircraft are manned with aircrews that are required to rest for a certain period of time after each leg of a mission. A mission may be continued whenever a rested aircrew is available at the location Given the number of missions that are needed to be flown on the different routes, and given the schedule timetable that is associated with those missions, we consider the problems: (1) What is the minimum number of crews that are needed to maintain the operation? (2) How many aircrews are needed to be staged at each location? (3) If the number of available aircrews is less than the minimum needed, which legs of what missions may be delayed so that the minimum required number of aircrews is reduced? We will exclude from the analysis the trivial case where the rest period of the aircrews is always less than the period of time for which the aircrafts are delayed. If this is the case, then it is clear that the minimum number of aircrews is equal to the number of missions and all the aircrews must be staged initially at the home base GRA

N82-21430# North Central Consultants Ltd., Jamestown, N. Dak.
FEASIBILITY STUDY FOR ALTERNATE FUEL PRODUCTION FROM BIOMASS RESOURCES
Jun. 1981 260 p Prepared in cooperation with Katzen (Raphael) and Associates and Touche, Ross and Co; prepared for Dawn Enterprises, Inc.
(Contract DE-FG07-80RA-50361)
(DE82-002616, DOE/RA-50361/T1) Avail. NTIS HC A12/MF A01

A 50 mm anhydrous alcohol plant is described. The plant uses barley grown in the region as the raw material to produce a motor fuel grade alcohol through a fermentation and distillation process North Dakota lignite coal is used as the primary energy sources to produce alcohol from the barley The site is located on an active branch of the Burlington Northern Railroad, providing efficient and economical access to North Dakota's vast lignite coal fields in western North Dakota and to the established grain and grain by-product markets of Duluth and Minneapolis. The site is also adjacent to paved secondary highways, providing access to state and interstate highway systems. The plant site is adjacent to the City of Walhalla and will be annexed to the city limits and served by community facilities. Electrical energy to operate plant equipment is partially produced by co-generation within the plant but the total electrical energy cannot be produced internally. A technical review of the plant is provided. The process, plant layout, and major equipment procurement and costs are described. A complete economic analysis is provided using the data derived from the technical evaluation and cost estimates. Siting and the environmental and socio-economic considerations are covered. A review of the proposed management and personnel structure is included. DOE

N82-22085# Raven Systems and Research, Inc., Atlanta, Ga.
MICRORESOURCE ESTIMATION RESEARCH PROJECT, PHASE 4 Final Report
Dec. 1981 14 p
(Contract DAAK70-78-D-0052)
(AD-A110248) Avail: NTIS HC A02/MF A01 CSCL 05A

Microestimation is a technique by which system analysts predict the manpower requirements needed to make changes to computer programs During the past three years, Raven Systems and Research has conducted several studies related to microestimation, and it has recently developed a prototype Automated Microestimation Systen (AMS) This report is provided to accompany the delivery of the AMS. It is both a description of the new system and a summary of research to date. This report consists of four parts: (1) The history of the microestimation study, including significant conclusions; (2) AMS development and overall design and operation, (3) Questions related to interfacing AMS with several other systems either currently in existence or under development, and (4) Several general problems related to microestimation, brought to light as a result of the entire microestimation study Part 4 also makes recommendations for further development and research related to the AMS and microestimating in general GRA

N82-22086# Naval Postgraduate School, Monterey, Calif
PROPOSED SYSTEM FOR THE USE OF EVALUATION FACTORS IN THE SOURCE ELECTION OF SERVICE CONTRACTORS M.S. Thesis
R D. PINGEL Sep 1981 114 p refs
(AD-A109686) Avail: NTIS HC A06/MF A01 CSCL 05A

Technical personnel are increasingly being required to perform vital functions as proposal evaluators in the source selection process for which they have not properly been trained. This research effort provides a comprehensive system for source selection using price and other factors in a form aimed at the technical professionals that support field acquisition activities. All examples selected are from the general acquisition area of service contracting The system consists of the basic considerations necessary for preparation of a procurement request, the basic elements of a source selection plan, selection of a technical evaluation panel, selection of evaluation factors for service contractors, preparation of negotiation objectives, the actual conduct of evaluations and negotiations, and debriefing of unsuccessful offerors. Author (GRA)

N82-22087# Carnegie-Mellon Univ., Pittsburgh, Pa. Management Sciences Research Group.
A NETWORK APPROACH TO CONSORT PERSONNEL PLANNING USING CROSS SECTIONAL DATA
R. S. MOHAN, C GAIMON (Ohio State Univ.), and G. L. THOMPSON Oct. 1981 17 p refs
(Contract N00014-80-C-0151)
(AD-A110808, MSRR-478) Avail. NTIS HC A02/MF A01 CSCL 05I

The control theory cohort approach of Gaimon and Thompson is formulated as a network model. The basic notation is defined. With reference to a network diagram, the objective function and the constants of the basic model are introduced. An example of the formulation is presented. N.W.

N82-22089# Messerschmitt-Boelkow-Blohm G.m b H., Ottobrunn (West Germany). Unternehmensbereich Raumfahrt.
PLANNING AND MANAGEMENT OF RESEARCH AND DEVELOPMENT PROJECTS: PROBLEMS AND MEASURES TAKEN [PLANUNG UND UEBERWACHUNG VON F UND E - PROJEKTEN: PROBLEME UNE MASSNAHMEN]
B. MADAUSS 1 Oct. 1981 36 p In GERMAN
(MBB-UR-570-81-OE) Avail: NTIS HC A03/MF A01

Detailed planning of production management systems are reviewed. The organization of integrated, aerospace project status control procedures is considered as an example. Conceptual, project phases are identified, like system proposal, specification, and preliminary design followed by critical design, first article configuration inspection, and system production review At each phase, problems are reduced to technology, deadlines, or costs. Management analysis methods are compared: (1) rough order of magnitude, (2) cost estimate parametric relationship, and (3) a detailed planning method or computation from work unit leveling The cost effectiveness of the methods is assessed

Author (ESA)

N82-22097# National Bureau of Standards, Washington, D.C. Inst. for Computer Sciences and Technology.
PROCEEDINGS OF THE COMPUTER PERFORMANCE EVALUATION USER'S GROUP (CPEUG) MEETING (17TH): INCREASING ORGANIZATIONAL PRODUCTIVITY Final Report
T W. POTTER, ed. Nov. 1981 343 p refs Conf. held in San Antonio, 16-19 Nov. 1981
(PB82-129438; NBS-SP-500-83, LC-81-600155) Avail NTIS HC A15/MF A01 CSCL 05B

The proceedings reflects the critical role of information services in the productivity, and survival of today's organization, as well as such trends as increasing personnel costs, limited budgets, and the convergence of data processing, communications, and word processing technologies The program was divided into three parallel sessions and included technical papers on previously unpublished works, case studies, tutorials and panels GRA

N82-22101# Michigan Univ., Ann Arbor. Mental Health Research Inst.
LINKS OF INTEREST AND EXPERTISE AMONG SCIENTISTS Final Report, 1 Oct. 1978 - 30 Sep. 1980
M. KOCHEN, A BLAIVAS, R. CRICKMAN, and D D PRICE 4 Feb. 1981 44 p refs
(Contract NSF IST-78-16629)
(PB82-130360) Avail NTIS HC A03/MF A01 CSCL 05B

The main aims of the project on links of interest and expertise among scientists were to: (1) describe the network used by scientists in choosing peers; (2) study the way scientific clusters, define themselves, (3) recommend improved ways to describe interest and expertise and to use the network. A pair of nonlinear differential equations were used to model the growth of two interacting specialties, econometrics and artificial intelligence to analyze the effect of information on planning expert selection, scholarly communication, and the interaction of libraries and publishers. GRA

N82-22103# Forecasting International Ltd , Arlington, Va.
THE POTENTIAL INFLUENCE OF SOCIAL, ECONOMIC, REGULATORY AND TECHNOLOGICAL FACTORS ON SCIENTIFIC AND TECHNICAL COMMUNICATION THROUGH 2000 A.D. VOLUME 2: THE PROCESS Final Report
A. CLAYTON 1 Sep. 1981 46 p refs 2 Vol
(Contract NSF IST-78-12102)
(PB82-129925) Avail: NTIS HC A03/MF A01 CSCL 05B

This volume contains a detailed account of the project history, which addresses both the substantial progress and the problems encountered. GRA

N82-22140# Aerospace Medical Div., Brooks AFB, Tex.
AIR FORCE TECHNICAL OBJECTIVE DOCUMENT, AEROSPACE MEDICAL DIVISION FISCAL YEAR, 1983 Final Report
M. A. SANDERS and T. D. N. DOUTHIT 1982 46 p
(AD-A109460; AMD-TR-81-1) Avail: NTIS HC A03/MF A01 CSCL 06B

This TOD describes the planning methodology used within AMD laboratories' seven technology areas to achieve our technical goals Specifically, efforts are directed in the biotechnology program to man's adaptability, survivability, and performance capabilities within his operational environment. This research and development of AMD's functions is accomplished as disciplinary work by teams of biomedical scientists, engineers and physical scientists within the Air Force laboratories and the industrial and academic research and development communities. GRA

N82-22793# National Materials Advisory Board, Washington, D. C. Commission on Sociotechnical Systems.
AN ASSESSMENT OF THE INDUSTRIAL ENERGY CONSERVATION PROGRAM. VOLUME 1: SUMMARY Final Report, Nov. 1980 - Jul. 1981
Sep. 1981 50 p refs
(Contract DE-AC01-80CS-40298)
(PB82-122755; NMAB-395-1) Avail: NTIS HC A03/MF A01 CSCL 10A

Findings and recommendations of the industrial energy conservation program are summarized. Industrial operations in the U S consume some 37% of the country's total energy. This percentage will increase to 50% by 1980 unless appropriate conservation measures are applied. Conservation measures are difficult to implement. It is concluded that improvements for conservation are needed in the areas of: project selection, project management, and transfer of results to industry. GRA

N82-22882# Rolls-Royce Ltd., Derby (England)
ANALYSIS OF SICKNESS RATES
D. SCHITTEK 1981 23 p refs Transl into ENGLISH from Fortschrittliche Betriebsfuhrung u. Ind. Eng. (West Germany), v 29, no. 5, 1980 p 247-252 In ENGLISH and GERMAN
(PNR-90097, TRANS-15573/TLT-00819) Avail: NTIS HC A02/MF A01

The unexpectedly high absenteeism in West Germany during an economic recession is discussed. The literature indicates Work content, worker expectations, management methods, performance assessment techniques, and degree of personal responsibility affect psychosomatic illness rates. Psychological factors are suggested as the cause of increases in somatic illness, since physiological stresses show a downward trend. Sociological influences are also important, lower tolerance of frustration and growing sensitivity to working conditions increase the probability that illness will occur as an abreaction of the unconscious arousal complexes to which dissatisfaction can give rise. Managers who place the responsibility for industrial relations on medical and social welfare experts are criticized. Managers should ensure that tasks challenge individuals' knowledge, skill, and experience, and that workers are divided into groups whose members work well together. Author (ESA)

N82-23046# European Space Research and Technology Center, Noordwijk (Netherlands). Power and Control Systems Div.
EUROPEAN SPACE TRIBOLOGY LABORATORY MANAGEMENT PROCEDURES HANDBOOK
Nov. 1981 29 p
(ESA-PSS-06-3; ISSN-0379-4059) Avail. NTIS HC A03/MF A01

Management structures by which the laboratory is operated are presented. The constitution and responsibilities of the management bodies are defined. The responsibilities of key individuals are listed Procedures used in implementing the management policies decided on by ESA are outlined. These procedures are mandatory, and alterations, additions or amendments to them are made only with the agreement of the Technical Director. Quality control, costing and scheduling are included. Author (ESA)

N82-24014*# International Business Machines Corp., Manassas, Va Federal Systems Div
SOFTWARE METRICS: THE QUANTITATIVE IMPACT OF FOUR FACTORS ON WORK RATES EXPERIENCED DURING SOFTWARE DEVELOPMENT
J. E. GAFFNEY, JR. and R. W. JUDGE *In* NASA. Goddard Space Flight Center Proc. of the Sixth Ann. Software Eng Workshop 15 p 1981 refs
Avail: NTIS HC A13/MF A01 CSCL 09B

A model of a software development process is described. The software development process is seen to consist of a sequence of activities, such as 'program design' and 'module development' (or coding). A manpower estimate is made by multiplying code size by the rates (man months per thousand lines of code) for each of the activities relevant to the particular case of interest and summing up the results. The effect of four objectively determinable factors (organization, software product type, computer type, and code type) on productivity values for each of nine principal software development activities was assessed. Four factors were identified which account for 39% of the observed productivity variation Author

N82-24128*# National Aeronautics and Space Administration, Washington, D C
RESEARCH AND TECHNOLOGY OBJECTIVES AND PLANS, SUMMARY FISCAL YEAR 1982, RESEARCH AND TECHNOLOGY PROGRAM
1982 179 p
(NASA-TM-84415; NAS 1.15:84415) Avail. NTIS HC A09/MF A01 CSCL 05A

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

N82-24202*# Garrett Turbine Engine Co., Phoenix, Ariz.
STUDY OF ADVANCED PROPULSION SYSTEMS FOR SMALL TRANSPORT AIRCRAFT TECHNOLOGY (STAT) PROGRAM Final Report
C. F. BAERST, R W HELDENBRAND, and J. H ROWSE Mar 1981 119 p refs
(Contract NAS3-21997)
(NASA-CR-165610, NAS 1.26:165610, GARRETT-21-3911)
Avail: NTIS HC A06/MF A01 CSCL 21E

Definitions of takeoff gross weight, performance, and direct operating cost for both a 30 and 50 passenger airplane were established. The results indicate that a potential direct operating cost benefit, resulting from advanced technologies, of approximately 20 percent would be achieved for the 1990 engines Of the numerous design features that were evaluated, only maintenance-related items contributed to a significant decrease in direct operating cost. Recommendations are made to continue research and technology programs for advanced component and engine develoment. T.M.

N82-24379# Centre National d'Etudes Spatiales, Toulouse (France).
SPACE COMPONENTS COORDINATION: RESULTS AND OUTLOOK
H. ARCISZEWSKI *In* ESA 2nd ESA Prod. Assurance Symp. p 121-131 Jan. 1982
Avail: NTIS HC A11/MF A01; ESA, Paris FF 140 Member States, AU, CN and NO (+20% others)

The activities of the ESA space components coordination group (SCCG) are outlined, i.e, development and maintenance of the ESA/SCCG specification system for standard components and advanced technologies; qualification and maintenance of qualification of components manufactured in Europe to promote the usage thereof for ESA and national space projects, and incorporation of SCCG space component requirements in the Cenelec electronic components committee. Over 100 qualified sources covering 400 different types of component are available. European manufacturers supply 70% to 80% of components. Author (ESA)

N82-24389# European Space Research and Technology Center, Noordwijk (Netherlands)
COMPONENT PROCUREMENT FOR ESA PROJECTS
U. ERNSBERGER *In* ESA 2nd ESA Prod. Assurance Symp. p 225-229 Jan. 1982
Avail: NTIS HC A11/MF A01; ESA, Paris FF 140 Member States, AU, CN and NO (+20% others)

Factors which delay component delivery are reviewed. Centralized procurement is advocated because it uses manpower optimally, avoids duplicating effort, reduces cost, and reduces lead times by simplifying procedure. The prime contractor should appoint a parts program manager, responsible to project management. If he coordinates and directs activities, including interfaces, necessary for program execution, product assurance personnel can concentrate on quality and reliability control. A consortium-wide procurement organization would prevent loss of know how caused by disbanding program teams. Time schedule problems can be reduced if major procurement starts in the design development phase, adequate funding is provided in time, and a close monitoring and control system is applied. Author (ESA)

N82-25024# Air Force Inst of Tech., Wright-Patterson AFB, Ohio School of Systems and Logistics.
PRODUCTIVITY MEASUREMENT IN RESEARCH AND DEVELOPMENT LABORATORIES M.S. Thesis
T. A. FAUTH Sep. 1981 164 p refs
(AD-A111311; AFIT/LSSR-87-81) Avail: NTIS HC A08/MF A01 CSCL 05A

This investigation consisted of a theoretical and empirical literature search and an extensive telephone interview process to identify the state-of-the-art R&D productivity indicators. The literature search (of publications from 1960 to the present) resulted in a chronological presentation of theoretical and empirical R&D productivity measurement methodologies and an expanded bibliography. The telephone interview process surveyed 14 Air Force, 30 Army, 20 Navy, and 21 industry laboratories. Specific literature and interview objective and subjective R&D productivity measurement indicators were identified and compared. Both objective and subjective productivity indicators were identified as the primary means of measuring laboratory productivity in the literature (empirical combined government and industry - 59%, theoretical combined government and industry - 46%) and from the interviews (government - 92%, industry - 62%). Status versus milestones, the degree technical objectives are reached, expenditures versus budget, and periodic reviews were the most common (of a standardized list of 18) indicators to both government and industry laboratories. Effectiveness is perceived as a more important component of productivity than efficiency. GRA

N82-25039# European Space Agency, Paris (France). Space Science Dept.
REPORT ON THE ACTIVITIES OF SPACE SCIENCE DEPARTMENT IN 1980-1981 Annual Report, 1980-1981
D. E. PAGE, comp., B. FITTON, comp., A. PEDERSEN, comp., B. G. TAYLOR, comp., K. P. WENZEL, comp , T. D. GUYENNE, ed., E. SWALLOW, ed , and G. LEVY, ed. Feb. 1982 82 p refs Original contains color illustrations
(ESA-SP-1042; ISSN-039-6566) Avail: NTIS HC A05/MF A01; ESA, Paris FF 60

Cosmic rays, plasma physics, astronomy and high energy astrophysics were studied. Solar and interplanetary proton propagation and acceleration are considered. An experiment for measuring charge spectra of ultraheavy, cosmic ray nuclei is described. Electric field data from ISEE 1 and GEOS 2 were analyzed. Atomic and ionic IR fine structure lines emitted by gaseous nebulae were also studied. The southern galactic plane in the CO(2-1) transition at 1 3 mm wavelength was surveyed. Data from the COS B spark chamber gamma-ray astronomy telescope were analyzed. Author (ESA)

N82-25676*# Colorado State Univ., Fort Collins
A PROPOSAL FOR OBSERVATIONS OF UPPER AND MIDDLE TROPOSPHERIC CLOUDS Final Report
In its Initial Studies of Middle and Upper Tropospheric Stratiform Clouds 56 p 18 May 1982 refs
Avail NTIS HC A21/MF A01 CSCL 04A

A proposal for a multi-institutional investigation of the processes involved in the growth and maintenance of high level extended clouds is presented. Mapping of variability of the cloud and of its radiative characteristics in terms of the meteorological environment of the cloud; performance of case studies involving observation of the cloud microphysics and radiation characteristics; and investigation of the processes responsible for the generation, maintenance, and dissipation of the cloud system are recommended. Both modeling and monitoring activities are considered The specific research projects which the author proposes to carry out are described. Suggestions for the administrative organization of the total effort are presented J.D.

N82-25800# Council for Scientific and Industrial Research, Pretoria (South Africa).
COMPUTER-AIDED PRODUCTION
G. DOUMEINGTS 1981 60 p Transl. into ENGLISH from Bull. de Liaison de la Rech en Informatique et Autom (South Africa), no. 64, Oct. 1980
(CSIR-TRANS-1611) Avail. NTIS HC A04/MF A01

Computer-aided production is defined and the importance of using data processing is discussed in relation to actual production processes. After describing the different stages of the process of attainment of an objective and showing how data processing can be used, the main factors explaining the present interest in this area are presented. S.L.

N82-25829# Defense Mapping Agency, Washington, D.C.
LESSONS LEARNED ON THE ROAD TO A MODERN PROGRAMMING ENVIRONMENT Final Report
A. J. KRYGIEL 6 Jan. 1982 18 p refs
(AD-A111102) Avail: NTIS HC A02/MF A01 CSCL 09B

The problems of coping with increasing levels of automation in a large organization are formidable ones. Not the least of these is the organization's investment in the computer software needed to deliver its products. The environment in which the software is developed must be supportive, allowing rapid generation of error-free and maintainable computer code which meets user requirements. Defining the components which constitute this environment -- called a Modern Programming Environment (MPE) -- is merely a first step. Constructing the environment and then ensuring the proper interaction of personnel with it must also be accomplished. This paper discusses some of the steps that have already been taken by the Defense Mapping Agency to proceed to an MPE and the lessons learned along the way.
Author (GRA)

N82-26512# Brookhaven National Lab., Upton, N Y.
FUTURE RAW MATERIALS AND ENERGY USE IN INDUSTRY: A RESEARCH AGENDA
T. E. OHARE and F. J. SALZANO Jun. 1981 224 p Workshop Held at Reston, Va., 9-10 Nov. 1978
(Contract DE-AC02-76CH-00016)
(DE82-005975, BNL-51382) Avail: NTIS HC A10/MF A01

Research programs that might lead to a major reduction in the usage of energy and industrial raw materials in 21st century technology were discussed The working panels considered agricultural technology; chemicals and polymers; construction; forest products, pulp and paper; glass, cement, and ceramics; information processing and machine intelligence; iron and steel processing; manufacturing; nonferrous metals processing, raw materials, exploration and extraction; technological education and engineering practices; and textiles. Research profiles and selected research projects and programs for the industries considered are included. DOE

N82-26983# Air Force Human Resources Lab., Brooks AFB, Tex. Manpower and Personnel Div.
APTITUDE REQUIREMENTS BASED ON TASK DIFFICULTY: METHODOLOGY FOR EVALUATION Interim Report, 1975 - 1980
L. D. BURTCH, M. S. LIPSCOMB, and D. J. WISSMAN Jan. 1982 38 p refs
(Contract AF PROJ 7719)
(AD-A110568, AFHRL-TR-81-34) Avail: NTIS HC A03/MF A01 CSCL 05I

The development and application of a technology designed for the evaluation of the difficulty of Air Force jobs in conjunction with the aptitude level required for the job is described. The technology developed makes use of computed variables and task factor data collected by the Air Force Occupational Measurement Center as well as benchmark difficulty data collected by contract personnel experts for the specialties under study The application of this technology provides a unique method of determining and comparing the learning difficulty of Air Force tasks and jobs, both within and across career specialties. Analyses have indicated high interrater reliabilities for both supervisory and benchmark ratings. A two-variable multiple regression equation was developed for each of the specialties studied. Relatively high correlations were obtained between the two ratings indicating that independent raters tend to agree with supervisors. These questions resulted in estimates of average task difficulty per unit time (ATDPUT) values for each job in each specialty. The value of these estimates and implications for their use are discussed. Author (GRA)

N82-27183# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio School of Systems and Logistics.
A REVIEW OF THE USEFULNESS OF R AND D MANAGEMENT TECHNIQUES M.S. Thesis
R J. MCCLARY Sep. 1981 93 p refs
(AD-A110968; AFIT-LSSR-73-81) Avail: NTIS HC A05/MF A01 CSCL 05A

R&D activities are commonly considered quite different from activities of general management (e.g production management and administrative management) and thus require different and unique management approaches and techniques. Several management techniques have evolved which seem to be specially suited to R&D planning and controlling. Six techniques chosen for this study are participative management techniques, schedule charts, work breakdown structures, activity networks, generalized networks, and cost/schedule variance analysis. This study reviews each of these techniques and reports on empirical data gathered by interview from R&D managers at a large government R&D organization The data reported includes usage and ratings of effectiveness in R&D planning and controling. GRA

N82-28019# Naval Postgraduate School, Monterey, Calif.
ADPE ACQUISITION: THE ACQUISITION OF THE NAVAL POSTGRADUATE SCHOOL COMPUTER: A CASE STUDY M.S. Thesis
J E. BOYLE Sep. 1981 48 p refs
(AD-A107478) Avail. NTIS HC A03/MF A01 CSCL 05C

The federal computer acquisition process is examined by studying one particular major computer system acquisition. The manner in which the principals involved conducted the acquisition in relation to the political and regulatory environment is examined and displayed in a case study format. Although the situational facts involve a computer acquisition for the Naval Postgraduate School, broad issues are developed which apply universally to public and private sector computer systems acquisition. The case exposes the reader to the issues of specification development, conversion costs, benchmark testing, and the role of competition in computer acquisition. Attention is focused on the environment in which a computer system need is developed and how that need is 'marketed' through the review and support process of a large organizational buying system. GRA

N82-28206# Council for Scientific and Industrial Research, Pretoria (South Africa). Production Engineering Advisory Service.
MINI-SEMINAR ON APPROACHES TO PRODUCTIVITY IMPROVEMENT
Aug. 1981 70 p refs
(ISBN-0-7988-2082-9) Avail: NTIS HC A04/MF A01

Management of administrative productivity is addressed. Improving productivity through routing and scheduling is discussed. Storage of merchandise is considered. Rationalization is considered. Management motivation is also considered. N W.

N82-28208# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Systems and Logistics.
DETERMINATION OF CONTRACT SUITABILITY TO THE AWARD FEE CONCEPT M.S. Thesis
H. R. MCLELLAND and D. D. ODOR Jun 1981 50 p refs
(AD-A107465; AFIT-LSSR-27-81) Avail: NTIS HC A03/MF A01 CSCL 15E

The concept of the Award Fee contract has existed within the federal government since the 1950s. The Navy and the National Aeronautical and Space Administration used Award Fee contracts on a limited basis in the early 1960s. The Air Force still considered their use experimental as late as 1978 In FY 79 Award fee accounted for 2.9 percent of all contracts over $10,000, and totaled over $1.5 billion. An estimate of the government's administrative costs for a moderate-sized Award Fee program was $115,000 annually. The burden of the administrative costs is considered to be justified when the government realizes greater benefits as a result of the Award Fee provision. There is a general lack of definitive guidance for evaluating the suitability of any contract to the Award Fee concept. With no formalized guidelines for the selection of a contract, there is no objective way to judge the possible, or probable, cost to benefit ratio of a given contract GRA

N82-28218# Societe Nationale Industrielle Aerospatiale, Les Mureaux (France). Div. Systemes Balistiques et Spatiaux.
TEXT PROCESSING IN THE WRITING OF CONTRACTS [LE TRAITEMENT DE TEXTE AU SERVICE DE LA REDACTION DES CONTRATS]
J. BERNARD and J. C. MULLER 1981 9 p In FRENCH
Presented at Conf BUROTICA 81, Paris, 16 Jun. 1981
(SNIAS-821-422-105) Avail: NTIS HC A02/MF A01

Compilation problems encountered while drawing up contracts are discussed. Cut and paste methods were reviewed and tasks where EDP can be timesaving are identified. A text processing system is proposed. The system was implemented for a trial period of 15 months. Results are positive operationally, financially, and from a human factors point of view. Author (ESA)

N82-28239# Air Force Systems Command, Washington, D.C.
AIR FORCE SYSTEMS COMMAND RESEARCH PLANNING GUIDE, RESEARCH OBJECTIVES
1 Feb. 1982 211 p Supersedes AFSC-TR-80-01
(AD-A112242; AFSC-TR-82-01; AFSC-TR-80-01) Avail. NTIS HC A10/MF A01 CSCL 15C

The purpose of the Planning Guide is to direct the attention of the scientific community to the technology interests of the Air Force, to provide a prospectus of research objectives to which the scientific community can respond, and to document the relevancy of fundamental research to the Air Force mission The research objectives described represent the combined counsel of technical directors and program managers at the 14 Air Force research and development organizations. These objectives enunciate scientific opportunities which, when exploited, will provide fundamental knowledge required to develop future Air Force systems, prevent technological surprises, and provide alternatives in solving technological problems which mitigate the quantitative superiority of Air Force systems. The objectives are grouped into seven technical areas: life sciencies, materials, geophysics, aerospace vehicles, propulsion and power, weaponry, and electronics. These areas relate directly to Air Force mission areas and involve such scientific disciplines as physics, chemistry, biology, psychology, mathematics, and engineering. GRA

N82-28673# Shock and Vibration Information Center (Defense), Washington, D. C.
THE SHOCK AND VIBRATION DIGEST, VOLUME 14, NO. 4 Monthly Report
J. NAGLE-ESHLEMAN, ed. Apr. 1982 107 p refs
(AD-A114448) Avail: SVIC, Code 5804, Naval Research Lab., Washington, D.C. 20375; $20.00/set CSCL 20K

Qualification testing, structural frequency response data and hygrothermoviscoelasticity of composites are discussed.

N82-28674# Southwest Research Inst., San Antonio, Tex.
THE CHANGING DIMENSIONS OF QUALIFICATION TESTING
H. N. ABRAMSON *In* Shock and Vibration Information Center The Shock and Vibration Digest, Vol. 14, No 4 p 3-19 Apr. 1982 refs Presented at the 52nd Shock and Vibration Symp., New Orleans, 28 Oct. 1981
Avail: SVIC, Code 5804, Naval Research Lab., Washington, D C 20375; $20.00/set CSCL 20K

The changing dimensions of qualification testing are demonstrated. In the one case the objective is mission integrity It is achieved principally through generic testing; that is, the environment is a stable one. In the other case, the objective is operational reliability. It is achieved mostly through custom testing, that is, the environment is an unstable one. Author

N82-29028*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
ORBIT DETERMINATION SOFTWARE DEVELOPMENT FOR MICROPROCESSOR BASED SYSTEMS: EVALUATION AND RECOMMENDATIONS
C. M. SHENITZ (Computer Sciences Corp.), F. E MCGARRY, and K. K. TASAKI Jul. 1980 95 p refs
(NASA-TM-84794; STL-80-001, NAS 1.15:84794) Avail: NTIS HC A05/MF A01 CSCL 09B

A guide is presented for National Aeronautics and Space Administration management personnel who stand to benefit from the lessons learned in developing microprocessor-based flight dynamics software systems. The essential functional characteristics of microprocessors are presented. The relevant areas of system support software are examined, as are the distinguishing characteristics of flight dynamics software. Design examples are provided to illustrate the major points presented, and actual development experience obtained in this area is provided as evidence to support the conclusions reached. Author

N82-29097# Navy Personnel Research and Development Center, San Diego, Calif.
EMPIRICAL COMPARISON OF BINARY AND CONTINUOUS PROXIMITY MEASURES FOR CLUSTERING OCCUPATIONAL TASK DATA Final Report, 1 Oct. 1980 - 1 Aug. 1981
J J. PASS and R. E. CHATFIELD Mar. 1982 24 p refs
(Contract ZF00001042)
(AD-A112930; NPRDC-TR-82-36) Avail: NTIS HC A02/MF A01 CSCL 05I

Thirteen binary and three continuous proximity measures were used to cluster-analyze job incumbent profiles of task inventory data. The results were compared: (1) to recommend a binary measure for programming into CODAP System 80, a software package used extensively by the military and many other organizations, and (2) to determine to what extent binary measures can produce cluster solutions similar to solutions based on continuous measures. Sixteen 250-by-250 proximity matrices were derived from each of three Navy occupational samples, and the clustering procedure in CODAP was applied to selected matrices. Proximity matrix and cluster solution comparison revealed that: (1) there was high variability among binary measures, (2) the Jaccard and Dice measures were the most powerful binary measures, and (3) there was high similarity between the Jaccard and distance measures. The implications of the findings are discussed with reference to the proportion of zero scores in task inventory data.

The Jaccard measure is recommended for clustering binary data for tasks and for programming into CODAP System 80.
Author (GRA)

N82-29222# Booz-Allen and Hamilton, Inc., Bethesda, Md.
CASE STUDIES OF INNOVATION IN R AND D PLANNING Final Report
C. L. RUST and J. J. MCCAMBRIDGE Dec. 1981 111 p refs Sponsored by Electric Power Research Inst
(Contract EPRI PROJ. 1432-2)
(DE82-901277; EPRI-EA-2154) Avail: NTIS HC A06/MF A01

Four organizations were selected as case studies to illustrate innovative approaches to R and D planning. The highlights of their planning systems are described. Comparisons of the four R and D planning systems revealed strong similarities, despite significant differences, in procedural or analytical specifics and management emphasis. Successful R and D planning systems possess three important characteristics founded upon (1) clear cut, hierarchial statements of technical objectives; (2) use of quantitative and qualitative criteria to measure the fit of R and D projects to technical objectives; (3) rely on management judgment for resource allocation decisions. Some form of variable and zero phase budgeting procedure to evaluate merits of programs/projects at different funding levels while focusing on a small set of efforts at the margin is adopted. DOE

N82-29293# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).
HUMAN FACTORS IN AIR TRAFFIC CONTROL
V. D. HOPKIN (Royal Air Force Inst. of Aviation Medicine) Apr. 1982 187 p refs
(AGARD-AG-275; ISBN-92-835-1421-1) Avail: NTIS HC A09/MF A01

Human factors are related to air traffic control, air traffic control systems, the physical surroundings, equipment, and operation of the system, and the selection, development, training and evaluation of air traffic controllers.

N82-29305# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).
HUMAN FACTORS IMPLICATIONS OF CONDITIONS OF EMPLOYMENT
In its Human Factors in Air Traffic Control p 110-118 Apr. 1982
Avail: NTIS HC A09/MF A01

The managerial direction of air traffic controllers is reviewed. Performance, attitude, management controller relations, and successfully developed collaboration techniques are examined. The following topics are discussed: management of controllers; consultation with controllers; needs of controllers at work; career structure; work rest cycles; occupational health; and retirement.
E.A.K.

N82-29306# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France)
INFLUENCES ON THE INDIVIDUAL CONTROLLER
In its Human Factors in Air Traffic Control p 119-125 Apr. 1982
Avail: NTIS HC A09/MF A01

Experiences of and influences on individual air traffic controllers are analyzed. Different parameters which interfere with the daily workload are outlined. The following influences that interfere with performance efficiency are considered: experience, age, stress, boredom, personality, attitudesm trust and job satisfaction.
E.A.K.

N82-29307# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).
THE MEASUREMENT OF THE AIR TRAFFIC CONTROLLER
In its Human Factors in Air Traffic Control p 126-140 Apr. 1982
Avail: NTIS HC A09/MF A01

The standardization of measurements for air traffic controller performance are discussed. The purpose for measuring the controllers is outlined and factors measured by task performance are presented. Issues related to the measurements are as follows: system performance; task performance; error, delays, omissions and nonconsistencies; physiological and biological indices; modelling and allied techniques, subjective assessments; social factors; qualitative factors; tests and other measures; and interactions between measures. E.A.K.

N82-29665# Institut fuer Angewandte Geodaesie, Frankfurt am Main (West Germany).
TWENTY-FIVE YEARS AT THE BERLIN BRANCH OFFICE OF THE INSTITUTE FOR APPLIED GEODESY (1956 - 1981) [25 JAHRE AUSSENSTELLE BERLIN DES INSTITUTS FUER ANGEWANDTE GEODAESIE (1956-1981)]
W WEBER *In its* Rept. on Cartography and Geodesy. Ser. 1: Original Rept., No. 86 p 9-24 1981 refs In GERMAN Original contains color illustrations
Avail: NTIS HC A06/MF A01

The history of the Berlin branch office, including tasks and objectives, is reviewed. The origins of the service are discussed. Facilities are described. Cartographic work, map reproduction, and printing services are outlined. Projects in progress are commented on. Author (ESA)

N82-30123# American Psychological Association, Inc., Washington, D.C.
METHODOLOGICAL INNOVATIONS FOR STUDYING ORGANIZATIONS
1981 18 p refs
(Contract N00014-79-G-0074)
(AD-A113284) Avail: NTIS HC A02/MF A01 CSCL 05A

Conducting research on complex organizations is a complex task. Social scientists studying organizations are faced with a number of specific challenges in carrying out high quality research They include: collecting and then sharing qualitative data in ways that fit into a wider body of knowledge; phrasing research questions in ways more dictated by the significance of the issue, less by what other researchers are doing; picking strategies (such as a field experiment or survey methodology) on bases other than expediency or familiarity; making sense of patterns of results from a diverse set of studies conducted, designing and executing research to increase the chances that the finding will actually be used by decision makers in organizations; and using new, powerful quantitative analytic techniques appropriately. These methodological issues were addressed by a group of eighteen social scientists over a two year period. This brochure describes the results of this effort and tells how to obtain the materials that have been created. Author (GRA)

N82-30126# Federal Compiler Testing Center, Falls Church, Va. Federal Conversion Support Center.
CONVERSION CONTRACTING TECHNIQUES ASSOCIATED WITH PROCUREMENT OF A REPLACEMENT ADP HARDWARE SYSTEM Final Report
Sep. 1981 17 p
(PB82-145079; GSA/FCSC-81/003) Avail: NTIS HC A02/MF A01 CSCL 05A

Various procurement strategies for obtaining conversion services associated with the procurement of a replacement hardware system or timesharing service are discussed. Conversion associated costs are usually significant and must be considered when evaluating proposals for replacement hardware and teleprocessing services (FPR 1-4.1109-15). Five possible methods for procuring services with a hardware replacement are considered. GRA

N82-30127# Federal Compiler Testing Center, Falls Church, Va. Federal Conversion Support Center.
PREPARING SOFTWARE CONVERSION STUDIES Final Report
Jul. 1981 70 p
(PB82-142670; GSA/FCSC-81/002) Avail: NTIS HC A04/MF A01 CSCL 05A

A conversion study as required by FPR 1-4 1109-13 is a procurement planning document which should be conducted as early in the procurement cycle as possible, ideally, when it is determined that additional computing resources are required and that the most cost effective method of satisfying that requirement is to procure new or replacement hardware or teleprocessing support. The conversion study should be a major input in establishing the procurement strategy which has the lowest overall cost to the Government and encourages competition to the maximum extent practicable. An outline is presented that provides an agency with a suggested format and level of detail for each area of the conversion study, including sample forms and examples. GRA

N82-30129# Science and Technology Agency, Tokyo (Japan).
A SUMMARY OF FY 1980 WHITE PAPER ON SCIENCE AND TECHNOLOGY IN JAPAN: INTERNATIONAL COMPARISONS AND FUTURE TASKS
Jul. 1981 25 p
(PB82-161456; W-81-8) Avail. NTIS HC A02/MF A01 CSCL 05A

The strength, potential and special features of the advanced countries and their relative positions in the fields of science and technology were compared. Policy measures and strategies adopted by the major advanced countries for promoting science and technology are dealt with. Trends in activities of science and technology, and policy measures taken by the Japanese Government are summarized. GRA

N82-30758# Argonne National Lab., Ill.
ENERGY AND MATERIALS FLOWS IN THE CEMENT INDUSTRY
J. E. SAPP Jun. 1981 230 p refs
(Contract W-31-109-ENG-38)
(DE82-001609; ANL/CNSV-17) Avail: NTIS HC A11/MF A01

The cement industry is a large user of energy In 1976, for example, the cement industry consumed 0.7% of the nation's direct energy, using 50 million tons of coal, 5.5 million barrels of fuel oil, 88,107 million cubic feet of natural gas, and 10,558 million kilowatt hours of electricity. Earlier, in 1971 when the cement industry was sixth in total energy use for heat and power among SIC four digit industries, cement production consumed the most coal in that SIC group. From 1947 through 1976, the period covered by this study, cement industry energy consumption increased by 58%. However, process improvements during that period reduced the direct energy needed to produce a metric ton of cement 23% for dry processors and 17% for wet processors. There are contraints but further energy reductions are possible for individual producers through continued equipment modernization. DOE

N82-31387# Societe Nationale Industrielle Aerospatiale, Les Mureaux (France)
CONTRACT INCENTIVES
M. ROUZE *In* CNES The Future of Launchers in Europe p 597-600 1982 In FRENCH; ENGLISH summary
Avail: NTIS HC A99/MF A01

The economical and technical features in the development of aerospace programs are discussed Methods used to achieve favorable results are: the establishment of a new type of relationship between contractural partners which entails to encite research, cost optimization and technical requirements, and the requirements of a specific organization and coherent management; incite industries to use cost optimization methods. Aerospace contract negotations are outlined, focusing on profit sharing schemes and penalty clauses. Author (ESA)

N82-31768# Weil (Warren) Associates, Inc , Washington, D C
FEDERAL EMPLOYEE ENERGY AWARENESS PROGRAM GUIDE
Sep. 1981 68 p refs
(Contract DE-AC08-80CS-21388)
(DOE/CS-21388/2) Avail. NTIS HC A04/MF A01

The planning and management of an employee energy awareness program aimed at reconditioning employees concerning the necessity for energy conservation is described. The program aims to introduce some specific energy conserving behaviors, and to provide motivation for these behaviors. Advice is given on how to structure programs, set goals, implement strategies, and establish procedures for program evaluation and change. R.J F.

N82-32147# California Univ , Livermore. Lawrence Livermore Lab.
INTEGRATED OPERATIONS PLAN FOR THE MFTF-B MIRROR FUSION TEST FACILITY. VOLUME 2: INTEGRATED OPERATIONS PLAN
Dec 1981 92 p
(Contract W-7405-ENG-48)
(DE82-011074; UCRL-15430-VOL-2) Avail: NTIS HC A05/MF A01

An integrated plan for the operation of the mirror fusion test facility is presented. The plan delineates policies and provides for accomplishing the functions required by the program. The management, operations, maintenance, and engineering support responsibilities are specified The plan covers phasing into sustained operations as well as the sustained operations themselves. DOE

N82-32291# Joint Publications Research Service, Arlington, Va.
COMMENTARY ON U.S. SPACE POLICY AND PROGRAMS
I I. ISACHENKO *In its* USSR Rept.: Space, No. 17 (JPRS-81552) p 94-103 17 Aug. 1982 Transl. into ENGLISH from Ekon. i Organ. Prom Proizv (USSR), no. 1, Jan. 1981 p 171-186
Avail: Issuing Activity

The research and contract policy of the National Aeronautics and Space Administrtion is analyzed. Several stages of research are described, from preliminary project assessments to detailed definition and production. The coordination and monitoring of contractors and subcontractors is addressed with reference to the space shuttle and Apollo programs. Finally, technology transfer practices are discussed. M.G.

N82-32564# Massachusetts Univ., Amherst.
WORKSHOP ON ASSEMBLY AND iNSPECTION Final Report
G. BOOTHROYD, ed. Sep. 1981 91 p refs Workshop held at Amherst, Mass., 8-9 Jun. 1981
(Contract NSF MEA-81-15036)
(PB82-172586; NSF/MEA-81014) Avail. NTIS HC A05/MF A01 CSCL 13H

Assembly and inspection in industrial manufacturing is discussed. Individuals involved in industrial manufacturing expressed their views on such questions as: What kind of research is most likely to lead to significant improvements in manufacturing productivity. What lessons can be learned from the research conducted in other countries. What are the social and economic impacts of actual and proposed research and what educational benefits can be obtained. A list of attendees is provided and eight formal presentations are summarized. Final recommendations stressed the need for integration of design and manufacturing functions in industry research to improve flexibility of assembly automation and use of the systems approach to productivity improvements in assembly and inspection. GRA

N82-32980# Air Force Human Resources Lab., Brooks AFB, Tex. Logistics and Technical Training Div.
ADVANCED INSTRUCTIONAL SYSTEM: APPLICATIONS FOR THE FUTURE
W A. NUNNS Jul 1982 11 p Presented at the Sci. and Eng. Symp., Wright-Patterson AFB, Ohio, 27-29 Oct 1981
(Contract AF PROJ. 1121)
(AD-A117144; AFHRL-TP-81-45) Avail. NTIS HC A02/MF A01 CSCL 05I

The Advanced Instructional System (AIS) was developed as a prototype computer-based training system to demonstrate the feasibility of administering and managing individualized instruction on a large scale A secondary, but major, function of the AIS was to provide a research and development capability for evaluation of instructional innovations. Throughout the AIS development effort, there was a continual evolution in computer technology applicable to the instructional process. At the completion of development in 1977, the AIS incorporated state-of-the-art instructional techniques, media, and computer hardware and software. Since completion of the formal development phase, several major capabilities have been added to the system to support other Laboratory research efforts. What has evolved is a system that, in addition to supporting the full range of computer-based instructional functions, has capabilities to support flight scheduling, information retrieval, and materials development As a result of several technology demonstrations conducted jointly by the Air Force Human Resources Laboratory (AFHRL) and the Major Commands, the Tactical Air Command (TAC). Strategic Air Command (SAC), and Military Airlift Command (MAC) have identified applications where implementation of this technology would improve their operational effectiveness and efficiency. These implementations could well be where the full benefit of the AIS technology to the Air Force would be realized. GRA

N82-32990# Air Force Systems Command, Brooks AFB, Tex. Applications and Liaison Office.
PROGRAMS IN EDUCATION AND TRAINING OF MANPOWER AND PERSONNEL, INCLUDING LOGISTICS AND GROUP ASPECTS OF HUMAN FACTORS ENGINEERING Final Annual Report, fiscal year 1981
R. M. BUESCHER Jun. 1982 160 p
(Contract AF PROJ. 9981)
(AD-A116275, AFHRL-TP-82-27) Avail. NTIS HC A08/MF A01 CSCL 05A

The Air Force Human Resources Laboratory (AFHRL) mission, corporate philosophy, and descriptions of its research and development (R&D) thrusts are presented. Fiscal Year 1981 technica achievements and ongoing R&D are organized under each thrust area. AFHRL organizational structure, the functions of its divisions and staff offices, available technical resources, and publications and presentations by Laboratory personnel during Fiscal Year 1981 are included Author

N82-33822# Resource Planning Associates, Inc., Cambridge, Mass.
THE POTENTIAL FOR INDUSTRIAL COGENERATION DEVELOPMENT BY 1990 Final Report
31 Jul. 1981 158 p refs
(RA-81-1455) Avail: NTIS HC A08/MF A01

The cogeneration study focused on five industries that constitute three quarters of industrial steam demand: pulp and paper, chemicals, petroleum refining, steel, and food processing. These industries use almost one fifth of the total energy consumed in the United States. The analysis reflected the investment and regulatory concerns in the United States. The analysis reflected the investment used by industrial and utility managers. Phone discussions were held with approximately 70 companies to verify and augment the process and energy use data for the five industries. S.L.

N82-33933# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div
METHODS AND TECHNIQUES OF EXPERIMENTAL RESEARCH ON THE ATMOSPHERE (SELECTED ARTICLES)
R I. BOGDANOV, A. A. VORONTSOV, Y A GLAGLEV, B. P. ZAYCHIKOV, M. V KRECHMER, G P KALDUZOV, A F. KUSENKOV, V. I. KUZMICHEVA, and V. I. SHLYAKHOV 18 Jun 1982 56 p refs Transl. into ENGLISH from Tr Tsent. Aerol. Obs., Met. Tekh Eksperim. Issled. Atm (USSR), no. 102, 1971 p 3-23, 139-140,
(AD-A117570, FTD-ID(RS)T-0782-82) Avail: NTIS HC A04/MF A01 CSCL 04B

Data acquisition, Experimental data, Meteorological data, Accuracy, Research management, Atmospheres, Foreign technology, USSR, Translations Methods and Techniques of Experimental Research on the Atmosphere. GRA

N82-34297# Naval Personnel Research and Development Center, San Diego, Calif.
A SYSTEM FOR ASSESSING USER RESPONSE TO NAVPERRANDCEN RDT/E PRODUCTS Final Report, Oct. 1981 - Mar. 1982
H. H. ROSEN Jun 1982 20 p refs
(AD-A117719, NPRDC-SR-82-29) Avail NTIS HC A02/MF A01 CSCL 05A

A user-oriented system for assessing user response was developed. In this system, a report on a product and an evaluation request are mailed to previously identified users for appropriate action. Results indicate that the system has great potential for initiating and maintaining a productive dialogue between researchers and operational consumers. Data provided can be used to improve the quality of R&D management decisions by offering both long-term trend information and immediate feedback regarding product utilization. Author

N82-34299# American Univ., Washington, D. C. Inst for Applied Public Financial Management.
ESTABLISHING A RELIABLE SOURCE OF FUEL FOR DEPARTMENT OF DEFENSE REQUIREMENTS: EFFECTIVE PETROLEUM, OIL AND LUBRICANT FINANCIAL MANAGEMENT Final Report
T F. SCHERER Dec. 1981 99 p refs Sponsored in part by the Defense Fuel Supply Center
(PB82-170812, REPT-115-80-7) Avail: NTIS HC A05/MF A01 CSCL 05A

Procurement options available as a result of changes in the energy market are analyzed Both direct and indirect methods of acquiring products are considered. It is shown that the only viable solution to DFSC's problem lies in purchasing the desired quantities using direct acquisition methods and by reducing the cost incurred to a refiner for supplying military products. GRA

02

PROJECT OR SYSTEMS MANAGEMENT

Includes operations research, management information systems, and program management.

A82-10078#
COMPUTER SYSTEMS EVOLUTION IN NASA PROGRAM MANAGEMENT
F. T. WHITING, JR. (McDonnell Douglas Technical Services Co., Inc., Houston, TX) In. Computers in Aerospace Conference, 3rd, San Diego, CA, October 26-28, 1981, Collection of Technical Papers New York, American Institute of Aeronautics and Astronautics, 1981, p 10-14. refs
(AIAA 81-2097)

It is pointed out that a revolutionary change has taken place in the use of computers during the past five years. This change is

nowhere more evident than in the complex, multilayered program and project management effort mounted by NASA in the development of the Space Shuttle. NASA management has pioneered the use of computers in mass data handling, data base storage, and communications. The computer has become a full-fledged tool of management information and action feedback, without any evident reduction in its use as an engineering calculation device. 'Engineering' has become increasingly data base management oriented, while 'administration' has moved rapidly beyond payroll and accounting toward large data bases of their own. The fundamental driver in this merging of the functions appears to be a basic change in the use of computers, from calculating devices to information storage, sorting, and retrieval devices. G.R.

A82-10114#
PROGRAM MANAGEMENT - A TOP-DOWN APPROACH TO HARDWARE/SOFTWARE INTEGRATION
R U. FUJII (Logicon, Inc., San Pedro, CA) In: Computers in Aerospace Conference, 3rd, San Diego, CA, October 26-28, 1981, Collection of Technical Papers. New York, American Institute of Aeronautics and Astronautics, 1981, p. 271-277
(AIAA 81-2157)

This paper suggests a management approach to hardware/software integration in which the integration begins during the system concept definition phase and continues through each of the topdown system development processes, culminating with integration test. In this integration management approach, hardware and software are considered not as separable components, but as being interrelated in the same way as software routines are functionally interrelated and managed. Two aspects of this integration management approach are discussed: integration management planning, and performance evaluation and measurements for providing management visibility (Author)

A82-10115#
SUCCESSFUL PROJECT DEVELOPMENT THROUGH MANAGEMENT OF HARDWARE/SOFTWARE INTEGRATION
R. L. BRIDIGUM (Honeywell, Inc., Avionics Div., Minneapolis, MN) In: Computers in Aerospace Conference, 3rd, San Diego, CA, October 26-28, 1981, Collection of Technical Papers. New York, American Institute of Aeronautics and Astronautics, 1981, p. 278-282.
(AIAA 81-2158)

Two case histories are reviewed that illustrate the major problems associated with hardware/software integration in avionics subsystem development. It is shown that more cost effective project development can be accomplished through: (1) spending more time and money on the hardware/software definition of a system; (2) extensive planning of the integration effort earlier in the project development cycle; and (3) implementing a rigorous approach to integration, starting with module test. V.L.

A82-10118*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
RELATIONS BETWEEN INFORMATION SYSTEM ENGINEERING AND SOFTWARE ENGINEERING
E. D. CALLENDER, C. HARTSOUGH, and R. V. MORRIS (California Institute of Technology, Jet Propulsion Laboratory, Pasadena, CA) In: Computers in Aerospace Conference, 3rd, San Diego, CA, October 26-28, 1981, Collection of Technical Papers. New York, American Institute of Aeronautics and Astronautics, 1981, p. 299-305.
(AIAA 81-2161)

This paper examines some of the relations between information system engineering and software engineering. A model for the development process of an information system is presented that focuses on problems common to both disciplines. The concepts of complexity, multiplicity of view, distortion in communication, and concurrency and iteration in implementation are treated. A set of design constructs for the description of an information system is presented. The role of project management is treated. The issue of how to characterize requirements analysis is answered by making it a design activity from the point of view of a user of the product system. (Author)

A82-10133#
COMMON ISSUES/OPTIONS IN THE MANAGEMENT OF EVOLVING COMPUTER SYSTEMS
F. C. HOLLAND (Mitre Corp., McLean, VA) In: Computers in Aerospace Conference, 3rd, San Diego, CA, October 26-28, 1981, Collection of Technical Papers New York, American Institute of Aeronautics and Astronautics, 1981, p. 429-433.
(AIAA 81-2189)

An investigation is conducted regarding the problems which many corporations and government agencies have to face currently in connection with their computer systems. One of the problems is related to a large investment in existing software which is partly in a form excluding an easy transfer to other computers. The software investment tends, therefore, to inhibit desirable hardware replacement. The problem is further enhanced by increasing software development costs. A problem area in government is related to more extensive and complex procurement procedures and oversight responsibilities Changing user needs and reorganizations in government produce additional difficulties. Possible solutions to the considered problems include design choices and management/organizational choices Promising design choices are related to an employment of layered architectures, bus technology, devices to run old software on new hardware, modular software, and standard languages. Particular attention is given to layered architectures and cable bus technology. G.R

A82-10922*# New Hampshire Univ., Durham.
THE CELSS PROGRAM - AN OVERVIEW OF ITS STRUCTURE AND USE OF COMPUTER MODELLING
M. M. AVERNER (New Hampshire, University, Durham, NH) and R. D MACELROY (NASA, Ames Research Center, Moffett Field, CA) American Society of Mechanical Engineers, Intersociety Conference on Environmental Systems, San Francisco, CA, July 13-15, 1981, 3 p.
(ASME PAPER 81-ENAS-36) MEMBERS, $2.00; NONMEMBERS, $4 00

NASA has initiated a research program, CELSS, directed at the acquisition of the knowledge and technology required for the development of an autonomous, regenerative life support system. The program is structured to promote effective, cooperative research in fundamental, applied and engineering science. The initial research thrusts involve investigations into problems of food production, waste processing and system control and integration. In the area of food production both conventional, higher plant-based processes as well as chemosynthetic food production technologies are being investigated. Alternative waste processing procedures, both biological and physicochemical, are being examined. Computer based modelling as an aid to design and analysis is an integral part of the approach to system control and management. A mass balance model depicting the flow of elemental mass in a conceptualized closed, regenerative life support system is described. (Author)

A82-14384#
KC-10, FLIGHT TEST PROGRAM MANAGEMENT - THE CONTRACTOR'S VIEWPOINT
J L. COOK (Douglas Aircraft Co., Long Beach, CA) AIAA, SETP, SFTE, SAE, ITEA, and IEEE, Flight Testing Conference, 1st, Las Vegas, NV, Nov. 11-13, 1981, AIAA 4 p.
(AIAA PAPER 81-2380)

The management of a flight test program for the KC-10 aerial refueling tanker aircraft, which included elements of development, FAA certification and Air Force qualification and operational testing, is described. In addition to the manufacturer and the FAA, the participants included the Joint AFLC/AFCS Program Office (JPO), the Air Force Primary Test Organization, and the Air Force Test and Evaluation Center. The flight test program involved not only tanker and receiver aircraft qualifications and operational evaluations, but also air crew training, ground crew training, tech order validation, maintainability demonstrations, human factors

tests, support equipment compatibility validations, cargo loading demonstrations, and acceptance test procedure validations It was found that a division of authority between the Air Force and the FAA was highly effective, and that parallel, rather than series development testing is essential to efficient test programs O.C

A82-14701
MANAGEMENT OF SOFTWARE DESIGN - A STRUCTURED APPROACH
S. C. DOLBEY and D. R. CAREY (Westinghouse Electric Corp., Baltimore, MD) In: NAECON 1981; Proceedings of the National Aerospace and Electronics Conference, Dayton, OH, May 19-21, 1981. Volume 1. New York, Institute of Electrical and Electronics Engineers, Inc., 1981, p. 172-178

A structured software design procedure has been developed which bridges the gaps between structured software concepts, top down design philosophies, and realistic software design problems. This design approach presents software management with an orderly procedure for the design and implementation of complex software systems The central concept of this procedure consists of splitting all levels of software design into the four functional areas· design abstract, configuration identification, data definition, and design specification. Each area is stressed at various times during the life cycle of software development. Thus, this procedure provides a design skeleton, under the guise of source code comments, which grows in depth of detail as the software designer descends into the lower, more detailed levels of design. (Author)

A82-14835#
TRAINER SOFTWARE DOCUMENTATION - A REFLECTION OF WHAT NEVER WAS
K. E. WAGNER (U S. Navy, Naval Training Equipment Center, Orlando, FL) In: NAECON 1981; Proceedings of the National Aerospace and Electronics Conference, Dayton, OH, May 19-21, 1981. Volume 3. New York, Institute of Electrical and Electronics Engineers, Inc., 1981, p. 1330-1332

Attention is given to a study of software and system documentation at the Naval Training Equipment Center in Orlando, FL. The study included the identification of current software documentation management at the Center and at selected outside sites; a survey to determine software documentation characteristics associated with trainer systems; and the identification of areas for potential capability enhancement. It is noted that the documentation of trainer systems through interactive graphics might result in the disappearance of the artificial distinction between hardware and software. S.C S

A82-16178
THE FEDERAL RADIONAVIGATION PLAN
W. K. MAY (U S. Coast Guard, Washington, DC) (Institute of Navigation, Annual Meeting, Annapolis, MD, June 9-11, 1981.) Navigation, vol. 28, Fall 1981, p. 231-246.

Policies and plans for the U.S. radionavigation services which are delineated by the Federal Radionavigation Plan are described. Areas of authority and responsibility as well as management structure for defining cost requirements and cost-effective operation are provided, along with various navigation phases and current and future requirements for each phase Federally operated systems with a high degree of common use, both military and civil, including Loran-A, Loran-B, Omega, VOR, VOR/DME, VORTAC, TACAN, ILS, TRANSIT, MLS, Radiobeacons, and the Navstar GPS are examined for a suitable mix to satisfy user requirements. A preliminary recommendation for the future navigation mix will be issued by the DOD/DOT in 1983, and a decision at the national level will be forthcoming in 1986. It is noted that mantime navigation is tending toward a minimum number of systems, while aviation has witnessed heavy investments in VOR/DME M.S.K.

A82-16557
MANAGEMENT OF A LARGE AVIONICS PROJECT
H R. SANDILANDS (Marconi Avionics, Ltd., Hemel Hempstead, Herts., England) and B. TAYLOR (Marconi Avionics, Ltd., St. Albans, Herts., England) IEE Proceedings, Part F - Communications, Radar and Signal Processing, vol. 128, pt. F, no. 7, Dec. 1981, p. 408-411

The management of a major avionics project is discussed, using as an example the Airborne Early Warning Nimrod Mission System Avionics project, sponsored by the UK Ministry of Defense. A multilayer project family tree is outlined; this family tree structure is the basis for the identification and interrelation of all the elemental and incremental tasks which must be performed to implement the project It serves to allocate managerial responsibility for conduct and achievement on a direct, one-to-one basis. It is fundamental to all management and control activities, such as cost and timescale estimation and attribution, preparation of program networks, identification of milestones and key events, allocation of resources, preparation of management information, as well as progress, cost and performance reporting. It may even play a future role in forming the contract with the customer. J F

A82-16735
LESSONS OF APOLLO FOR LARGE-SCALE TECHNOLOGY
R. C SEAMANS, JR. (MIT, Cambridge, MA) and F I ORDWAY, III (U.S. Department of Energy, Office of Policy Coordination, Washington, DC) In Between Sputnik and the Shuttle - New perspectives on American astronautics San Diego, CA, Univelt, Inc , 1981, p 241-287. refs

The reasons for the success of the Apollo program are probed. Managerial acumen is emphasized for the effective integration of the social, technical, scientific, and political activities which were involved. The dependence NASA had on experiences of the DOD and other organizations is outlined, and comparisons are made of the operations of NASA and ERDA NASA was able to devise in-house organizational schemes to match project requirements, while ERDA had many organizational options defined at its inception. The three principal variables in any large scale effort are given as funding, time to completion, and program content. The ability to focus manpower in stress situations is described in terms of the rescue of the Apollo 13 crew. Phased project planning is discussed, along with systems management, the industrial team, and options for post-Apollo missions, especially for a manned space station M S.K.

A82-20767
DATA SYSTEMS ORGANIZATION - A CHANGE FOR THE BETTER
R. D. SAMUELSON (McDonnell Aircraft Co., St. Louis, MO) In: Flight testing in the eighties; Proceedings of the Eleventh Annual Symposium, Atlanta, GA, August 27-29, 1980. Lancaster, CA, Society of Flight Test Engineers, 1980, p. 21-1 to 21-7.

The implementation of a data systems organization at McDonnell Aircraft is described in terms of the project and departmental bases for the F-15 program. Key objectives of the flight test reorganization comprised strengthened control over data and instrumentation programs, combination of data and instrumentation operations to broaden individual responsibilities and increase efficiency, manage the data system development and the test support activities separately, combine data and instrumentation design activities, and combine supporting laboratories and supply operations where feasible. The data systems were divided into a design and development branch, an operations branch, and a processing and support branch, with respective subsections. The system carried through to F-18 development and resulted in a reduction of 20% in total expenditures. M.S.K

A82-33025#
THE AEROSPACE LEARNING PROCESS
W. M. HAWKINS (Lockheed Corp., Burbank, CA) American Institute of Aeronautics and Astronautics, International Annual Meeting and Technical Display, Baltimore, MD, May 25-27, 1982, 6 p.
(AIAA PAPER 82-1291)

A number of projects significant in the history of aerospace are reviewed and lessons to be learned are stated. The role of private industry and government in the design and production of the Hudson, the P-38, the F-80, the C-130, the Discoverer, the Polaris, and the Reentry Test Vehicle are discussed. It is contended that high quality can be achieved with significant savings of time and money and that bureaucracy has been a much greater problem in recent projects than it was in the older ones. Major problems include the cult of systems management, excessive paperwork and meetings, the hardware competition process, and bureaucratic infighting. It is argued that there should be a return to the quick prototype and a single systems manager should preside over projects. Competition for project contracts should be curtailed C.D.

A82-37337#
ACQUISITION, SYNCHRONIZATION AND SYSTEM MANAGEMENT FOR THE INTELSAT TDMA SYSTEM
G. FORCINA, B. PONTANO, R. J. COLBY (International Telecommunications Satellite Organization, Washington, DC), and R. LEI (COMSAT Laboratories, Clarksburg, MD) In International Conference on Digital Satellite Communications, 5th, Genoa, Italy, March 23-26, 1981, Proceedings. New York, Institute of Electrical and Electronics Engineers, 1981, p. 377-386.

Operation and switching among the transponders of the Intelsat V and VI satellites to ensure acceptable time-sharing among the satellites users are described. Intelsat V features 6/4 coverage of antennas with two hemispheric beams and two zone beams in the hemispheric beams with opposite polarization. Bursts upcoming from earth arrive in a predefined repetitive sequence, with a change of the reference bursts occurring every 16 frames. System control and management of the TDMA system is achieved by transmitting a reference burst through a control and delay channel and a service channel and a traffic burst through a service channel in the form of a 32 bit word. The service channel receives alarms and coordination messages signalling burst time plan changes. Attention is also given to the synchronization procedure, synchronization in multitransponder operation, reference station synchronization and to satellite position determination and management functions. M S.K.

A82-43332#
A SURVEY REGARDING THE GERMAN-FRENCH DEVELOPMENT PROGRAM ALPHA JET [UEBERBLICK UEBER DAS DEUTSCH-FRANZOESISCHE ENTWICKLUNGSPROGRAMM ALPHA JET]
P. KANIA (Dornier GmbH, Friedrichshafen, West Germany) Deutsche Gesellschaft fuer Luft- und Raumfahrt, Symposium ueber angewandte Flugwissenschaften bei der Entwicklung des Alpha Jet, Darmstadt, West Germany, Sept. 24, 1981, Paper. 27 p In German.

The project Alpha Jet has its origin in the late 1960s, when in Germany and in France a need for a new jet trainer for the air force was recognized Initial contacts between German and French aerospace companies in 1968 led to plans for the development of the Alpha Jet aircraft in a joint project by French and German companies. In response to the need of the 'Luftwaffe' for a combat aircraft providing close-air support, the development objectives for the Alpha Jet were extended to cover also requirements concerning an employment of the aircraft for combat missions. In September 1975, Belgium became the third partner in the Alpha Jet project. The last of four prototypes of the Alpha Jet performed its first flight on October 11, 1974. Attention is given to details concerning the implementation of the Alpha Jet program, organizational questions, aspects of the program schedule, financial considerations, and an outlook regarding future developments involving the Alpha Jet. G.R.

A82-43873
MIGRATION FROM A TERRESTRIAL NETWORK TO A SATELLITE NETWORK - RISKS/CONSTRAINTS/PAYOFFS
K. A. HOMON In. ICC '81; International Conference on Communications, Denver, CO, June 14-18, 1981, Conference Record. Volume 3. New York, Institute of Electrical and Electronics Engineers, Inc., 1981, p. 58.3.1-58.3 3.

The migration method is regarded as a straightforward approach to a customer's requirements while addressing the known constraints. The migration plan organizes, controls, and communicates the extensive number of tasks, schedules, technical details, and node-by-node conversion details using the selected migration method as its cornerstone. It is noted that a successful migration plan must also provide the flexibility and robustness necessary to handle the unforeseen changes that will occur over the three- to four-year migration period A baseline network provides a solid structural underpinning for the migration plan. C.R.

A82-44563
UOSAT - AN INVESTIGATION INTO COST-EFFECTIVE SPACECRAFT ENGINEERING
M. N. SWEETING (Surrey, University, Guildford, England) Radio and Electronic Engineer, vol. 52, Aug.-Sept. 1982, p. 363-378. refs

The UOSAT Project commenced at the University of Surrey in 1979 to investigate the feasibility of, and the engineering problems associated with, the design, construction, launch and orbital operation of a relatively small and inexpensive spacecraft capable of a worthwhile contribution to the scientific, engineering and educational communities. The paper outlines the background to the project and the objectives of the UOSAT mission. After describing briefly the experiments on board the spacecraft, the paper deals with the design and fabrication of the satellite, the philosophies underlying these and the test and procurement procedures. Details of the project management and the resources necessary are given. The paper concludes with a summary of the present status of the spacecraft and its experiments. (Author)

A82-48036#
MISSION ANALYSIS AND DATA PROCESSING OF SOUNDING ROCKETS
G. SCHNEIDERS and W. ZIEGLTRUM (Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Oberpfaffenhofen, West Germany) In: Sounding Rocket Conference, 6th, Orlando, FL, October 26-28, 1982, Collection of Technical Papers. New York, American Institute of Aeronautics and Astronautics, 1982, p. 72-78.
(AIAA 82-1725)

The main task during the preflight phase of a sounding rocket project is concerned with the acquisition of appropriate data regarding the rocket/payload behavior. Such data are needed as a basis for suitable planning of the sounding rocket mission. A computer program, called Rosi (rocket simulation), was developed as a tool for obtaining the required data. The computer program is concerned with the conduction of an analysis of the motion of a rigid body in three-dimensional space, taking into account translation and rotation. Rosi is capable of calculating the trajectory of multistate vehicles. A simulation procedure for impact prediction is included. The procedure can calculate the impact parameters of the vehicle at any cut-off point of the trajectory. Attention is given to TM-data processing, processes for orbit/attitude-reconstruction, and data concerning computer execution time. G.R.

A82-48063*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
MISSION ANALYSIS TECHNIQUES FOR ATTACHED SHUTTLE PAYLOADS
S. LAMBROS (NASA, Goddard Space Flight Center, Special Payloads Div., Greenbelt, MD) In: Sounding Rocket Conference, 6th, Orlando, FL, October 26-28, 1982, Collection of Technical Papers New York, American Institute of Aeronautics and Astronautics, 1982, p 271-277
(AIAA 82-1759)

Visibility times, i.e., times which desired targets are visible to a payload, are examined for attached Shuttle payloads. These times are affected by a number of constraints. Some constraints are examined along with mathematical or computer modeling techniques used to determine their effects. The constraints include: occultation of the earth, moon, and sun, and limb avoidance angles of each; orbit parameters such as inclination and ascending node, along with sensitivity to changes in each, TDRSS acquisition; South Atlantic Anomaly (SAA) avoidance, nighttime viewing only, bright earth avoidance angles; the field of view; Shuttle attitude, and Orbiter operational constraints. All of this information is integrated and, with computer programs, a schedule of observations and Shuttle attitudes is obtained (Author)

N82-10276# Mid-American Solar Energy Complex, Minneapolis, Minn.
QUARTERLY REPORT OF SOLAR FEDERAL BUILDINGS PROGRAM IN THE MASEC REGION
Jun. 1981 20 p
(Contract DE-AC02-79CS-30150)
(DE81-027968; MASEC-R-81-059/1) Avail. NTIS HC A02/MF A01

Solar Federal Buildings Program (SFBP) projects within the 12-state MASEC region are listed. The states involved are Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, and Wisconsin The SFBP agencies projects are briefly described. DOE

N82-10290*# Computer Technology Associates, Inc., Seabrook, Md.
INTEGRATED COMMAND, CONTROL, COMMUNICATIONS AND COMPUTATION SYSTEM FUNCTIONAL ARCHITECTURE
C. G. COOLEY and L. E. GILBERT 17 Aug. 1981 188 p refs
(Contract NAS5-26239)
(NASA-CR-166739) Avail. NTIS HC A09/MF A01 CSCL 17B

The functional architecture for an integrated command, control, communications, and computation system applicable to the command and control portion of the NASA End-to-End Data. System is described including the downlink data processing and analysis functions required to support the uplink processes. The functional architecture is composed of four elements: (1) the functional hierarchy which provides the decomposition and allocation of the command and control functions to the system elements, (2) the key system features which summarize the major system capabilities; (3) the operational activity threads which illustrate the interrelationship between the system elements; and (4) the interfaces which illustrate those elements that originate or generate data and those elements that use the data. The interfaces also provide a description of the data and the data utilization and access techniques. R.J.F

N82-11977# Naval Postgraduate School, Monterey, Calif Dept. of Administrative Sciences
THE INDIVIDUAL VERSUS THE COMPUTER: AN EXAMINATION OF ATTITUDE PROBLEMS AND THEIR IMPACT ON SYSTEM DEVELOPMENT M.S. Thesis
G. J. PLATO Jun. 1981 94 p refs
(AD-A104636) Avail: NTIS HC A05/MF A01 CSCL 05A

Whether rational or irrational in nature, negative feelings toward computer based systems have been a persistent problem for computer implementors and systems managers for many years. People may sometimes fear for the future of their employment, feel intimidated by a technology they do not understand, resent the invasion of privacy associated with indiscriminate data collection, or exhibit a wide variety of other emotional responses. In order to better anticipate, understand and cope with the multitude of emotional reactions and interface problems that potentially may develop among non-technical computer system users, current literature pertaining to such negative attitudes has been explored. With a greater understanding of possible human-computer interface problems, it is believed that managers, computer professionals, system users and social institutions alike can all assume important roles in helping to promote more universally positive interactions and attitudes in the future. GRA

N82-12999# Office of Technology Assessment, Washington, D.C.
SOCIETY'S DEPENDENCE ON INFORMATION SYSTEMS
In its Computer-based Natl Inform. Systems p 97-102 Sep. 1981 refs
Avail: SOD HC

System failures and their implications are discussed The calculation, assignment, and management of the risks involved with information system failures, were examined. T.M.

N82-13057# Smiths Industries Ltd., Bishops Cleeve (England). Aerospace and Defence Systems
COMMAND-RESPONSE DATA TRANSMISION TO MECHANICAL SYSTEMS MANAGEMENT EFFECT ON THE CREW/SYSTEM INTERFACE
I. MOIR (British Aerospace Aircraft Group)03(British Aerospace Aircraft Group), C. MOXEY, and P. A. LANCASTER *In* AGARD The Impact of New Guidance and Control Systems on Mil. Aircraft Cockpit Design 12 p Aug. 1981
Avail: NTIS HC A10/MF A01

The availability of low cost, high reliability micro-electronic digital devices digital data transmission systems an attractive proposition for aircraft data handling systems. Apart from the advantages of accuracy and high data rates which digital devices offer, significant improvements in system performance, weight and reliability are possible. Initially the use of digital data system was confined to aircraft avionics systems embracing navigation, weapon aiming and flight control functions. More recently the application techniques extended to the centralized control of mechanical system management. A example of an engine failure and shut-down in flight is given to demonstrate the interactive nature of data handling between two data buses and the effects upon advanced cockpit displays. A.R.H.

N82-15109# Max-Planck-Institut fuer Kernphysik, Heidelberg (West Germany).
AERONOMY SATELLITES AEROS A AND B: THE ASSISTANCE TO THE PROJECT BY THE PROJECT SCIENTIST Final Report, Apr. 1981
P. LAEMMERZAHL Bonn Bundesministerium fuer Forschung und Technologie Aug. 1981 43 p refs In GERMAN, ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-W-81-029; ISSN-0170-1339) Avail: NTIS HC A03/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 9,05

With the German-U.S. research satellite AEROS-A and the German satellite AEROS-B the most important aeronomic parameters in the upper atmosphere were measured between December 1972 and September 1975. Simultaneous observations of densities, composition, and temperatures of both the atmospheric neutral gas and the ionospheric plasma and, in addition, of the solar energy influx in the extreme ultraviolet was essential to allow for an integrated analysis of the aeronomic interactive processes. The responsibility within the project management for all scientific matters was with the project scientist, and this report is on his contribution to meet the goal of the mission. Also the experimental and mission aspects, the management organization, the project development, and the major science return from the AEROS program are explained Author

02 PROJECT OR SYSTEMS MANAGEMENT

N82-15816# Stichting Mathematisch Centrum, Amsterdam (Netherlands). Dept. of Operations Research.
ANALYSIS OF HEURISTICS FOR STOCHASTIC PROGRAMMING: RESULTS FOR HIERARCHICAL SCHEDULING PROBLEMS
M. A. H. DEMPSTER (Oxford Univ.), M. L. FISHER (Pennsylvania Univ.), L. JANSEN (Algemene Bank Nederland), B. J. LAGEWEG, J. K. LENSTRA, and A. H. G. RINNOOYKAN (Erasmus Univ.) Jun. 1981 26 p refs Submitted for publication
(Contract NSF ENG-78-26500; NATO-9.2.02(SRG), NATO-1575) (MC-BUT-142/81) Avail: NTIS HC A03/MF A01, Stichting Mathematisch Centrum, Amsterdam FL 3,15

Certain multi-stage decision problems that arise frequently in operations management planning and control allow a natural formulation as multi-stage stochastic programs. In job shop scheduling, for example, the first stage could correspond to the acquisition of resources subject to probabilistic information about the jobs to be processed, and the second stage to the actual allocation of the resources to the jobs given deterministic information about their processing requirements For two simple versions of this hierarchical scheduling problem, heuristic solution methods are described and their performance is shown asymptotically optimal both in expectation and in probability.
T.M.

N82-15982# Oak Ridge National Lab., Tenn.
ROLE OF ENGINEERING JUDGEMENT AND THE COMPUTER IN THE MANAGEMENT OF MATERIAL PROPERTY DATA
M. K. BOOKER 1980 5 p Presented at the ASMB Century 2 Emerging Technol. Conf., San Francisco, 13-14 Aug. 1980
(Contract W-7405-ENG-26)
(DE81-028630; CONF-800804-43) Avail: NTIS HC A02/MF A01

The considerations involved in development of a successful computer based data system include: (1) several specialized systems are preferred to a single all encompassing system; (2) the system should be directed by materials experts, but should utilize computer experts; (3) all aspects of the system should emphasize flexibility; (4) an on line master file should be maintained with off line backup files; (5) charactenzation of data should take precedence over volume of data; (6) accuracy of input data should take precedence even over characterization, an interactive, on line textural numerical search and retrieval program is needed; and (7) the system should be a dynamic data management tool, not a passive repository for data flexible capabilities for analysis and display of data are essential. DOE

N82-16921*# National Aeronautics and Space Administration, Washington, D. C.
PRINCIPLES OF PROJECT MANAGEMENT
Jan. 1982 8 p
(NASA-TM-84089; NHB-7120.2) Avail: NTIS HC A02/MF A01 CSCL 05A

The basic principles of project management as practiced by NASA management personnel are presented. These principles are given as ground rules and guidelines to be used in the performance of research, development, construction or operational assignments. J.M.S

N82-18056# Commission of the European Communities, Ispra (Italy). Joint Research Center.
ORDER: A PROGRAM PACKAGE FOR INFORMATION ON MANAGEMENT OF STAFF ACTIVITIES AND EXPENDITURES
J. EDER, C. PAGNY, and H. REYLANDER 1981 46 p Partly in ENGLISH and FRENCH Submitted for publication
(EUR-7442-EN) Avail: NTIS HC A03/MF A01

A set of two programs for information on management of staff activity and expenditures executed by a Division or other unit is presented. In order to render a detailed and transparent account for the employment of staff and for the utilization of resources, computer programs were developed. The base is given by existing staff, previsions on how to employ these persons in the scope of certain research programs (jobs), and accorded credits. A monthly updating data input consists of actual working time of each person employed for the job to which he is engaged and expenditures. This data is compiled in data sets on disk The program allows elaboration and sorting of various listings, the most important of them being: (1) staff and organization of the Division; (2) activity and budget reports; and (3) orders and other expenditures.
J.M.S

N82-19088# Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany). Betriebsbereich.
GROUND WORK FOR PROJECT ORGANIZATION IN DEVELOPMENT PROJECTS: EXPERIENCE IN SPACE FLIGHT [GRUNDSAETZE DER PROJEKTORGANISATION BEI ENTWICKLUNGSPROJEKTEN - ERFAHRUNGEN AUS DER RAUMFAHRT]
B. J. MADAUSS 13 Jun. 1980 14 p In GERMAN
(MBB-UR-476-81-O) Avail: NTIS HC A02/MF A01

The principles of the project organization in development projects, especially in space technology, were examined. The following topics are discussed: high technological requirements; participation of national and international organizations; contractors; administration; industrial syndicate contracts; mission and responsibility of project management; necessary competence of project management; typical functions of the project organization in R&D projects in space technology; operational project organization; interndustnal project organization.
Transl. by E.A.K.

N82-19095# Mitre Corp., McLean, Va.
THE INTEGRATED LIBRARY SYSTEM (ILS): USER MANUAL
S. E. SELANDER, E. A PAYNE, G. FREIBURGER, and L. B. BROGAN Jul. 1981 292 p
(Contract N01-LM-0-3526)
(PB82-114968; NLM/DF-81/003A; NLM/LHC-CR-81-06) Avail: NTIS HC A13/MF A01 CSCL 05B

The Integrated Library System (ILS) is a minicomputer based library automation system designed to support a full range of technical processing and retrieval activities using a single master bibliographic file (MBF). This document presents a full user manual for all ILS functions that are available in ILS Version 2.0. The text in this document is identical to the online HELP text provided with the ILS software, but has been somewhat reorganized here into a format more suitable for a printed document. GRA

N82-19296# Engins Matra, Velizy (France)
EXUV. PHASE A STUDY. VOLUME 4: SATELLITE DEVELOPMENT PROGRAM Final Report
Paris ESA Nov. 1979 51 p Prepared in cooperation with British Aerospace Dynamics Group, Bristol, England and Dornier-Werke G.m.b.H., Friedrichshafen, West Germany 5 Vol.
(Contract ESTEC-3846/79/NL-MS)
(REPT-44/69/JS/CB-VOL-4; ESA-CR(P)-1481-VOL-4) Avail: NTIS HC A04/MF A01

Model utilization in the EXUV satellite development program is discussed and a master time schedule is outlined. Assembly, integration, test and launch plan are described. Ground support equipment specifications are given. A combination prototype/flight model offers large cost savings, as does a structural/thermal model. The master schedule comprises a 12 month project definition phase and a 36 month development/protoflight phase. Integration and test sequences include launch operations, structure/thermal model tests, engineering model tests, and prototype/flight model tests. Ground support equipment consists, where possible, of concepts, designs and test equipment from previous ESA programs.
Author (ESA)

N82-19841# Navy Personnel Research and Development Center, San Diego, Calif.
HUMAN FACTORS IN SYSTEM DEVELOPMENT: STATUS AND EVALUATION
D. MEISTER *In* Research Inst. of National Defence Human Factors in System Develop.: Experiences and Trends p 15-76 Jun. 1981 refs
Avail. NTIS HC A08/MF A01

Human factors in system development as it is presently performed in the U.S. is described. What is achieved and remaining problems are discussed, indicating research requirements and how human factors research does or does not satisfy these requirements. The way in which the developmental human factors engineer performs and the kinds of information needed are determined by circumstances under which the work is done These circumstances make demands for supporting human factors research which to a large extent are not now being satisfied. As a consequence, the developmental human factors engineer's ability to perform system development tasks is severely impaired.
Author (ESA)

N82-19935# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil)
A MODEL FOR DIMENSIONING A CORRECTIVE MAINTENANCE SYSTEM M.S. Thesis - 17 Nov. 1980 [UM MODELO PARA DIMENSIONAMENTO DE UM SISTEMA DE MANUTENCAO CORRETIVA]
F. M A. REIS Sep 1981 208 p refs In PORTUGUESE; ENGLISH summary
(INPE-2233-TDL/064) Avail: NTIS HC A10/ A01

The design of an auxiliary tool to be used in systems planning, the objective of which is to maintain other systems, is discussed. The planner's task may be defined as the minimization of the relationship between the total cost of the maintenance system and the operating system availability, subjected to the restrictions of minimal acceptable availability and reliability for the operating system and a given budget. A simulation model is developed; interactions between the two systems and component supply are observed. The maintenance and repair tasks are reproduced. The simulation output consists of estimates for availability, total cost, and other statistics. This output allows the planner to evaluate changes in the objective function caused by variations in the maintenance system parameters. M.G.

N82-20008# General Electric Co., Santa Barbara, Calif. Center for Advance Studies.
PLANNING STUDY TO ESTABLISH DOD MANUFACTURING TECHNOLOGY INFORMATION ANALYSIS CENTER Final Technical Report, May 1980 - Jan. 1981
Jan. 1981 191 p refs
(Contract DAAG46-80-C-0026)
(AD-A108925; GE80TMP-43) Avail: NTIS HC A09/MF A01 CSCL 05A

Based on the results of the planning study, it is recommended that the DoD sponsor and initiate administrative procedures to establish an MTIAC within 2 years with the mission of improving the diffusion of DoD Manufacturing Technology (MT) program results by serving as a focal point between defense-related industries and the Military Services. It is also recommended that the MTIAC be: (1) Operated and staffed by one of several qualified nongovernment, DoD contractor organizations; (2) Administered by DLA and technically monitored by a Military Services agency such as AMMRC; and (3) Initially funded (by OSD and the Military Services) at an annual level ranging from $400,000 to $700,000 with a growth not to exceed $1,000,000 in 5 years. GRA

N82-20011# Messerschmitt-Boelkow-Blohm G.m.b.H , Ottobrunn (West Germany). Unternehmensbereich Raumfahrt.
TRANSFER OF AEROSPACE PROJECT MANAGEMENT TO THE DEVELOPMENT OF TECHNICAL SERIES PRODUCTION [NUTZUNG DES PROJEKT-MANAGEMENTS AUS DER RAUMFAHRT FUER DIE ENTWICKLUNG TECHNISCHER SERIENPRODUKTE]
B. MADAUSS 1981 47 p Partly in GERMAN and ENGLISH Presented at Battelle-Inst. Conf. on Management von Entwicklungsprojekten, Frankfurt, 26-27 Mar., 1981
(MBB-UR-482-81-O) Avail: NTIS HC A03/MF A01

The application of aerospace management techniques to commercial systems management was examined. To establish criticality and sequence of action the following measures are outlined: identification of most critical problems; layout of a complete plan for everything; identify placing elements. Aerospace management techniques are cited: decision analysis, technological forecasting, system engineering management, reliability analysis, value engineering, management information systems, and quality assurance Transl by E.A K.

N82-20199*# Boeing Aerospace Co., Seattle, Wash Large Space Systems Group.
SPACE OPERATIONS CENTER SYSTEM ANALYSIS STUDY EXTENSION. VOLUME 1: EXECUTIVE SUMMARY Final Report, Jun. 1980 - Dec. 1981
Jan. 1982 94 p refs Prepared in cooperation with Hamilton Standard, Hartford, Conn., and Grumman Aerospace Corp., Bethpage, N.Y. 4 Vol.
(Contract NAS9-16151)
(NASA-CR-167555; NAS 1.26:167555; D180-26785-1) Avail: NTIS HC A05/MF A01 CSCL 22A

The analysis fo Space Operations Center (SOC) systems is summarized. Design considerations, configurations of the manned orbital space station, planned operational and research missions, and subsystem tradeoffs are considered. Integration into the space transportation system is discussed. A modular design concept permitting growth of the SOC as its functions are expanded is described. Additional considerations are special requirements for habitat modules, design modifications needed to operate in geosynchronous orbits, and use of the external tank for cryogenic propellant storage or as a pressurized hangar. A cost summary is presented. J.D H

N82-20200*# Boeing Aerospace Co., Seattle, Wash. Large Space Systems Group.
SPACE OPERATIONS CENTER SYSTEM ANALYSIS STUDY EXTENSION. VOLUME 2: PROGRAMMATICS AND COST Final Report, Jun. 1980 - Dec. 1981
Jan. 1982 66 p refs Prepared in cooperation with Hamilton Standard, Hartford, Conn., and Grumman Aerospace Corp., Bethpage, N. Y. 4 Vol.
(Contract NAS9-16151)
(NASA-CR-167556; NAS 1.26:167556; D180-26785-2) Avail: NTIS HC A04/MF A01 CSCL 22A

A summary of Space Operations Center (SOC) orbital space station costs, program options and program recommendations is presented. Program structure, hardware commonality, schedules and program phasing are considered. Program options are analyzed with respect to mission needs, design and technology options, and anticipated funding constraints. Design and system options are discussed. J.D.H.

N82-20201*# Boeing Aerospace Co., Seattle, Wash.
SPACE OPERATIONS CENTER SYSTEM ANALYSIS. VOLUME 3, BOOK 1: SOC SYSTEM DEFINITION REPORT, REVISION A Final Report, Jun. 1980 - Jan. 1982
Jan. 1982 325 p Prepared in cooperation with Hamilton Standard, Hartford, Conn , and Grumman Aerospace Corp., Bethpage, N. Y. 4 Vol.
(Contract NAS9-16151)
(NASA-CR-167559; NAS 1 26:167559; D180-26495-3) Avail: NTIS HC A14/MF A01 CSCL 22A

The Space Operations Center (SOC) orbital space station program and its elements are described. A work breakdown structure is presented and elements for the habitat and service modules, docking tunnel and airlock modules defined. The basis for the element's design is given. Mass estimates for the elements are presented in the work breakdown structure. J.D.H.

N82-20202*# Boeing Aerospace Co., Seattle, Wash.
SPACE OPERATIONS CENTER SYSTEM ANALYSIS. VOLUME 3, BOOK 2: SOC SYSTEM DEFINITION REPORT, REVISION A Final Report, Jun. 1980 - Jan. 1982
Jan. 1982 204 p refs Prepared in cooperation with Hamilton Standard, Hartford, Conn., and Grumman Aerospace Corp., Bethpage, N. Y. 4 Vol.
(Contract NAS9-16151)
(NASA-CR-167560, NAS 1.26:167560, D180-26495-3-REV-A)
Avail: NTIS HC A10/MF A01 CSCL 22A

The Space Operations Center (SOC) orbital space station program operations are described A work breakdown structure for the general purpose support equipment, construction and transportation support, and resupply and logistics support systems is given. The basis for the design of each element is presented, and a mass estimate for each element supplied The SOC build-up operation, construction, flight support, and satellite servicing operations are described. Detailed programmatics and cost analysis are presented. J.D.H.

N82-20365*# Hughes Aircraft Co., El Segundo, Calif. Space and Communications Group.
THE 30/20 GHZ FLIGHT EXPERIMENT SYSTEM, PHASE 2. VOLUME 4: EXPERIMENT SYSTEM DEVELOPMENT PLAN Final Report, Apr. 1980 - Mar. 1981
L. BRONSTEIN, Y. KAWAMOTO, J J. RIBERICH, J. R SCOPE, B. J. FORMAN, S. G. BERGMAN, and S. REISENFELD Jul. 1981 40 p 4 Vol.
(Contract NAS3-22340)
(NASA-CR-165409-VOL-4, SCG-8103411R, NAS 1 26:165409-VOL-4; SCG-810341R) Avail: NTIS HC A03/MF A01 CSCL 17B

The development plan for the 30/20 GHz flight experiment system is presented A master program schedule with detailed development plans for each subsystem is planned with careful attention given to how technology items to ensure a minimal risk. The work breakdown structure shows the organization of the program management with detailed task definitions. The ROM costs based on the development plan are also given R.J.F

N82-20495*# Automation Industries, Inc., Silver Spring, Md.
PRECISE TIME AND TIME INTERVAL USERS, REQUIREMENTS AND SPECIFICATIONS
J. R. BOWSER *In* NASA. Goddard Space Flight Center Proc. of the 13th Ann. Precise Time and Time Interval (PTTI) Appl. and Planning Meeting p 27-42 Mar. 1982
Avail: NTIS HC A99/MF A01 CSCL 20E

The functional areas of application of Precise Time and Time Interval (PTTI) were considered and expanded. A comprehensive overview of the PTTI requirements and applications would provide an opportunity for individuals working in a specific functional area. Mutual problems, requirements, applications or successes shared by those in other functional areas were studied. Based upon the results of a two year study a compendium of PTTI requirements, applications and the means of meeting the requirements among Department of Defense components, other government agencies and major commercial users was compiled and is presented. It was found that the planning process for PTTI support for new acquisitions or new programs was less than a well defined, coordinated process. The processes are described in general terms and a generic model for requirements determination and subsequent coordination which may enhance the planning process and introduce cost benefits to the program is also presented. M.D.K.

N82-20899 California Univ., Berkeley.
SOFTWARE REQUIREMENTS ENGINEERING: EXPERIENCE AND NEW TECHNIQUES Ph.D. Thesis
C W NAM 1981 154 p
Avail: Univ. Microfilms Order No. 8200224

The software requirements development process is investigated. Activities from the initial conception of a system through the development of software requirements specification are described. A framework for software requirements engineering (SRE) is developed in a comprehensive manner with three interrelated subjects context analysis, functional specifications, and design constraints. This includes functional architecture of systems, characteristics of good requirements specification, personnel involved in the process of analysis, and management guidelines that are effective even in complex environments. The SRE principles include formal definitions for system requirements, system function, system function decomposition, and the subsequent design. Here, decomposition is defined as a set of interacting sub-functions and requirements in terms of the primitive concepts of sequences of inputs and outputs, sequences of transformations, and performance indices. Dissert. Abstr.

N82-21094# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Systems and Logistics.
IDENTIFICATION OF AN ADAPTABLE COMPUTER PROGRAM DESIGN FOR ANALYZING A MODULAR ORGANIZATIONAL ASSESSMENT INSTRUMENT M.S. Thesis
J B. BUSHMAN Sep. 1981 194 p refs
(AD-A109879, AFIT-LSSR-50-81) Avail: NTIS HC A08/MF A01 CSCL 05A

The purpose of this study was to identify an adaptable computer program design for analyzing the data collected by the Organizational Assessment Package (OAP) which would be responsive to the needs of management consultants within the Air Force The system described provides consultants with a means by which potential problem areas within Air Force organizations can be identified, thus increasing the consultant's efficiency during the diagnostic phase. The system is flexible in that it will accept survey data from a wide range of survey structures. This feature provides consultants with a means by which the analysis of an organization can be tailored to the specific needs and problems of the organization. The development and implementation of this system will provide a means for the management consultants to better serve commanders throughout the Air Force and improve the overall effectiveness of the Air Force. Author (GRA)

N82-21250*# Lockheed Engineering and Management Services Co., Inc , Houston, Tex.
AVIONICS TEST BED DEVELOPMENT PLAN
L. H. HARRIS, J. M. PARKS, and C. R. MURDOCK Dec. 1981 89 p
(Contract NAS9-15800)
(NASA-CR-167579; NAS 1.26:167579; JSC-17859; LEMSCO-17155A) Avail. NTIS HC A05/MF A01 CSCL 22B

A development plan for a proposed avionics test bed facility for the early investigation and evaluation of new concepts for the control of large space structures, orbiter attached flex body experiments, and orbiter enhancements is presented. A distributed data processing facility that utilizes the current laboratory resources for the test bed development is outlined. Future studies required for implementation, the management system for project control, and the baseline system configuration are defined. A background analysis of the specific hardware system for the preliminary baseline avionics test bed system is included. E.A.K.

N82-21251*# Lockheed Engineering and Management Services Co., Inc., Houston, Tex. Engineering Development and Integration Branch.

AVIONICS TEST BED DEVELOPMENT PLAN

L. H. HARRIS, J. M. PARKS, and C R. MURDOCK Dec. 1981 37 p

(Contract NAS9-15800)

(NASA-CR-167580; NAS 1.26:167580; JSC-17859; LEMSCO-17155A-SUPPL) Avail: NTIS HC A03/MF A01 CSCL 22B

The plan is for a facility for the early investigation and evaluation of new concepts for the control of large space structures, orbiter attached flex body experiments, and orbiter enhancements. This plan outlines a distributed data processing facility that will utilize the current JSC laboratory resources for the test bed development. The future studies required for implementation, the management system for project control, and the baseline system configuration are described. T.M.

N82-22081*# National Aeronautics and Space Administration, Washington, D. C.

THE SPACELAB PROJECT: A TRANSATLANTIC CHALLENGE FOR EUROPE

D. R. OTTEMEYER Dec. 1981 17 p Transl. into ENGLISH from Astronautik (West Germany), v. 13, no. 3, 1976 p 57-60 Translation announced as A76-43294 Transl. by Kanner (Leo) Associates, Redwood City, Calif. Original doc. prep. by ERNO Raumfahrttechnik GmbH, Bremen

(Contract NASW-3541)

(NASA-TM-76656; NAS 1.15.76656) Avail: NTIS HC A02/MF A01 CSCL 22A

The contribution of Europe to the U.S. space program is related to the development of Spacelab. The Federal Republic of Germany is to contribute 53% and Italy 18% of the expenses. The industrial team conducting the development work for the Spacelab consists of experts from firms of the ten nations participating financially in the program. Attention is given to organizational problems, details on the development program, aspects of mission preparation, and future developments. R.J.F.

N82-23994# Michigan Univ., Ann Arbor.

THE SOFTWARE DEVELOPMENT FACILITY APPROACH TO IMPROVED SOFTWARE DEVELOPMENT Ph.D. Thesis

D. W. JOHNSON 1981 231 p

Avail: Univ. Microfilms Order No. 8125141

An approach to the solution of problems in the development of software to meet data and information processing needs is presented. The software development facility (SDF) approach involves the integration of software tools into an easy to use decision support system. A descriptive model of a software system and the various environments in which such a software system could operate is provided. This model provides the motivation and foundation for the design of a generalized SDF which can be adapted to differing organizational and development support environments. The adaptability is accomplished by the use of a 'meta' definition function which allows an organization to describe software objects and relationships between objects of particular interest. A tool control function which integrates the various tools used in the development process is included. All pertinant data about the development process is maintained by a data base management function. The major usage functions include design, reporting, construction, testing, and management support. All user interaction with the SDF is via a user-friendly command language A prototype develpment facility and its use on a specific software project are described. Results from the project show a substantial reduction in the manpower required when using the software development facility. Dissert. Abstr.

N82-23998*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

GUIDE TO DATA COLLECTION

Sep 1981 121 p

(NASA-TM-84181; NAS 1.15:84181; SEL-81-001) Avail: NTIS HC A06/MF A01 CSCL 09B

Guidelines and recommendations are presented for the collection of software development data. Motivation and planning for, and implementation and management of, a data collection effort are discussed Topics covered include types, sources, and availability of data; methods and costs of data collection; types of analyses supported; and warnings and suggestions based on software engineering laboratory (SEL) experiences. This document is intended as a practical guide for software managers and engineers, abstracted and generalized from 5 years of SEL data collection. Author

N82-24127# Pattern Analysis and Recognition Corp., Rome, N Y

SABERS: STAND-ALONE ADIC BINARY EXPLOITATION SUMMARY, FISCAL YEAR 1982 Final Technical Report, Apr. 1978 - Jan. 1981

A. J. FRANKLIN, R. L. CALDWELL, S COLE, T. L. MCGIBBON, K H MICHEL, and J. R. WILSON Griffiss AFB, N Y. RADC Sep. 1981 367 p refs 3 Vol.

(Contract F30602-78-C-0078; AF PROJ. 1955)

(AD-A110273, RADC-TR-81-250-VOL-3) Avail: NTIS HC A16/MF A01 CSCL 09B

Computer system operations are presented Programming support information is provided Emphasis is given to graphics applications N.W.

N82-24129# Pattern Analysis and Recognition Corp , Rome, N Y.

SABERS: STAND-ALONE ADIC BINARY EXPLOITATION RESOURCES SYSTEM, VOLUME 1 Final Technical Report, Apr. 1978 - Jan. 1981

A. J. FRANKLIN, R. L. CALDWELL, S. COLE, T. L. MCGIBBON, K. H. MICHEL, and J. R. WILSON Griffis AFB, N.Y. RADC Sep. 1981 120 p 3 Vol.

(Contract F20602-78-C-0078, AF PROJ. 1955)

(AD-A110271; RADC-TR-81-250-VOL-1) Avail: NTIS HC A06/MF A01 CSCL 09B

SABERS software architecture is discussed. The interprocess communications mechanism is presented. Data bases and data files are discussed. Graphics applications are explained. N.W.

N82-24130# Pattern Analysis and Recognition Corp , Rome, N. Y.

SABERS: STAND-ALONE ADIC BINARY EXPLOITATION RESOURCES SYSTEM, VOLUME 2 Final Technical Report, Apr. 1978 - Jan. 1981

A. J FRANKLIN, R. L. CALDWELL, S. COLE, T L MCGIBBON, K. H. MICHEL, and J R. WILSON Griffiss AFB, N.Y. RADC Sep. 1981 297 p 3 Vol.

(Contract F30602-78-C-0078; AF PROJ. 1955)

(AD-A110272, RADC-TR-81-250-VOL-2) Avail: NTIS HC A13/MF A01 CSCL 09B

Terminal operating procedures are enumerated. System commands are explained. Interactive processing is discussed. N.W.

N82-24240# Observatoire de Meudon (France).

DEVELOPMENT OF AN EXPERIMENT BY THE PRIME CONTRACTING LABORATORY [DEVELOPPEMENT D'UNE EXPERIENCE EN MAITRISE D'OEUVRE TOTALE DE LABORATOIRE]

M. RENE and S. KNOLL *In* CNES The Technol. of Spaceborne Sci. Expt. p 689-721 1981 refs In FRENCH

Avail: NTIS HC A99/MF A01

The various development phases of a spaceborne experiment are considered. Scientific space research is situated with respect to other (military, commercial) space activities. Citing the ISPM

program as an example, preliminary studies that lead up to the definition of an experiment are reviewed. Task and feasibility analyses follow. An engineering model results and the choice of appropriate technology is discussed. The identification model is then built which undergoes a rigorous test program. When the complete system is integrated and functional, flight models are fabricated which are subject to final adjustments The smooth and harmonious interaction of all elements of a development program is stressed. Author (ESA)

N82-24243# Centre National d'Etudes Spatiales, Toulouse (France).
ORGANIZATION OF A DATA PROCESSING PROJECT [ORGANISATION D'UN PROJET INFORMATIQUE DE REALISATION DE TRAITEMENT DES DONNEES]
D. HERMELIN *In its* The Technol. of Spaceborne Sci. Expt. p 769-799 1981 refs In FRENCH
Avail: NTIS HC A99/MF A01

The importance of coordinating data processing with the development and execution of a spaceborne experiment is considered. The system must be coherent overall (experiment + platform + data collection network, localization, dating and processing). The productivity of a computer programming team is modeled. Two people do not produce twice as much as one. The computer program development team is discussed, relating to its hierarchy, its organization, and the responsibilities of the project manager. Management and quality control are treated. The various phases of the development project are defined. Author (ESA)

N82-24244# Centre de Recherches en Physique de l'Environnement, Issy-les-Moulineaux (France).
OPERATION OF AN ONBOARD EXPERIMENT: OPERATIONAL ORGANIZATION AND DATA PROCESSING FOR THE GEOS PROJECT [EXPLOITATION D'UNE EXPERIENCE EMBARQUEE ORGANISATION DES OPERATIONS ET DU TRAITEMENT DES DONNEES. EXEMPLE DU PROJET GEOS]
B. DELAPORTE *In* CNES The Technol. of Spaceborne Sci. Expt. p 801-829 1981 In FRENCH
Avail NTIS HC A99/MF A01

The operation of satellite-borne instruments, assuming a successful launch, and subsequent data collection and distribution are discussed. The functioning of the GEOS satellites, possibilities for immediate response to operational problems, and principles of data selection and information dissemination are treated. Satellite servocommand operations are summarized. The GEOS mission is recalled and the onboard experiments are listed. Constraints imposed by a geostationary orbit are dealt with and the general operational philosophy is stated. Startup of the experiments and ground support facilities is defined. Telecommand philosophy, real time processing, and project organization are reviewed. Author (ESA)

N82-24249# Centre National d'Etudes Spatiales, Toulouse (France).
WORKING UP A PREPROCESSING SYSTEM [REALISATION D'UNE CHAINE DE PRETRAITEMENT]
D. MONCHY *In its* The Technol. of Spaceborne Sci. Expt. p 925-951 1981 refs In FRENCH
Avail: NTIS HC A99/MF A01

Writing a computer program can be decomposed and the difficulties that arise with spaceborne systems are explained Projects concerned are balloon-borne experiments, satellite-borne black box experiments, French scientific experiments, and applications satellites. Program definition and client specifications are considered. A typical functional analysis is presented and an architecture is proposed. Computer programming is described in stages, in relation to norms, and for purposes of simulation. Functional acceptance, integration, and system startup are covered. Problems, involving client relations, are also mentioned. Author (ESA)

N82-24252# Centre National d'Etudes Spatiales, Toulouse (France).
THE DATA PROCESSING CAPABILITIES OF THE TOULOUSE SPACE CENTER (CST) [LES MOYENS INFORMATIQUES DU CST]
A DARGENT *In its* The Technol of Spaceborne Sci. Expt. p 983-1004 1981 In FRENCH
Avail. NTIS HC A99/MF A01

The equipment and services available through the data processing center are described. The role played by data processing in a space program is summarized. Tasks include calculations for mission definition and analysis, spacecraft development, launch, and spaceborne experiment data exploitation. The responsibilities of the data processing center to the user are covered and information dissemination is outlined. Data processing equipment at the center is listed and capabilities are specified. Details on the various user services are given. Author (ESA)

N82-24257# Joint Publications Research Service, Arlington, Va.
OPERATIONS AT FLIGHT CONTROL CENTER
A. MILITSIN *In its* USSR Rept.: Space, No. 15 (JPRS-80424) p 20-23 29 Mar. 1982 Transl. into ENGLISH from Aviats. Kosmonavt. (USSR), no. 12, Dec. 1981 p 40-41
Avail: NTIS HC A07/MF A01

The preparations which preceeded the launch of a spacecraft are outlined. The launch is the culmination of one stage of operations and it marks the start of another. It starts with the design of the space vehicle which gives birth to a new flight control center which means that new means and control principles are required. The design, development and introduction form the basic subject of concern. The ballistics experts calculate trajectories, the controllers plan the flight program, the mathematicians derive the algorithms and write the programs, the communications people and computer specialists select new technical and computer equipment. Training for personnel and the equipment follows Coordination, mutual understanding and decision making on an operational basis and under any conditions, are developed. Situations are modeled on special simulators or played out by leaders in comprehensive training sessions. The flight control center is the place that prepares the flight. E.A.K.

N82-24271*# Boeing Aerospace Co., Seattle, Wash.
SPACE OPERATIONS CENTER SYSTEM ANALYSIS: REQUIREMENTS FOR A SPACE OPERATIONS CENTER, REVISION A Final Report, Aug. - Dec. 1981
G R. WOODCOCK Jan. 1982 72 p
(Contract NAS9-16151)
(NASA-CR-160944; NAS 1.26:160944; D180-26495-2-REV-A; REPT-2-1634-REV-A) Avail: NTIS HC A04/MF A01 CSCL 14B

The system and program requirements for a space operations center as defined by systems analysis studies are presented as a guide for future study and systems definition. Topics covered include general requirements for safety, maintainability, and reliability, service and habitat modules, the health maintenance facility; logistics modules; the docking tunnel; and subsystem requirements (structures, electrical power, environmental control/life support; extravehicular activity; data management; communications and tracking; docking/berthing; flight control/propulsion; and crew support). Facilities for flight support, construction, satellite and mission servicing, and fluid storage are included as well as general purpose support equipment. A.R.H.

N82-24729# Mid-American Solar Energy Complex, Minneapolis, Minn.
SUMMARY OF DESIGNS FOR NEW RESIDENTIAL SINGLE-FAMILY ACTIVE WATER AND SPACE HEATING
Sep. 1981 6 p refs
(Contract DE-AC02-79CS-30150)
(DE82-002280; MASEC-R-81-052) Avail: NTIS HC A02/MF A01

The history of program planning and contract negotiations are traced until the residential solar water and space heating program was dropped for lack of funding. DOE

N82-25021# Georgia Inst. of Tech., Atlanta. School of Information and Computer Science.
RESEARCH PROGRAM IN FULLY DISTRIBUTED PROCESSING SYSTEMS Quarterly Progress Report, 1 Jun. - 31 Aug. 1981
Oct. 1981 14 p refs
(Contract N00014-79-C-0873; F30602-78-C-0120; F30602-81-C-0249; DAAG29-79-C-0155; DAAK70-79-D-0087; NSF MCS-79-24370; GIT PROJ. G36-647; GIT PROJ. G36-652; GIT PROJ. G36-643; GIT PROJ. G36-654; GIT PROJ. G36-659; GIT PROJ. G36-638)
(AD-A111723; QPR-8) Avail. NTIS HC A02/MF A01 CSCL 09B

The Georgia Tech Research Program in Fully Distributed Processing Systems is a comprehensive investigation of data processing systems in which both the physical and logical components are extremely loosely coupled while operating with a high degree of control autonomy at the component level. The definition of the specific class of multiple computer systems being investigated, and the operational characteristics and features of those systems is motivated by the desire to advance the state-of-the-art for that class of systems that will deliver a high proportion of the benefits currently being claimed for distributed processing systems. The scope of individual topics being investigated under this program ranges from formal modeling and theoretical studies to empirical examinations of prototype systems and simulation models. Also included within the scope of the program are areas such as the utilization of FDPS's and their interaction with management operations and structure.
Author (GRA)

N82-25892*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
MANAGEMENT AND CONTROL OF SELF-REPLICATING SYSTEMS: A SYSTEMS MODEL
G VONTIESENHAUSEN Feb. 1982 36 p refs
(NASA-TM-82460; NAS 1.15:82460) Avail: NTIS HC A03/MF A01 CSCL 12B

In 1980, a conceptual engineering approach to self-replicating systems was achieved. The design was based on von Newmann's kinematic version of self-replicating automata. The systems management and control and the organization of the control elements are reported. After developing the functional requirements of such a system, a hierarchy of three management and control levels is described. These are an autonomous, an external, and an intelligent management and control system. Systems recycling, systems specialization, and information replication are discussed
Author

N82-26998# General Systems Group, Inc., Salem, N.H.
NATIONAL SOFTWARE WORKS TOOL INTEGRATION STUDIES Final Technical Report, Dec. 1978 - Apr. 1981
N. RASMUSSEN Griffiss AFB, N.Y. RADC Nov. 1981 178 p refs
(Contract F30602-79-C-0106; AF PROJ. 2531; ARPA ORDER 3686)
(AD-A111317; RADC-TR-81-309) Avail: NTIS HC A09/MF 01 CSCL 09B

This final technical report documents the following specific activities of the subject contract: (1) Review of the NSW project organizational structure, including roles, responsibilities and contractor assignments; (2) Description of the NSW development process; (3) Survey of the NSW system architecture and user functionality; (4) Establishment of the current operational status of NSW including the chronology of major events; and finally (5) Serve as an introductory NSW tutorial for new users.
Author (GRA)

N82-27992# Ben Gurion Univ. of the Negev, Beersheva (Israel). Dept. of Electrical Engineering
PROCESSING OF ENCRYPTED COMMERCIAL DATA
B. ARAZI Pretoria National Research Inst. for Mathematical Sciences Sep. 1981 14 p refs
(CSIR-TWISK-225) Avail: NTIS HC A02/MF A01

A simple encryption scheme is suggested for processing encrypted commercial data stored in the memory of a central computer offering a time sharing service The validity of the scheme is deduced from certain basic characteristics of commercial data processing. Maintenance of the security of commercial information is made possible. J.D.

N82-28225# Institute for Defense Analyses, Arlington, Va. Science and Technology Div.
THE CRITICAL TECHNOLOGIES PROJECT EXECUTIVE SUMMARY Report, Dec. 1979 - Oct. 1980
Jan. 1981 97 p
(Contract MDA903-79-C-0018)
(AD-A107489, AD-E500431, IDA-R-258; IDA/HQ-81-23259)
Avail: NTIS HC A05/MF A01 CSCL 15C

The Critical Technologies Project, to develop recommended entries for the Militarily Critical Technologies List (MCTL) in selected technology areas to introduce an MCTL into the export control procedures is discussed. Author

N82-29069# Carnegie-Mellon Univ., Pittsburgh, Pa. Dept. of Computer Science.
DECENTRALIZED RESOURCE MANAGEMENT IN DISTRIBUTED COMPUTER SYSTEMS Final Technical Report, May - Oct. 1980
H. L. APPLEWHITE, R. GARG, E. D. JENSEN, J D. NORTHCUTT, L. SHA, and J. W. WENDORF Griffiss AFB, N.Y. RADC Feb. 1982 94 p refs Sponsored in part by Natural Science and Engineering Research Council of Canada
(Contract F30602-78-C-0099; AF PROJ. 5581)
(AD-A113255; RADC-TR-81-203) Avail: NTIS HC A05/MF A01 CSCL 09B

This is the first technical report from The Archons project, which is performing research in the science and engineering of 'distributed computers'. By this we mean a computer having highly decentralized (e g , consensus) resource management at every level of abstraction from the executive down. This report provides a snapshot of several incomplete, ongoing investigations: decentralized synchronization; the requirements for simulation of decentralized resource management algorithms; and the facilities to be provided by a decentralized executive. We begin with a summary of our views on decentralized resource management and control, and the implications of physical communications on control (especially at the executive level). Then we briefly survey several other distributed system projects. This brings the Archons project into closer focus, as their orientations and objectives are considerably different from ours. Synchronization (the induction of a common, consistent ordering on events) is the essence of decentralized control. New concepts and techniques are required to achieve synchronization in distributed computers without reliance on any decentralized entity such as a semaphore, monitor, sequencer, or bus arbiter. GRA

N82-29073# RAND Corp., Santa Monica, Calif.
ARE ROBUSTNESS MEASURES ROBUST
R. Y. ARGUEDEN Jan. 1982 22 p refs Presented at RGI Tutorial: Robustness in Operations Res., 1981
(RAND/P-6734) Avail: NTIS HC A02/MF A01

To a large degree, the classical approach to problem solving in operations research (OR) is to fit a real life situation into a well-known OR model. When OR models are used to deal with major policy problems in which the underlying processes are not well understand, this effort results in too much simplification. Due to an inability to perceive all uncertainties, and a consequent wish to retain flexibility once the decisions are made, decisionmakers are more interested in the robustness of their policy decisions than their optimality, which becomes a vague concept due to the

nature of these problems. This paper emphasizes the desirability of robustness and criticizes attempts to fit an operationalized measure of robustness into an optimization structure, by the aid of a decision analytic example. Author

N82-29217*# Bowie State Coll., Md.
AUTONOMOUS SCHEDULING TECHNOLOGY FOR EARTH ORBITAL MISSIONS
S. SRIVASTAVA 1982 67 p refs
(Contract NGR-21-027-004)
(NASA-CR-168939; NAS 1 26.168939) Avail: NTIS HC A04/MF A01 CSCL 05A

The development of a dynamic autonomous system (DYASS) of resources for the mission support of near-Earth NASA spacecraft is discussed and the current NASA space data system is described from a functional perspective. The future (late 80's and early 90's) NASA space data system is discussed The DYASS concept, the autonomous process control, and the NASA space data system are introduced. Scheduling and related disciplines are surveyed. DYASS as a scheduling problem is also discussed. Artificial intelligence and knowledge representation is considered as well as the NUDGE system and the I-Space system. Author

N82-30136# R and D Associates, Arlington, Va
SUGGESTED CHANGES IN THE DEPARTMENTAL REVIEW PROCESS TO IMPROVE ENERGY TECHNOLOGY BASE MANAGEMENT Final Technical Report, Oct. 1980 - Apr. 1981
J. BENGSTON, R. B. DAVIDSON, and H. W. HEVERT Apr. 1981 52 p
(Contract DE-AC01-80ER-30005)
(DE82-004929; DOE/ER-30005/T1; RDA-TR-116500-001) Avail: NTIS HC A04/MF A01

The DOE procedures for technology base planning and assessment are reviewed. On the basis of this review, two recommendations for improved procedures are made. First, DOE should develop the capability to establish, maintain, and use a comprehensive, current inventory of technology base activities. Second, DOE should develop means for describing technology base plans and activities within DOE R and D programs in a way which is suitable for use in Department-wide review of the energy technology base. DOE

N82-30240*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
NETWORKS CONSOLIDATION PROGRAM
M. L. YEATER, D. T. HERMAN, and E. B. LUERS (Bendix Field Engineering Corp.) *In its* The Telecommun and Data Acquisition Rept. p 10-13 15 Jun. 1982 refs
Avail: NTIS HC A10/MF A01 CSCL 14B

Progress in the networks consolidations program (NCP) to combine the resources of the two NASA ground spacecraft tracking networks (the Deep Space Network, operated by JPL, and the ground spaceflight tracking and data network, operated by Goddard) into one consolidated network is reported. Management, design, and implementation activities occurring between August 1981 and April 1982 are addressed, with special emphasis on planning and budgeting activities. J.D.

N82-30241*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
MANAGEMENT AND DEVELOPMENT OF LOCAL AREA NETWORK UPGRADE PROTOTYPE
T. J. FOUSER *In its* The Telecommun. and Data Acquisition Rept. p 14-19 15 Jun. 1981
Avail: NTIS HC A10/MF A01 CSCL 05A

Given the situation of having management and development users accessing a central computing facility and given the fact that these same users have the need for local computation and storage, the utilization of a commercially available networking system such as CP/NET from Digital Research provides the building blocks for communicating intelligent microsystems to file and print services. The major problems to be overcome in the implementation of such a network are the dearth of intelligent communication front-ends for the microcomputers and the lack of a rich set of management and software development tools Author

N82-30249*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
THE DEVELOPMENT VERSION CONTROL AND VISIBILITY SUBSYSTEM
L. R. HAWLEY *In its* The Telecommun. and Data Acquisition Rept. p 113-116 15 Jun. 1982 refs
Avail. NTIS HC A10/MF A01 CSCL 05A

A prototype development version control and programming environment visibility subsystem (DVCS) is described. DVCS provides an implementation/management interface serving both the implementor and management. The DVCS provides the implementor listings annotated with change bars, detects errors in the block structure of the design and indicates when standards requiring the use of structured programming constructs in the design of software are violated. E.A.K.

N82-30956# Air Force Inst. of Tech, Wright-Patterson AFB, Ohio. School of Engineering.
A MANAGEMENT SYSTEM FOR COMPUTER PERFORMANCE EVALUATION M.S. Thesis
H. K. BIRCH Dec. 1981 134 p refs
(AD-A115538; AFIT/GCS/EE/81D-1) Avail: NTIS HC A07/MF A01 CSCL 05J

This study discusses the design and implementation of a management system that will provide an installation manager or manager of a computer system with the means to measure and evaluate the performance of their computer system. This system is composed of three parts; information, people, and reports. The information part of this system is a set of factors that can cause problems with computer performance and the data which can be gathered by various CPE tools and techniques used to solve these problems. The factors and data of the information portion of this management system are presented and discussed in this paper The reports section of this system is the most important part because this is what the installation manager or computer system manager will use to determine the performance of their computer system The responsibility of the reports and their accuracy lies with the CPE team. This paper discusses some of the reports that a CPE team can generate. GRA

N82-32548*# Jet Propulsion Lab, California Inst. of Tech., Pasadena.
TOP DOWN IMPLEMENTATION PLAN FOR SYSTEM PERFORMANCE TEST SOFTWARE
G. N. JACOBSON and A. SPINAK *In its* The Telecommun. and Data Acquisition Report p 190-199 15 Aug. 1982
Avail: NTIS HC A10/MF A01 CSCL 01B

The top down implementation plan used for the development of system performance test software during the Mark IV-A era is described. The plan is based upon the identification of the hierarchical relationship of the individual elements of the software design, the development of a sequence of functionally oriented demonstrable steps, the allocation of subroutines to the specific step where they are first required, and objective status reporting. The results are: determination of milestones, improved managerial visibility, better project control, and a successful software development. E.A.K.

03

LOGISTICS MANAGEMENT

Includes procurement, transportation, or maintenance of military materiel, facilities, or personnel.

A82-13473#
AVIONICS COMPONENT STANDARDIZATION - THE KEY TO MAINTAINABILITY
J. MARTIN (National Semiconductor Corp., Santa Clara, CA) In. Digital Avionics Systems Conference, 4th, St Louis, MO, November 17-19, 1981, Collection of Technical Papers. New York, American Institute of Aeronautics and Astronautics, 1981, p 163-167 (AIAA 81-2252)

The issue of maintability of avionics components is discussed with particular reference to problems currently seen within the logistical support system. Particular attention is given to nonstandard specifications, proliferation of part numbers, the problem of product obsolescence, and the problem of diminishing manufacturing sources. It is shown that standardization is essential for the long-term viability of the defense structure. V.L.

A82-14787
DBMS - A TOOL FOR SYSTEM LIFE CYCLE MANAGEMENT
D. L. SAIDMAN (Westinghouse Electric Corp., Hunt Valley, MD) In. NAECON 1981; Proceedings of the National Aerospace and Electronics Conference, Dayton, OH, May 19-21, 1981. Volume 2 New York, Institute of Electrical and Electronics Engineers, Inc., 1981, p. 903-908 refs

State-of-the-art implementations of computer software, known as data base management systems (DBMS), now offer the potential to effectively manage a variety of logistics-related data. This paper traces the evolution of data management, leading to the creation of DBMS, and the application of DBMS in logistics Several Westinghouse DBMS applications in logistics and LCC are discussed, including the use of the System 2000 DBMS to manage F-16 data and the use of the IMAGE DBMS in the Westinghouse Electronic Repair Center. B.J.

A82-15676
WORKSHOP ON CRITICAL MATERIALS NEEDS OF THE AEROSPACE INDUSTRY
J. B. WACHTMAN, JR (National Bureau of Standards, National Measurement Laboratory, Washington, DC) Resources and Conservation, vol 6, Aug. 1981, p 143-153.

A public workshop was held at the National Bureau of Standards (NBS) to assess the critical materials needs of the U.S. aerospace industry In attendance were more than 180 representatives from aerospace manufacturing companies and suppliers, as well as from a large number of government agencies. Following a full day of prepared remarks by industry and government materials experts, participants met in separate workshops to discuss: Supplies of Critical Raw Materials, Supplies of Critical Engineering Materials, and Substitution, Conservation, Specialized Recycling and Higher Performance. A summary of industry opinions and recommendations was prepared by the chairman of each workshop discussion group. (Author)

A82-27890#
ATE LOGISTICS IN THE UNITED STATES AIR FORCE
R H. FREEMAN (USAF, Aeronautical Systems Div, Wright-Patterson AFB, OH) In: AUTOTESTCON '80; International Automatic Testing Conference, Washington, DC, November 2-5, 1980, Proceedings. New York, Institute of Electrical and Electronics Engineers, Inc., 1980, p. 79-83

It is noted that the problems and complexities of ATE (automatic test equipment) have a dollar and mission impact that now demands visibility from all levels of USAF management. Several solutions have been proposed to minimize these difficulties. One of the more promising solutions is MATE (Modular Automatic Test Equipment), a cradle-to-grave acquisition methodology approach to ATE. A second solution is to reduce the requirement for ATE by changing USAF maintenance concepts. Both solutions are being actively considered within the USAF for implementation B.J.

A82-27902
THE DATA BASE ROLE IN AUTOMATIC TEST SYSTEM PROGRAMS
F H. KOESTER, JR (Mantech International Corp, Jacksonville, FL) In: AUTOTESTCON '80, International Automatic Testing Conference, Washington, DC, November 2-5, 1980, Proceedings. New York, Institute of Electrical and Electronics Engineers, Inc., 1980, p 182-184

The increased electronic density of modern complex weapon systems has forced the systems developer to use automatic testing systems The complexity of the testing systems requires near-concurrent development of the Automatic Test Equipment (ATE) and the prime systems. An automatic systems data base is found to be one of the most effective means to help the Weapon System manager in the performance of his task. The present investigation considers appropriate approaches for developing a suitable data base. Attention is given to the characteristics of the needed data base, questions of system applications, a problem/solution matrix, the acquisition process, and data base future developments. G.R.

A82-40963#
LOGISTICS RESEARCH PROGRAM IN THE UNITED STATES AIR FORCE
J. C. REYNOLDS and P E DAVIDSON (USAF, Coordinating Office for Logistics Research, Wright-Patterson AFB, OH) In International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 2 New York, American Institute of Aeronautics and Astronautics, 1982, p. 851-853.

An assessment is given of the factors which contribute to the lack of interest and investment of resources in logistics research and development, with emphasis on the need to integrate the consideration of logistics into research and development activities, and attention to the program developed toward that end by the U S. Air Force USAF program results demonstrate that any agency with logistics responsibilities can improve its technical capabilities and operational methods through management attention and the cooperation of the logistics and research and development communities O.C.

A82-42195
READINESS/INTEGRATED LOGISTIC SUPPORT TRADEOFFS
A L PORT (Analytic Sciences Corp., Reading, MA) In Annual Reliability and Maintainability Symposium, Los Angeles, CA, January 26-28, 1982, Proceedings. New York, Institute of Electrical and Electronics Engineers, 1982, p. 220-226. refs

Methodologies are described which have been applied successfully at TASC in analyses of the readiness characteristics of military avionics systems. It is recommended that, when planning logistic resources for a wartime scenario including a surge demand period, two basic rules should be observed. It is necessary to provide (1) sufficient repair facility throughput to match the LRU arrival rate during the nonsurge period, and (2) sufficient LRU spares to sustain sortie requirements during the surge. An increase in either resource can only partially offset shortages in the other, but there is room for some consideration of the cost impacts of the different mixes of resources. B.J.

A82-42196
LOGISTICS SUPPORT PRODUCTIVITY IMPROVEMENT
R. A. BOENNING, G A MOHR, JR., and V. B. MORRIS, JR. (Westinghouse Electric Corp., Baltimore, MD) In: Annual Reliability and Maintainability Symposium, Los Angeles, CA, January 26-28, 1982, Proceedings. New York, Institute of Electrical and Electronics Engineers, 1982, p. 227-232.

Five current research and development projects in Westinghouse Integrated Logistics Support Division which contribute to improved productivity and enhanced quality in logistics

support are described. The projects range widely over the field of logistics support. Combined interactive training, technical manuals and ATE; voice control of ATE; automated conversion of photographs to line drawings; a compact laser range simulator; and computerized reading grade level determination are discussed. (Author)

N82-18763# Environmental Protection Agency, Washington, D.C. Municipal Wastewater Research Committee.
MUNICIPAL WASTEWATER: RESEARCH STRATEGY SUPPLEMENT, 1981-1985
Jul. 1981 241 p
(PB82-120106; EPA-600/9-81-032) Avail: NTIS HC A11/MF A01 CSCL 13B

The requirements for Research and Development support of Program Office activities are identified. Both short-term requirements and research responses and long-range research planning are presented. These plans are based on current perceptions of research necessary to address anticipated problems or technology needs over the next five years. T.M.

N82-19086# Messerschmitt-Boelkow-Blohm G.m b.H., Ottobrunn (West Germany). Betriebsbereich.
COST PROBLEMS IN THE UTILIZATION PHASE OF A WEAPON SYSTEM [KOSTENPROBLEME IN DER NUTZUNGSPHASE DER WAFFENSYSTEME]
G. LAUBE 1981 23 p In GERMAN Presented at Wehrtechnik-Seminar, Bonn, 6-7 Apr. 1981
(MBB-UA-576-81-O) Avail: NTIS HC A02/MF A01

The origins of high material maintenance charges in the utilization of weapon systems, and how these can be reduced considerably through proper integrated logistics management during the development and optimization of the life cycle cost, was investigated It is shown how up to 30% is saved in material maintenance costs for future systems in further development, more supply, or fast generation shifts. Transl. by E.A.K.

N82-19218# Institute for Defense Analyses, Arlington, Va.
ASSESSMENT OF AVIONIC EQUIPMENT FIELD RELIABILITY AND MAINTAINABILITY AS FUNCTIONS OF UNIT COST
M. I. KNAPP and J. W. STAHL 7 Oct. 1981 24 p refs Presented at the 16th Ann. Dept. of Defense Cost Analysis Symp., Arlington, Va., 4-7 Oct. 1981
(AD-A109373) Avail. NTIS HC A02/MF A01 CSCL 01C

Pound-for-pound, avionics is generally recognized as the most expensive, complex and sophisticated part of an aircraft. Reliability and maintainability are critical characteristics that influence spares provisioning, maintenance resource requirements, system operational availability and, ultimately, investment and operating costs. Consequently, much attention has been focused upon improving the reliability and maintainability of avionics which, in the past, have been disappointingly low. This paper addresses avionics reliability and maintainability. The analysis was performed last year in partial response to a request of IDA by OASD (C(3)I) to provide information for use by DSARC principals at the Full-Scale Development milestone. Since the 5000 series of DoD Directives and Instructions emphasize analytical comparisons of any new systems under consideration by the DSARC with current, comparable systems, we undertook analyses to determine if there may be one or more historical relationships between field reliability and maintainability and avionic equipment characteristics that would assist in forecasting those attributes. GRA

N82-20113*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
THE TELECOMMUNICATIONS AND DATA ACQUISITION REPORT Progress Report, Nov. - Dec. 1981
N. A. RENZETTI, ed. 15 Feb. 1982 140 p refs Sponsored by NASA
(NASA-CR-168577; JPL-PR-42-67) Avail: NTIS HC A07/MF A01 CSCL 22D

Progress in the development and operations of the Deep Space Network is reported. Developments in Earth-based radio technology as applied to other research programs are also reported. These programs include geodynamics, astrophysics, and radio searching for extraterrestrial intelligence in the microwave region of the electromagnetic spectrum.

N82-23042# General Accounting Office, Washington, D. C.
MISSION ITEM ESSENTIALITY: AN IMPORTANT MANAGEMENT TOOL FOR MAKING MORE INFORMED LOGISTICS DECISIONS Report to the Secretary of Defense
13 Jan. 1982 43 p refs
(PLRD-82-25; B-205399) Avail: SOD

Mission item essentiality, the means by which the essentiality of individual items is linked to mission essentiality of the end-item is discussed. It offers vast potential as a management tool for the services in making logistics decisions concerning requirements determination, resource allocation, and repair priorities. The Department of Defense developed a concept guide for use by the services. However, the department has allowed the services to proceed at their own pace and approach the matter from different viewpoints. As a result, progress has been slow. It was concluded tha the department should require the services to follow the concept guide and establish milestones for accomplishing the specific tasks set forth in the guide The Air Force is ahead of the other services in developing a conceptually sound essentiality coding system, but has run into problems in implementing the system. Once the implementation problems have been resolved, it is argued that the system will greatly benefit the Air Force in its logistics decision making process. R.J.F.

N82-24163# Naval Postgraduate School, Monterey, Calif.
CANNIBALIZATION OF THE F-14 AND S-3A AIRCRAFT: A VIABLE LOGISTIC M.S. Thesis
K. M. MYETTE Mar. 1981 112 p refs
(AD-A111207) Avail: NTIS HC A06/MF A01 CSCL 05/1

This thesis presents the results of an analysis of cannibalization and its effects on the F-14A and S-3A aircraft. The analysis includes cannibalization measurement methodologies, reasons why squadrons cannibalize, a comparison of fleet cannibalization activity and alternatives to cannibalization. Cannibalization is shown not to be a maintenance practice to be avoided at all cost, but rather a viable cost effective alternative to logistic failures. Additionally, material issue response delays rather than material shortages were found to lead to increased cannibalization. Author (GRA)

N82-26041# Naval Ship Research and Development Center, Bethesda, Md. Computation, Mathematics and Logistics Dept.
QUANTIFICATION OF EFFECTIVENESS Final Report, Apr. 1980 - Apr. 1981
P. HUBAI Jan. 1982 35 p refs
(Contract WF60532000)
(AD-A111475; DTNSRDC/CMLD-82/01) Avail: NTIS HC A03/MF A01 CSCL 05A

The Quantification of Effectiveness (QUEF) program was initiated to develop a simplified method of measuring systems effectiveness and to determine the sensitivity of systems effectiveness to logistic factors. The initial approach was to quantify systems effectiveness from the equipments' mission essential hardware characteristics. This approach was discontinued because the hardware characteristics identified were too detailed to allow a general method to be developed. The second approach involved the identification of the logistics factors that influence systems effectiveness and the reallocation of resources among the most sensitive of the logistics factors. This report describes the methodologies employed in the two approaches, discusses the problem, and presents the results. Author (GRA)

N82-26193# Air Force Human Resources Lab., Brooks AFB, Tex. Plans and Programs Office.
FISCAL YEAR 1983: AIR FORCE TECHNICAL OBJECTIVE DOCUMENT
Feb. 1982 20 p
(AD-A110934; AFHRL-TR-81-43) Avail: NTIS HC A02/MF A01 CSCL 05I

This document provides the academic and industrial research and development community with a summary of the technical area objectives of Air Force research in the field of training and personnel systems technology The areas covered are: (1) Manpower and Force Management; (2) Weapon Systems Logistics, Maintenance, and Technical Training; and (3) Air Combat Tactics and Training. Author (GRA)

N82-26259# General Accounting Office, Washington, D. C. Mission Analysis and Systems Acquisition Div.
OPPORTUNITIES EXIST TO ACHIEVE GREATER STANDARDIZATION OF AIRCRAFT AND HELICOPTER SEATS
26 Feb. 1982 7 p
(AD-A111718; GAO/MASAD-82-22) Avail: NTIS HC A02/MF A01 CSCL 01C

We reviewed the efforts of DOD and the services to standardize flight life-support equipment. While formal management structures and informal agreements have resulted in several standardized life-support items, we found a proliferation of tactical aircraft and helicopter seat systems, the most expensive items of life-support equipment We believe that the past methods of acquiring seats have been costly; that standardization opportunities have not been adequately defined; and that for the most part, standardization efforts undertaken have not been adequately organized, planned, and supported either by DOD or the services. Increased management emphasis by the Under Secretary of Defense (Research and Engineering) and the services could increase standardization of aircraft seats and lower acquisition and support costs. Implementation of the Deputy Secretary of Defense's April 30, 1981, initiatives, which recognized that increased standardization of subsystems and support systems cannot only reduce life-cycle costs but also increase reliability, should result in additional economies. Author (GRA)

N82-26323# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Systems and Logistics.
OPTIMAL PLACEMENT MODEL FOR THE B-52G WEAPONS SYSTEM TRAINER M.S. Thesis
F. E. HOKE, JR. Sep. 1981 79 p refs
(AD-A110977; AFIT/LSSR-83-81) Avail: NTIS HC A05/MF A01 CSCL 15E

As a result of the Force Modernization Study, the Strategic Air Command will have its first new generation simulator, the Weapons System Trainer (WST), available in the beginning of 1982. Because of the highly intensive requirements of B-52 training, it had been determined that each B-52 unit would be equipped with a total WST system. While there is agreement with the strategic implications of individual base location for the WST, the necessity of that decision should be questioned. The original research question directed at G model bases was: Can an economically optimum location scheme be determined for the minimum number of WST's necessary to meet training requirements? Consequently, the central objective of this research was the development of a mathematical model which would assure the optimum placement of the WST based on the defined resources, constraints, and *economic criteria. The research and generated solutions lend* credence to the n· ·l as a management tool, in that it permits an objective analysis of alternatives in terms of cost location schemes and number of simulators. It is concluded that the model should provide useful information in future simulator location studies. Author (GRA)

N82-27283# Army Logistics Evaluation Agency, Cumberland, Pa.
AVIATION MATERIEL COMBAT READY IN-COUNTRY (AMCRIC)
H. M. ORRELL, III Jun. 1981 58 p refs
(AD-A107451) Avail: NTIS HC A04/MF A01 CSCL 15E

A previous study, titled Aviation Materiel Combat Ready In-Country (AMCRIC), was provided as a basis to develop a concept to preposition Army aircraft in US Army Europe. This study recognized that aircraft are not authorized as war reserve, and that no aircraft are currently included in POMCUS in Europe. To adequately reinforce NATO, some method had to be devised to allow Army aircraft to be immediately available to a deploying combat force. The project considered: (a) Methods available to accomplish prepositioning of Army helicopters and ancillary systems; (b) South Vietnam Army aviation experience in combat; (c) State-of-the-art storage methods by US Government, foreign governments, and commercial contractors; and (d) Major command interfaces within the US Army that will be required to establish a workable concept. The project results were that US Army has the capability to store helicopters for short periods using on-hand resources; and The Vice Chief of Staff, Army, approved a prepositioning concept developed which will store helicopters in USAREUR on a test bed basis using AH-1S helicopters. GRA

N82-28209# Logistics Management Inst., Washington, D. C.
THE FRAMEWORK FOR LIFE CYCLE COST MANAGEMENT
R. P. WHITE Jan. 1982 100 p
(Contract MDA903-81-C-0166)
(AD-A113684; LMI-RE103) Avail: NTIS HC A05/MF A01 CSCL 14A

The existing phased acquisition process, with key milestone decisions by the Secretary of Defense, is the framework for managing the life cycle costs of major weapon systems developed and produced under contracts and operated and supported by the military departments. This report defines life cycle cost and describes the framework and the several regulations, directives, *and instructions that guide and direct the performance of the wide* variety of functions that are parts of and influence the costs of the planning, designing, managing, acquiring, operating, and supporting of major DoD weapon systems. These include the policies and procedures for major system acquisition, the DSARC process, CAIG, R/M, quality, standardization, and contracting techniques of the award fee contract, life cycle costing, value engineering programs and incentives, and reliability improvement warranties. The report also fits each of these functions and activities into the framework, showing when each may, or must, be performed. It highlights the role of the program manager and the need for joint DoD/contractor management of the high risk process of developing major programs to meet mission needs. GRA

N82-29220# Defense Systems Management School, Fort Belvoir, Va.
CONCEPTS, THE JOURNAL OF DEFENSE SYSTEMS ACQUISITION MANAGEMENT, AUTUMN 1981, VOLUME 4, NUMBER 4
1981 125 p refs
(AD-A113130) Avail: NTIS HC A06/MF A01 CSCL 05A

Contents. Financing Defense System Programs; Evaluating the *Impact of Quantity, Rate, and Competition; Department of Defense* Acquisition Improvement Program; Human Factors in Weapon Design: The Performance Gap; Systems Approach to Multinational Acquisition (NATO AWACS); Scheduling for Program Management: How and Why; and Defense Systems Management Review/Concepts Index. GRA

N82-29221# Doty Associates, Rockville, Md.
STUDY OF INCREASING LEAD TIMES IN MAJOR WEAPON SYSTEMS ACQUISITION Final Technical Report, 15 Jul. 1980 - 31 Jul. 1981
W. B. HUMPHREY, R. B. LADD, and J. N. POSTAK 31 Jul. 1982 235 p refs
(Contract MDA903-80-C-0519)
(AD-A113459; DAI-TR-254) Avail: NTIS HC A11/MF A01 CSCL 15E

This study analyzed the problems of increasing lead times that have been experienced in the acqusition of major weapon systems during the past decade Items that have been significantly increasing lead time were identified and classified. In cases where sufficient lead time data was available, trend analysis was conducted. Causes of increasing lead times were identified and assessed. Based on the above effort, alternative courses of action were developed which have potential for alleviating increasing lead times. Alternatives were categorized and evaluated for feasibility of implementation by Program Managers, DoD, Congress and other government departments, and industry GRA

N82-29615# Massachusetts Inst. of Tech., Cambridge. Center for Policy Alternatives.
LIFE FORECASTING AS A LOGISTICS TECHNIQUE Final Report, Jan. - Oct. 1981
R. T. LUND, F R. TULER, and J. R. ELLIOTT Jan. 1982 62 p refs
(Contract DAAG46-80-C-0099)
(AD-A114630, AMMRC-TR-82-2) Avail. NTIS HC A04/MF A01 CSCL 15E

This document reports on a preliminary investigation of the use of reliability, nondestructive inspection (NDI) and life forecasting concepts in Army maintenance practice. The report includes the following major topics (1) and overview of the Army Reliability Centered Maintenance (RCM) program, (2) brief discussion of NDI methods, (3) summary of life forecasting techniques, (4) alternatives for expanding use of RCM by incorporating life forecasting methodologies, and (5) conclusions and recommendations. GRA

N82-30124# General Accounting Office, Washington, D. C Mission Analysis and Systems Acquisition Div.
IMPROVING THE EFFECTIVENESS AND ACQUISITION MANAGEMENT OF SELECTED WEAPON SYSTEMS: A SUMMARY OF MAJOR ISSUES AND RECOMMENDED ACTIONS Report to the Congress
14 May 1982 127 p
(AD-A114628, GAO/MASAD-82-34) Avail: NTIS HC A07/MF A01 CSCL 05A

Our review of 24 selected systems identified 71 issues, falling into two broad areas and 15 rather specific categories, which either have a direct bearing on the weapon systems' effectiveness or management of the acquisition program. These issues are not intended to represent all of the problems or questions associated with the weapon programs reviewed The issue categories should also not be considered independently because some of the categories are very closely related. GRA

N82-32307# Air Force Human Resources Lab., Wright-Patterson AFB, Ohio. Logistics Research Branch.
MAINTENANCE SUPPORT RESOURCE FORECASTING MODELS. VOLUME 2: EQUIVALENCE TESTING OF RELIABILITY AND MAINTENANCE MODEL AND EXPECTED VALUES MODEL Final Technical Paper
S. R. NICHOLS Brooks AFB, Tex. Jun. 1982 57 p Submitted for publication
(AD-A117149; AFHRL-TP-82-12(2)) Avail: NTIS HC A04/MF A01 CSCL 05B

Three maintenance support resource forecasting models were developed. They are the logistics composite model (LCOM), reliability and maintainability model (R&M), and the expected values model (EVM). These three models were analyzed in terms of: (1) how they relate to each other, (2) the minimal data requirements of each model, (3) how the models can best be used in the weapon system acquisition process, and (4) whether the models generate roughly equivalent results All three models were compared in terms of input requirements, method of processing, and output products. The results of the equivalence testing for the two average value models are included. The results of the equivalence testing for the two average value models are included GRA

04

URBAN TECHNOLOGY AND TRANSPORTATION MANAGEMENT

Includes municipal water and waste treatment, rapid transit, and urban planning.

N82-13984# Smith (Wilbur) and Associates, New York.
MEASURES OF EFFECTIVENESS OF TRANSPORTATION SYSTEMS MANAGEMENT Final Report
Apr. 1981 43 p refs Prepared jointly with Tri-State Regional Planning Commission
(PB81-233884, UTMA-IT-09-00890-81-1) Avail: NTIS HC A03/MF A01 CSCL 13B

The basic concepts of transportation systems management (TSM) by providing simple classification schemes, geographic conditions of applicability, relative measures of effectiveness, and techniques for quantification were developed. Two key elements are emphasized: coordination of transportation activities, and maximization of efficiency and productivity. Some of the findings reported are: (1) traffic engineering improvements, (2) demand management measures achieve reductions in vehicle miles of travel; and (3) bus lanes and priority entry treatments. GRA

N82-14659# Energy, Inc., Idaho Falls, Idaho
ENERGY RECOVERY FROM MUNICIPAL WASTE DEVELOPMENT PROGRAM FOR IDAHO FALLS, IDAHO Final Report
Jul. 1981 155 p refs
(Contract DE-AC01-79CS-20240)
(DE81-029999; DOE/CS-20240/1) Avail: NTIS HC A08/MF A01

The development of a demonstration facility to show that fluidized-bed technology is a viable means to recover resources from municipal wastes in Idaho Falls is described. The tasks described include: (1) evaluation of the energy market of Idaho Falls to identify potential customers for recovered energy and to determine what form of energy would be economically viable; (2) evaluation of the municipal solid waste of Idaho Falls, determining its approximate composition, heating value, production rates, and seasonal variations; (3) development of a resource recovery facility concept that will be economically attractive to the city and technically feasible; and (4) evaluation of such topics as zoning, legal limitations, and environmental aspects of the facility to determine its compatibility with the city of Idaho Falls DOE

N82-14990# General Motors Technical Center, Warren, Mich Transportation Systems Div.
SYSTEMS OPERATION STUDIES FOR AUTOMATED GUIDEWAY TRANSIT SYSTEMS. FEEDER SYSTEMS MODEL FUNCTIONAL SPECIFICATION Final Report
T. M. LINDEN Jun. 1981 37 p
(Contract DOT-TSC-1220)
(PB81-233496; DOT-TSC-UMTA-81-14, UMTA-MA-06-0048-81-1) Avail. NTIS HC A03/MF A01; also available in set of 5 reports HC E15 as PB81-223488 CSCL 13F

The objective of the FSM is to map the zone-to-zone transit patronage demand onto AGT station pairs and to generate feeder system performance data. The output of this model can be used in conjunction with AGT data in order to provide normalized comparisons between different AGT systems operating in the same

demand environment with both conventional feeder service/AGT operation and dual mode feeder/AGT operation. Because of its generic nature, the model is recommended for representative AGT deployments comparison only. GRA

N82-14994# General Motors Technical Center, Warren, Mich Transportation Systems Div
SYSTEMS OPERATION STUDIES FOR AUTOMATED GUIDEWAY TRANSIT SYSTEMS. DETAILED STATION MODEL FUNCTIONAL SPECIFICATION Final Report
J. BENDER Jul. 1981 48 p
(Contract DOT-TSC-1220)
(PB81-233538, DOT-TSC-UMTA-81-16; UMTA-MA-06-0048-81-5)
Avail: NTIS HC A03/MF A01; also available in set of 5 reports HC E15 as PB81-233488 CSCL 13F

The Detailed Station Model (DSM) is a discrete event model representing the interrelated queueing processes associated with vehicle and passenger activities in an AGT station. The DSM provides operational and performance measures of alternative station configurations and management policies with respect to vehicle and passenger handling capabilities and provides an analytic tool to support trade studies. Its architecture facilitates interchange of alternative operational strategy algorithms and station traffic flow patterns to assist in the initial design selection by planners. GRA

N82-16015# Netherlands Organization for Applied Scientific Research TNO, Delft.
RESEARCH IN URBAN PLANNING DURING THE 70'S [HET PLANOLOGISCH ONDERZOEK IN DE JAREN ZEVENTIG]
J. C DAAMEN, M. V. BESSELAAR, H C. CHRISTERUS, and C. W W. VANLOHUIZEN 1980 243 p refs In DUTCH
(TNO-80/PS/206) Avail. NTIS HC A11/MF A01

The extent, nature, and themes of urban planning research in the Netherlands are described. Projects were indexed for contribution to the promotion, coordination, and programming of research The inventory contains public research projects and government research projects by order of the government The different fields of research are only quantitatively (number of projects) assessed. Activities showing research trends in the first half of the decade are compared with those in the second half of the decade. Author (ESA)

N82-16017# Transportation Research Board, Washington, D.C.
TRANSIT PLANNING AND MANAGEMENT
W. CHERWONY, M. G. FERRERI, L. J. PIGNATARO, W. R. MCSHANE, A. J. WIENER, A J. BLOCH, W. H. CROWELL, G GIULIANO, J M. LUTIN, and M. LIOTINE 1981 89 p refs
(PB81-238032; TRB/TRR-797; ISBN-0-309-03211-32; LC-81-11205; ISSN-0361-1981) Avail: NTIS HC A05/MF A01 Research Board, 2101 Constitution Ave., N.W., Washington, D.C.

Management and planning issues affecting primarily rail and bus mass transit are presented. Topics include strategic planning, future directions, environmental factors, modeling, demand analysis, employer subsidies, the Caracas subway, funding procedures, performance evaluation, operating expenditures, paraprivate transportation, logistics, pupil routing, and combined passenger and postal services. GRA

N82-16589# Environmental Sciences Research Lab., Research Triangle Park, N.C. Meteorology and Assessment Div
CARBON MONOXIDE COMMUTER EXPOSURE DATA BASE: A 5-DAY STUDY IN LOS ANGELES
W. B. PETERSON, R H ALLEN (Comp-Aid, Inc), R A. ZISKIND (Science Applications, Inc), and M B ROGOZEN (Science Applications, Inc.) Aug. 1981 77 p
(PB82-103607; EPA-600/4-81-069) Avail: NTIS HC A05/MF A01 CSCL 13B

Carbon monoxide exposure to the commuter population was monitored to assess the CO exposure to Los Angeles commuters. Interior carbon monoxide, exterior carbon monoxide and vehicle speed for three vehicles traveling typical commute routes during the morning and evening peak traffic periods were measured. Hourly average CO measurements were taken from eight south coastal air quality management district fixed site monitoring stations and six California transportation agency cans in the proximity of the commuter routes. GRA

N82-16599# Environmental Protection Agency, Atlanta, Ga Environmental Impact Statement.
CENTRAL HILLSBOROUGH COUNTY-TAMPA, FLORIDA: 201 FACILITIES PLAN. VOLUME 1: WASTEWATER FACILITIES EXISTING ENVIRONMENT TECHNICAL REFERENCE DOCUMENT
Sep. 1981 373 p refs
(PB82-107913; EPA-904/9-81-078A) Avail: NTIS HC A16/MF A01, also available in set of 3 reports HC E20 as PB82-107897 CSCL 13B

Proposed wastewater facilities for the City of Tampa, the City of Temple Terrace and portions of management alternatives were evaluated with particular attention to the impacts of alternative management systems on growth patterns and primary and secondary impacts on wetlands and other area water resources. Present social, economic, and natural environmental features of the planning area are described. Natural and man made features of the area are documented. GRA

N82-16600# Environmental Protection Agency, Atlanta, Ga. Environmental Impact Statement
CENTRAL HILLSBOROUGH COUNTY-TAMPA, FLORIDA: 201 FACILITIES PLAN. VOLUME 2: ALTERNATIVES EVALUATION TECHNICAL REFERENCE DOCUMENT
Sep. 1981 211 p refs
(PB82-107921, EPA-904/9-81-078B) Avail: NTIS HC A10/MF A01; also available in set of 3 reports HC E20 as PB82-107897 CSCL 13B

Proposed wastewater facilities for the City of Tampa, the City of Temple Terrace and portions of management alternatives were evaluated. The impacts of alternative management systems on growth patterns and primary and secondary impacts on wetlands and other area water resources are emphasized. GRA

N82-16619# Camp, Dresser and McKee, Inc., Boston, Mass.
DENSITY LEVELS OF PATHOGENIC ORGANISMS IN MUNICIPAL WASTEWATER SLUDGE, A LITERATURE REVIEW Final Report
D. C PEDERSEN Sep. 1981 298 p refs
(Contract EPA-68-03-2803)
(PB82-102286, EPA-600/2-81-170) Avail. NTIS HC A13/MF A01 CSCL 13B

Density levels of indicator and pathogenic organisms in municipal wastewater sludges and septage were examined. The effectiveness of conventional municipal sludge stabilization processes (mesophilic anaerobic and aerobic digestion, composting and lime stabilization) and dewatering processes (drying beds, lagooning/storage, and sludge conditioning/mechanical dewatering) was evaluated for reducing density levels of indicator and pathogenic organisms. All literature published on this topic between 1940 and 1980 was reviewed. An annotated bibliography presents all citations reviewed, with pertinent abstracts and methods used by researchers. GRA

N82-16628# Environmental Protection Agency, Washington, D.C. Facilities Requirements Div
OPERATION AND MAINTENANCE COSTS FOR MUNICIPAL WASTEWATER FACILITIES
Sep 1981 140 p refs
(PB81-249971; EPA-430/9-81-004, FRD-22) Avail: NTIS HC A07/MF A01 CSCL 13B

The results of the latest and most comprehensive effort to obtain and analyze operation and maintenance costs for wastewater treatment works are presented. Data from more than 900 treatment plants and almost 500 conveyance systems throughout 40 of the 48 contiguous United States, including all ten EPA regions is summarized. Included is information on administrative costs, sludge handling costs, and staffing. Basic

information from site visits was combined into a simple data base and examined for relationships between total operation and maintenance costs, facility design parameters, and plant operation parameters. These relationships were developed for the general national level and, where possible, for smaller geographic units. Where appropriate in analyzing the data, total operation and maintenance costs were reduced to their major components.
GRA

N82-16942# San Bernardino Valley Municipal Water District, Calif.
FEASIBILITY OF GEOTHERMAL HEAT USE IN THE SAN BERNARDINO MUNICIPAL WASTEWATER TREATMENT PLANT Final Report, Sep. 1980 - Jun. 1981
W C RACINE, T. C. LARSON, C. A. STEWART, and H. B. WESSEL 1981 115 p refs Prepared in cooperation with Science Applications, Inc., La Jolla, Calif., and Stewart (Coulter) and Associates, Inc., Davis, Calif.
(Contract DE-FG03-80SF-11442)
(DE81-030968; DOE/SF-11442/T2) Avail: NTIS HC A06/MF A01

A system was developed for utilizing nearby low temperature geothermal energy to heat two high rate primary anaerobic digesters. The geothermal fluid would replace the methane currently burned to fuel the digesters. The design and operation of the facility are examined and potentially viable applications selected for additional study. Results of these investigations and system descriptions and equipment specifications for utilizing geothermal energy in the selected processes are presented. The economic analyses conducted on the six engineering design cases are discussed. The environmental setting of the project and an analysis of the environmental impacts that will result from construction and operation of the geothermal heating system are discussed.
DOE

N82-16954# Informatics, Inc., Rockville, Md Noise Information Program.
FOREIGN NOISE RESEARCH IN SURFACE TRANSPORTATION, 1978-1981
D. BARBER and C. MODIG May 1981 373 p
(PB82-100306; EPA-550/9-81-317) Avail: NTIS HC A16/MF A01 CSCL 13F

Information on foreign research projects in surface transportation noise abatement was collected from both individuals and organizations. They were asked to respond with information about research projects that deal with: highway vehicle noise control (trucks, buses, cars, etc.); vehicle component noise control (engines, exhaust mufflers, cooling systems, power trains, tires, etc.), roadway surface materials, tire/road interaction; path control (barriers, insulation, highway planning and land management); highway noise analysis (prediction models, propagation theory, etc.); rail noise (guided mass transit, light rail, elevated structures, wheel/rail interaction); off road and recreational vehicle noise, measurement, monitoring and enforcement research. From these contacts, 294 surface transportation noise research projects were identified.
GRA

N82-17579# New England River Basins Commission, Boston, Mass.
BEFORE THE WELL RUNS DRY: A HANDBOOK ON DROUGHT MANAGEMENT
Aug. 1981 63 p refs Sponsored in part by Geological Survey, Reston, Va.
(PB82-105818) Avail: NTIS HC A04/MF A01 CSCL 13B

A handbook is presented with a five-step planning process for local water supply officials to follow for designing a drought contingency plan. It explains and illustrates through a specific case study how and when a community can choose from among measures designed to augment supply and reduce demand to alleviate the problems of a drought. The key ingredients for a successful drought management plan are advance planning community cooperation.
GRA

N82-17688# JRB Associates, McLean, Va.
SOLID WASTE DATA: A COMPILATION OF STATISTICS ON SOLID WASTE MANAGEMENT WITHIN THE UNITED STATES
1981 74 p refs
(Contract EPA-68-01-6000)
(PB82-107301) Avail: NTIS HC A04/MF A01 CSCL 13B

A comprehensive compilation of the most current available information of solid waste management within the United States is presented. This information is in tabular form and organized by general categories for ease of reference. Factors such as employment in solid waste management, composition of solid wastes, collection methods, transportation, processing, and disposal are considered for both municipal and rural areas.
GRA

N82-18081# Metcalf and Eddy, Inc., Palo Alto, Calif.
URBAN STORMWATER MANAGEMENT AND TECHNOLOGY: CASE STUDY IN SAN FRANCISCO Final Report, Sep. 1979 - May 1980
J. A. LAGER, R K. ADVANI, and E. M. GOWEN Sep. 1981 59 p refs
(Contract EPA-68-03-2877)
(PB82-105594; EPA-600/2-81-204) Avail: NTIS HC A04/MF A01 CSCL 08H

Urban (CSO) management is discussed. San Francisco's experiences with the planning and design of CSO control and treatment facilities is presented. The development of the San Francisco combined sewer overflow control master plan a continuing process for treatment needs with the costs and environmental social impacts in a large urban area.
GRA

N82-19109# SRI International Corp., Menlo Park, Calif.
CENTRAL CONTROL SYSTEM SURVEY Final Report, Dec. 1979 - Jun. 1980
B. CONRAD, M. SAKASITA, and M. SANFILIPPO May 1981 137 p refs Sponsored in part by Bay Area Rapid Transit District
(Contract SRI-PROJ. 1529)
(PB82-101981; UMTA-CA-06-0124-81-1) Avail: NTIS HC A08/MF A01 CSCL 13B

The advances in control technology, such as displays, communication systems, control algorithms, and to what extent automation can facilitate rapid transit operations were examined. The survey focused on the central control functions of schedule creation, schedule implementation, schedule maintenance, and failure management. These functions tend to have the most direct impact on system performance. The five properties surveyed were the Chicago Transit Authority (CTA), the Massachusetts Bay Transit Authority (MBTA), the New York City Transit Authority (NYCTA), the Washington Metropolitan Area Transit Authority (WMATA), and the Bay Area Rapid Transit District (BART).
GRA

N82-19702 International Inst. for Applied Systems Analysis, Laxenburg (Austria).
OPERATIONAL WATER QUALITY MANAGEMENT: BEYOND PLANNING AND DESIGN
M. B. BECK 1981 84 p refs
(ER-7) Avail: Issuing Activity

Effective means of water quality management is discussed. The theory, practice, and the changing character of problems related to water pollution are considered. Current practice in each of the subsystems of a water quality management system is reviewed. The desirable attributes of water quality management and recommendations for realizing the full potential of operational management are noted.
Author (ESA)

N82-22109# Environmental Protection Agency, Washington, D.C. Office of Water Program Operators.
CONVEYANCE, TREATMENT, AND CONTROL OF MUNICIPAL WASTEWATER, COMBINED SEWER OVERFLOWS, AND STORMWATER RUNOFF: SUMMARIES OF TECHNICAL DATA
10 Feb. 1981 92 p
(PB82-131533; EPA-430/9-81-008; EPA/FRD-23) Avail NTIS HC A05/MF A01 CSCL 13B

This report is a part of the 1980 Needs Survey report and is a supplement to the cost estimate report to Congress (PB81-193625 entitled '1980 Needs Survey - Cost Estimates for Construction of Publicly-Owned Wastewater Treatment Facilities') dated February 10, 1981. It provides detailed summaries of present and future needs for sewage treatment facilities by State. GRA

N82-22110# Environmental Protection Agency, Washington, D.C Office of Solid Waste
REFUSE MANAGEMENT IN DEVELOPING NATIONS
J. THOMPSON Aug 1981 29 p
(PB82-127697) Avail: NTIS HC A03/MF A01 CSCL 13B

Planning and organizing the collection and disposal refuse in developing nations is discussed. Various methods of collection such as bulk bins and household refuse, types of equipment used and the costs for each type are described. Other pertinent information on life cycle costing, maintenance needs, contract collection, transfer stations, incineration and composing is also presented. GRA

N82-22111# Public Technology, Inc., Washington, D C.
URBAN CONSORTIUM Final Report
J K PARKER 1981 10 p
(Contract NSF ISP-78-12729)
(PB82-122789, NSF/ISP-81020) Avail. NTIS HC A02/MF A01 CSCL 13B

Needs and priorities were assessed for the areas of transportation, community and economic development, and management, finance and personnel were evaluated. Workshops were conducted to (1) assess the condition of urban infrastructure and developing future policies, and (2) study the use of emerging energy technologies in urban management. A study of multi-year revenue and expenditure forecasting and a study on the use of fire data were made. City-led research projects included evaluating landfill gas as an energy source; developing methodology for energy impact analysis of community development projects; developing a primary urban energy planning methodology handbook; and retrofitting municipal buildings with solar energy systems. GRA

N82-23533# Mueller Associates, Inc., Baltimore, Md.
A FLEET MANAGER'S GUIDE TO VEHICLES FOR VALID RESULTS
Feb. 1981 39 p refs Presented at DOE Conf. on Fleet Use of Unique Automotive Fuels, San Antonio, Tex., 13-14 Aug 1980 Sponsored by DOE
(DOE/CS-56051/04) Avail NTIS HC A03/MF A01

While the measurement of acquisition, maintenance, and insurance costs is relatively straightforward and amenable to standard cost accounting procedures, the measurement and extrapolation of fuel use (and costs) from limited test programs involves many subtleties which, if ignored, can lead to erroneous conclusions. Information is presented to aid the automotive fleet manager in setting up a test program to measure and estimate fleet fuel economy and fuel use. Other areas of economic interest may also be added. The collection and analysis of data from various tests, and methos for reporting results and performing life cycle cost analyses are included A.R.H.

N82-25414# Nichols Engineering and Research Corp., Belle Mead, N.J.
THERMAL CONVERSION OF MUNICIPAL WASTEWATER SLUDGE. PHASE 2: STUDY OF HEAVY METAL EMISSIONS Final Report, Aug. 1978 - Jan. 1980
Sep. 1981 96 p
(Contract EPA-R-804463)
(PB82-111816; EPA-600/2-81-203) Avail NTIS HC A05/MF A01 CSCL 13B

Heavy metal emissions associated with the thermal conversion (incineration) processes which can be conducted in a multiple hearth furnace to dry municipal wastewater (sewage) sludge and reduce its volume by forming an ash or char were analyzed. Sludge for this project was obtained from Jersey City, New Jersey. It contains about 8 percent solids which were increased to between 40 and 50 percent solid by adding polymer as a filter aid and filtering it in a 16 sp ft pilot filter press having expandable rubber diaphragm plates. A pilot scale multiple hearth furnace was used for the thermal conversion process. Sludge was subjected to thermal conversion of the conditions: incineration at 900 C (1625 F), low temperature conversion at 700 C (1290 F) (starved combustion for pyrolysis, and high temperature conversion at 900 C (1290 F) (starved combustion or pyrolysis). GRA

N82-25649# Mid-American Solar Energy Complex, Minneapolis, Minn
EVALUATION OF THE SOLAR CITIES PROGRAM
J. MUSUMECI Sep. 1981 10 p
(Contract DE-AC02-79CS-30150)
(DE81-030868; MASEC-R-81-044) Avail. NTIS HC A02/MF A01

The Grand Island Social Services Project, the Solar Utilities Conference, and Model Codes Workshops, and support services provided under this work package are described Author

N82-27881# Jones and Stokes Associates, Inc., Sacramento, Calif.
SPOKANE COUNTY COMPREHENSIVE WASTEWATER MANAGEMENT PLAN Final Environmental Impact Statement.
K. M DAVIDSON Aug. 1981 323 p refs Sponsored by EPA
(PB82-151564, EPA-910/9-81-087) Avail: NTIS HC A14/MF A01 CSCL 13B

The environmental impact statement states the Environmental Protection Agency's recommended alternative for wastewater treatment. The alternative chosen by the county and approved by the EPA includes collection and transport of all county wastewater to the city of Spokane's central wastewater treatment plant. GRA

N82-28854# Cornell Univ., Ithaca, N Y School of Civil and Environmental Engineering.
INTEGRATION OF PROCESSES FOR WASTEWATER RESIDUALS MANAGEMENT
R. I. DICK and Y. HASIT May 1981 184 p refs
(Contract NSF ENV-77-22947)
(PB82-147992; NSF/CEE-81065) Avail: NTIS HC A09/MF A01 CSCL 13B

The manner in which municipal wastewater treatment plant sludge management processes interact with each other and with wastewater treatment processes is examined. The research includes experimental work to develop data on the effect of wastewater and sludge process design and operational procedures on the physical properties of sludges. These observations are incorporated into models of process performance. Costs for energy are extracted from each of the cost models to permit assessment of the implications of energy cost changes on wastewater and sludge management. The economic effects of sludge management are discussed in regard to gravity thickeners, mean cell residence time of the activated sludge process, sedimentation tank size, incineration, ocean disposal, mode of transportation, and electron radiation. Also included are descriptions of process performance models, cost models, and optimal process integration applications. GRA

N82-29237# Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany). Information und Dokumentation.
THE TRANSRAPID TEST SYSTEM IN EMSLAND
E. EITLHUBER 1981 9 p refs Reprint from ETR-Eisenbahntech. Rundschau, (West Germany) v. 6, 1980 p 3-7 In GERMAN; ENGLISH summary
(MBB-543-81-O) Avail: Issuing Activity

Goals, requirements, and design of the Transrapid test system are described. Application oriented investigation of magnetic levitation railroad technology is outlined The Emsland demonstration train is 54 m long and can carry up to 196 passengers. It runs on a 31.5 km line and attains speeds of 400 km/hr. The railway wagon and overhead, monorail guideway design are shown. Certification testing is planned for 1982
Author (ESA)

N82-29501# Federal Emergency Management Agency, Washington, D.C.
FIRE AND EMERGENCY MASTER PLANNING: SELECTED BIBLIOGRAPHY ON MASTER PLANNING Final Report
Nov. 1981 40 p refs
(PB82-153859, FEMA-15) Avail. NTIS HC A03/MF A01 CSCL 13L

An annotative bibliography on master planning was developed as a reference document to provide community elected officials, fire service managers, and master planning team members with sources of information on master planning The master planning process is an analytical tool for evaluating past methods of providing fire protection, assessing the cost effectiveness of current fire protection and determining the best method of providing fire protection. Formally defined, master planning is a systematic approach for providing the highest level of protection at the least possible cost. This publication was designed to provide guidance information that enables the user to examine various benefits and aspects of master planning The selected bibliography on master planning is divided into five major areas of concern to community leaders and fire service managers: master planning, management, prevention, suppression, and emergency response. GRA

N82-32516# Raytheon Service Co., Burlington, Mass.
FEASIBILITY STUDY FOR ALTERNATIVE-FUELS PRODUCTION FROM SOLID WASTE
J. W. TEMPLE and J. F. LEONARD Feb. 1982 107 p
(Contract DE-FG01-80RA-50375)
(DE82-008084; DOE/RA-50375/1) Avail: NTIS HC A06/MF A01

The objective of the project was to evaluate the feasibility of producing refuse-derived fuel (RDF) at an existing shredding station in Charleston, South Carolina, and selling this product to local industry to replace fossil and wood-products fuels currently utilized. During the study, a complete survey of significant energy consumers in Charleston was conducted. Of 77 consumers contacted, full-scale testing was carried out at the two facilities offering the greatest potential to purchase all the fuel which could be produced. At this time, negotiations are ongoing with a large paper producer with respect to the purchase of all the RDF could be produced over a 20-year period. Although the proposal for the grant anticipated either loan guarantees or price supports, which would significantly improve the overall feasibility of the project, there is still a reasonable chance that the project will proceed. Environmental considerations, the present disposal systems, system definitions, and capital costs and operating costs are discussed. GRA

N82-33882# New York State Dept. of Environmental Conservation, Albany.
ELECTRICAL ENERGY CONSUMPTION AND HEATING REQUIREMENTS OF MUNICIPAL WASTEWATER TREATMENT PLANTS Final Report
M. H. WANG and L. K. WANG Feb. 1982 35 p refs Prepared for Lenox Inst. for Research, Inc., Mass.
(PB82-183393; LIR/12-81/1) Avail: NTIS HC A03/MF A01 CSCL 10A

Electrical energy consumption models were developed. The unit operations/processes of pumping, screening and comminution,, grit removal, sedimentation, chlorination, gravity thickening, anaerobic digestion, vacuum filtration, incineration, and diffused air flotation are examined. The mathematical models of total heating requirements of biological wastewater treatment plants are also presented GRA

05

MANAGEMENT TOOLS AND TECHNIQUES

Includes decisionmaking, modeling, forecasting, inventory controls, robots, and automation.

A82-10080*# IBM Federal Systems Div., Bethesda, Md.
A QUANTITATIVE METHOD FOR EVALUATING ALTERNATIVES
M. J. FORTHOFER (IBM Corp., Federal Systems Div., Bethesda, MD) In: Computers in Aerospace Conference, 3rd, San Diego, CA, October 26-28, 1981, Collection of Technical Papers. New York, American Institute of Aeronautics and Astronautics, 1981, p. 24-31. refs
(Contract NAS9-14360)
(AIAA 81-2102)

When faced with choosing between alternatives, people tend to use a number of criteria (often subjective, rather than objective) to decide which is the best alternative for them given their unique situation. The subjectivity inherent in the decision-making process can be reduced by the definition and use of a quantitative method for evaluating alternatives This type of method can help decision makers achieve degree of uniformity and completeness in the evaluation process, as well as an increased sensitivity to the factors involved. Additional side-effects are better documentation and visibility of the rationale behind the resulting decisions. General guidelines for defining a quantitative method are presented and a particular method (called 'hierarchical weighted average') is defined and applied to the evaluation of design alternatives for a hypothetical computer system capability. (Author)

A82-10090#
STRUCTURED PROGRAMMING WITH JOB ENRICHMENT
K HOUSER and R. SCHROER (Martin Marietta Aerospace, Denver, CO) In: Computers in Aerospace Conference, 3rd, San Diego, CA, October 26-28, 1981, Collection of Technical Papers. New York, American Institute of Aeronautics and Astronautics, 1981, p. 104-111.
(AIAA 81-2126)

A description is provided of a specific Military Standard development program of software verification and validation tools, giving particular attention to motivational factors that can contribute to improved programmer productivity within the constrained environment of a strictly disciplined software development. Aspects of formal and informal development organization are considered, along with a formal development approach. The results of the program are presented, and the lessons learned are examined. The overall experience with structured programming was found to be very positive. The program has shown that the apparent incompatibility between individual and organizational goals can be resolved. G.R.

A82-14702
MANAGEMENT SUPPORT TOOLS FOR SMALL PROJECTS
H. R. KLEIN and K. C. SMITH (TRW Defense and Space Systems Group, Ogden, UT) In: NAECON 1981, Proceedings of the National Aerospace and Electronics Conference, Dayton, OH, May 19-21, 1981. Volume 1. New York, Institute of Electrical and Electronics Engineers, Inc., 1981, p. 185-190.

It is noted that the organization and management of small computer system projects is made more difficult when appropriate automated tools are unavailable. This is so because manual techniques are so time consuming that they are seldom employed in the necessary detail Two automated tools which are uniquely oriented toward small projects and which satisfy the needs of the small project manager are introduced. The tools, which make efficient use of the project manager's time, are shown to be simple, extremely effective, and economical for the project manager to use. They have been implemented at low cost on mini/micro computer systems. C.R.

A82-24373
CAD/CAM IN BRITISH AEROSPACE - AIRCRAFT GROUP
J. S. RAWLINS (British Aerospace Public, Ltd., Co., Aircraft Group, Kingston-on-Thames, Surrey, England) In: Managing computer aided design, Proceedings of the Conference, London, England, November 19, 1980 London, Mechanical Engineering Publications, Ltd., 1980, p. 27-34.

The use of computer-aided design and computer-aided manufacturing (CAD/CAM) techniques in aspects of aircraft structure geometry and electrical system definition is described for the case of the BAe 146 commuter aircraft. The use of electronic design and production data transfer is especially important in aircraft industry projects of the kind described because of the geographical distribution of component fabrication and assembly facilities Emphasis is put on the ability of a CAD/CAM system to make information promptly available, from the conceptual design to the in-service product support stages, without need for manual transcription before distribution O.C

A82-24683
THE 1980'S - A FOREST OF ENERGY DECISION TREES; PROCEEDINGS OF THE REGION SIX CONFERENCE, SAN DIEGO, CA, FEBRUARY 20-22, 1980
Conference sponsored by the Institute of Electrical and Electronics Engineers. New York, Institute of Electrical and Electronics Engineers, Inc., 1980 192 p.
MEMBERS, $22.50; NONMEMBERS, $30

Technical and economic problems were addressed for developing technologies which hold promise for replacing world demand for oil based fuels Monitoring and analysis of conservation measures were discussed, along with new sources of fossil fuels, and energy from OTEC and fusion power plants Geothermal plant siting, construction, and operation were examined, and MHD prototype plants were described The applications and social effects of energy storage systems were explored, along with biomass potentials and methods, solar thermal energy systems, and topics relevant to fission reactor power systems Finally, the development and assessment of fuel cells for commercial and utility applications were described, and IEEE position papers were presented on reactors, safety, cogeneration, SPS, and solid waste energy sources. M.S.K.

A82-25552
COMMAND CONTROL AS A PROCESS
J. S. LAWSON, JR. (U.S Navy, Naval Electronic Systems Command, Washington, DC) In: Conference on Decision and Control, 19th, and Symposium on Adaptive Processes, Albuquerque, NM, December 10-12, 1980, Proceedings Volume 1. New York, Institute of Electrical and Electronics Engineers, Inc., 1980, p.1-6.

Military command control is described as a process for ultimately controlling a geographic area. Some of the requirements of this process are identified and models of it suitable for developing analytic procedures are presented. Two examples which highlight possible system trade-offs are discussed The differences in system and environmental parameters in different military scenarios are pointed out, and some promising avenues for future investigation are proposed. (Author)

A82-25565
OVERLAPPING CONTROL STRUCTURES AND SECURITY IN LARGE SCALE SYSTEMS
K. A. LOPARO (Case Western Reserve University, Cleveland, OH) In: Conference on Decision and Control, 19th, and Symposium on Adaptive Processes, Albuquerque, NM, December 10-12, 1980, Proceedings Volume 1. New York, Institute of Electrical and Electronics Engineers, Inc., 1980, p 214-218. refs
(Contract N00014-80-C-0199)

The problem of decision making in a large-scale C3 system is addressed The system has a hierarchical structure imposed by constraints on the flow of information and the command and control functions of the various military subsystems A mathematical framework for the decision problem is presented and these ideas are related to the functional integrity of the system in the midst of random disturbances and failures. (Author)

A82-25568
A MODEL FOR REAL-TIME HUMAN DECISION-MAKING IN A MULTI-TASK ENVIRONMENT
K. R. PATTIPATI, D. L. KLEINMAN, and A. R. EPHRATH (Connecticut, University, Storrs, CT) In: Conference on Decision and Control, 19th, and Symposium on Adaptive Processes, Albuquerque, NM, December 10-12, 1980, Proceedings. Volume 1 New York, Institute of Electrical and Electronics Engineers, Inc., 1980, p. 415-421 refs

The present research has sought to understand human information-processing and task selection procedures in a dynamic multi-task environment The approach has been to assimilate the results of a joint experimental and analytic program into a normative dynamic decision model (DDM) for predicting human task sequencing performance. To this end, a general multi-task paradigm was developed that retains the essential features of task selection in a manageable, yet manipulative, context. Via this framework, we have studied the effects of length of opportunity window, task values, and processing times on the human decision-making processes. (Author)

A82-27894
EVALUATION OF TEST PERFORMANCE OBJECTIVES THROUGH FLOW SIMULATION
J. K. SCULLY (JKS Systems, Port Jefferson, NY) In: AUTOTESTCON '80, International Automatic Testing Conference, Washington, DC, November 2-5, 1980, Proceedings New York, Institute of Electrical and Electronics Engineers, Inc., 1980, p 105-114

In connection with the current state of computer technology, it has now become feasible to provide a flow simulation capability which can be used as a practical evaluation tool on a day-to-day basis. The present investigation shows that simulation can provide the basis for a priori evaluation of various automatic support alternatives before specific requirements are imposed on test program sets, automatic test systems, or even test compatibility and aspects of prime equipment At the very least, simulation can be used to augment the decision making process by infusing some degree of order and regularity into the process itself. G.R.

A82-27897
SURVEY OF APPROACHES TO TESTING AND DIAGNOSING MICROPROCESSOR-BASED SYSTEMS
W. SCHMITT and E LYNCH (Mantech International Corp., Jacksonville, FL) In: AUTOTESTCON '80; International Automatic Testing Conference, Washington, DC, November 2-5, 1980, Proceedings. New York, Institute of Electrical and Electronics Engineers, Inc., 1980, p. 127-130

The test strategies for microprocessor-based system can be divided into two categories, including go/no-go testing and diagnostic testing. The major go/no-go test strategies employed

by industry today for microprocessor-based systems are related to logic analyzers, single stepping the microprocessor with Automatic Test Equipment (ATE), self-test/built-in test, and In Circuit Emulation (ICE). In a discussion of diagnostic test strategies, attention is given to board swapping, signature analysis, time domain analysis, and the guided probe technique. Often the strategy selected depends upon special considerations and trade-offs, taking into account existing in-house testing capabilities from component testing through final system test, testing operator skill level requirements, and component purchase prices vs capital equipment cost trade-offs. G.R.

A82-27905
IS A PAPERLESS ATE POSSIBLE WITH VIDEO DISC
M J. GOODING (Honeywell, Inc., Minneapolis, MN) In: AUTOTESTCON '80; International Automatic Testing Conference, Washington, DC, November 2-5, 1980, Proceedings. New York, Institute of Electrical and Electronics Engineers, Inc., 1980, p. 219-222. refs

This paper discusses an ATE application of the video disc technology that has come of age in the past few years. The ATE operator can become an organic part of the ATE with the help of embedded training and an 'automated operator manual', that includes pictorial data and schematics. A video disc, when coupled with a versatile CRT and controlled by the ATE computer, provides the required non-volatile, high-fidelity, long life, easy to control storage medium for virtually all ATE documentation. Both functional and technical design requirements are presented to show how such a technology fits in with ATE. Other approaches to automatic operator manuals in ATE are used to illustrate the merit of such concepts and the desire to pursue them by DOD agencies. An overview of the pertinent design characteristics of video disc system is given to explain the salient features of a design approach for implementing video disc on ATE. A comparison of several video disc systems is summarized. (Author)

A82-33875
A SELECTION PROCEDURE FOR COMPUTER-AIDED DESIGN SYSTEMS [EIN AUSWAHLVERFAHREN FUER RECHNERUNTERSTUETZTE KONSTRUKTIONSSYSTEME]
J. TONN (O & K Orenstein & Koppel AG, Dortmund, West Germany) VDI-Z, vol. 124, no. 9, May 1982, p. 321-325. In German.

A computer-aided design system makes it possible to increase the productivity of the design office. Many industrial firms are, therefore, interested in computer-aided design (CAD) and computer-aided manufacturing (CAM) procedures. However, for the selection of a system which is suited for the particular needs of a firm, it is generally necessary to conduct a systematic market and system analysis. Such an analysis must ordinarily be performed in each case by the involved enterprise itself. Consulting services can only be employed for the conduction of the analysis, if it is assumed that enterprise-related details regarding the requirements are very well known to the consulting firm. A description is presented of the processes and approaches employed in connection with the selection of a computer-aided design system in a large company engaged in the manufacture of machines. G.R.

A82-35627#
A DECISION-ANALYTIC EVALUATION OF THE SPS PROGRAM
A. B. IRELAND (Princeton University, Princeton, NJ) In: Space manufacturing 4; Proceedings of the Fifth Conference, Princeton, NJ, May 18-21, 1981. New York, American Institute of Aeronautics and Astronautics, 1981, p. 301-309. refs

The SPS (solar power satellite) project is divided into discrete subprojects, each of which results in the development of identifiable technologies. The manager must make 'go/no-go' decisions for each subproject based on the results of previous subprojects. This paper evaluates these decisions quantitatively using a methodology based on detailed cost and revenue models. The methodology evaluates expected values for each subproject, probabilities of 'go' decisions at all future decision points, and major cost and revenue drivers. The high expected value for the first (research) subproject indicates that the reduction in uncertainty in the cost of the SPS program due to the expected outcome of the research subproject more than offsets the cost of the subproject, and therefore that the subproject should be performed. B.J.

A82-36966
ANALYSIS OF HUMAN MOVEMENTS FOR WORKPLACE DESIGN
K.-P. HOLZHAUSEN (Forschungsgesellschaft fuer angewandte Naturwissenschaften, Forschungsinstitut fuer Anthropotechnik, Wachtberg-Werthhoven, West Germany) In. Manned systems design: Methods, equipment, and applications; Proceedings of the Conference, Freiburg im Breisgau, West Germany, September 22-25, 1980. New York, Plenum Press, 1981, p. 337-362. refs

Experimental design, tools, and analytical techniques for establishing an anthropometric data base for movement and distance parameters for human functions in the workplace are reviewed. Specific attention is given to the range of human actions in a seated position, a position relevant to control consoles and cockpits, with data being accumulated on human stature, reach, and range of motions, as well as on the patterns of movement. Technical approaches to cataloging the motions are examined, including mechanical, photographic, optoelectronic, and fully electronic monitoring and recording. Stereophotographic methods allow the investigation of movements with three-dimensional trajectories by use of two cameras. Attention is given to static models such as BOEMAN, linkman, COMBIMAN, and the Crewstation Geometry Evaluator systems for computer aided design of cockpit interiors. Applications of the techniques to solving workplace inefficiencies are illustrated with examples. M.S.K.

A82-40883#
COMPUTER-AIDED DERIVATION OF EQUATIONS OF MOTION FOR ROTARY-WING AEROELASTIC PROBLEMS
F. KIESSLING (Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Institut fuer Aeroelastik, Goettingen, West Germany) In: International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 1. New York, American Institute of Aeronautics and Astronautics, 1982, p. 67-77. refs

A general computer-algebra system has been applied to derive literal equations of motion for the aeroelastic behavior of rotary-wings. Inertia, elastic, structural damping, aerodynamic, and gravitational contributions are considered. Modal degrees of freedom are provided to represent elastic rotor blades. The program input comprises mainly a kinematic description of the system. A weighting scheme is used to obtain the most important terms in a consistent manner. Multiblade coordinate transformation is applied to reduce or to eliminate periodic coefficients. As output, matrices are written in FORTRAN code, which reflect the mathematical model and can be used for further numerical calculations. As an example, the suggested procedure is applied to a model of a two-bladed wind turbine mounted on an elastic tower. (Author)

A82-40884#
HAJIF-II - A PROGRAM SYSTEM FOR THE DYNAMIC ANALYSIS OF AERONAUTICAL STRUCTURES
G.-G. LIU and J.-J. LI (Chinese Aeronautical Establishment, Beijing, People's Republic of China) In: International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 1. New York, American Institute of Aeronautics and Astronautics, 1982, p. 78-82. refs

HAJIF-II is a program system developed for the calculation of modal parameters of aircraft structures as well as flutter and gust response analyses with active control systems taken into consideration. Ninety-nine substructures, each with 7000 degrees of freedom, can be used in the calculation of modal parameters and 50 modes for the flutter and gust response analyses. Some

new techniques, such as a revised hypermatrix technique, an improved algorithm of simultaneous iteration, and new methods of modal synthesis etc , were developed to improve the efficiency of the system. Typical aircraft structures were analyzed and good results were obtained. (Author)

A82-42194
TECHNIQUES FOR ACHIEVING INCREASED OPERATIONAL AVAILABILITY OF WEAPON DELIVERY SYSTEMS
S. J. MONROE and A. L. CIANFICHI (IBM Corp., Owego, NY) In: Annual Reliability and Maintainability Symposium, Los Angeles, CA, January 26-28, 1982, Proceedings. New York, Institute of Electrical and Electronics Engineers, 1982, p. 213-219.

This paper addresses the techniques developed by IBM in assessing operational availability. It is found that operational availability is primarily governed by the interrelationships of return rate, repair rate, and quantity of spares available. Having the elements identified, the next task was to obtain meaningful data to measure and evaluate these elements. The next step after obtaining the data was to analyze them, and formulate recommendations and corrective actions. Finally, upon completion of the analysis, the findings had to be communicated to the customer (Author)

A82-43172
A RISK/ACTION MODEL FOR THE DIFFERENTIATIONS OF R AND D PROFILES
W. WHITE (Siemens Gammasonics, Inc., Des Plaines, IL) IEEE Transactions on Engineering Management, vol EM-29, Aug. 1982, p. 88-93.

A simple model is presented in which conjugate definitions of risk and the level of action required, on a project-by-project basis, are used to differentiate R and D profiles. The model is designed to provide R & D managers with a simple graphical tool to make visible to management and staff alike the probabilistic nature and relative efforts required for a program involving both research and development projects. B.J.

A82-45075* Motorola, Inc., Phoenix, Ariz.
A USERS EVALUATION OF SAMIS
L. A. GRENON and M. G. COLEMAN (Motorola, Inc., Semiconductor Group, Phoenix, AZ) In: Photovoltaic Specialists Conference, 15th, Kissimmee, FL, May 12-15, 1981, Conference Record. New York, Institute of Electrical and Electronics Engineers, Inc., 1981, p. 985-989. NASA-supported research

SAMIS, the Solar Array Manufacturing Industry Simulation computer program was developed by Jet Propulsion Laboratories (JPL) to provide a method whereby manufacturers or potential manufacturers of photovoltaics could simulate a solar industry using their own particular approach. This paper analyzes the usefulness of SAMIS to a growing photovoltaic industry and clearly illustrates its limitations as viewed by an industrial user. (Author)

A82-45544
A SELF-LEARNING AUTOMATON WITH VARIABLE RESOLUTION FOR HIGH PRECISION ASSEMBLY BY INDUSTRIAL ROBOTS
J. SIMONS (Fonds National de la Recherche Scientifique, Brussels, Belgium), H. VAN BRUSSEL, J. DE SCHUTTER, and J. VERHAERT (Leuven, Katholieke Universiteit, Louvain, Belgium) IEEE Transactions on Automatic Control, vol. AC-27, Oct. 1982, p. 1109-1113. refs

This paper reports on the use of the stochastic automaton theory to configure control algorithms for high precision assembly operations performed with a force-sensing robot. The basic principle of the stochastic automation, i.e., its variable structure, has been extended to the dimensionality of the automaton by gradually optimizing the resolution of the input variables. (Author)

A82-46264#
INSTRUCTIONAL DESIGN FOR AIRCREW JUDGMENT TRAINING
F. BRECKE (Logicon, Inc., San Diego, CA) In. Symposium on Aviation Psychology, 1st, Columbus, OH, April 21, 22, 1981, Proceedings. Columbus, OH, Ohio State University, 1981, p. 145-160. refs

A conceptual framework for the concept of judgment is presented as a basis for its adaptation to pilot training design and research. Judgment is defined as a cognitive component which establishes alternative actions and factors for selection among them, and is an affective component which affects the choice among alternatives. A lack of total information is noted to be a fundamental criterion for situations requiring the use of judgment. The ability of a person to exercise correct judgment is bounded by the difficulty of the task, the repertoire of relevant cognitive strategies, the level of stress, and the available repertoire of stress coping mechanisms. Current U.S. Navy pilot training concentrates on procedures, and a method for systematically teaching judgment is described. It is recommended that elements of uncertainty be introduced as soon as proficiency is gained in flight skills. The use of programmed uncertainties in current F-14 and F-15 pilot training courses is outlined. M.S.K.

A82-46946#
PLANNING INMARSAT'S SECOND GENERATION OF SPACECRAFT
W. P WILLIAMS (International Maritime Satellite Organization, London, England) International Astronautical Federation, International Astronautical Congress, 33rd, Paris, France, Sept. 27-Oct. 2, 1982, 15 p
(IAF PAPER 82-93)

The next generation of studies of the Inmarsat service are outlined, such as traffic forecasting studies, communications capacity estimates, space segment design, cost estimates, and financial analysis. Traffic forecasting will require future demand estimates, and a computer model has been developed which estimates demand over the Atlantic, Pacific, and Indian ocean regions. Communications estimates are based on traffic estimates, as a model converts traffic demand into a required capacity figure for a given area. The Erlang formula is used, requiring additional data such as peak hour ratios and distribution estimates. Basic space segment technical requirements are outlined (communications payload, transponder arrangements, etc), and further design studies involve such areas as space segment configuration, launcher and spacecraft studies, transmission planning, and earth segment configurations. Cost estimates of proposed design parameters will be performed, but options must be reduced to make construction feasible. Finally, a financial analysis will be carried out in order to calculate financial returns. R.K.R.

A82-47273
REMOTE MANIPULATORS IN INDUSTRY AND SPACE
D. E. FLINCHBAUGH (I.C.S.D. Corp., Kissimmee, FL) In: Making space work for mankind; Proceedings of the Nineteenth Space Congress, Cocoa Beach, FL, April 28-30, 1982. Cape Canaveral, FL, Canaveral Council of Technical Societies, 1982, p. 6-10 to 6-18.

Robotics in industry and space are briefly discussed, and robot applications are listed and graphically illustrated. A mobile remote manipulator system, a robot for servicing a nuclear power steam generator, and remote manipulator spacecraft systems are depicted. Listed are potential robotic arm applications, benefits of a remotely operated service arm, and U.S. academic/institutional and industrial developers of robot vision/optical inspection systems. Graphic, analytical representations of a remote manipulator system and a mechanical arm assembly are provided. C.D.

05 MANAGEMENT TOOLS AND TECHNIQUES

N82-10403# Encotech, Inc., Schenectady, N.Y.
COMBUSTION TURBINE COMBINED-CYCLE R AND D PROJECT PRIORITY ANALYSIS Final Report
K. S. DELIGIANNIS and J. PATMORE, (Systems Control, Inc., Palo Alto, Calif.) Jul. 1981 237 p refs Sponsored by Electric Power Research Inst.
(Contract EPRI PROJ. 990-4)
(DE81-904206; EPRI-AP-1943) Avail: NTIS HC A11/MF A01

The development of a Computerized priority methodology for combustion Turbine R nd D projects was studied. The development of reliable and cost effective combustion turbine combined cycle systems is discussed. Time and funds to meet this development goal are limited, a method to prioritize potential R and D projects is highly desirable. The methodology includes a combined cycle plant simulation model (CCPSM) and a prioritization algorithm that ranks alternatives based on their benefit/cost effectiveness.
DOE

N82-10605# Harvard Univ., Cambridge, Mass. School of Government.
CASE STUDIES IN THE APPLICATION OF AIR QUALITY MODELLING IN ENVIRONMENTAL DECISION MAKING: SUMMARY AND RECOMMENDATIONS
C. G MILLER May 1981 92 p refs
(Contract EPA-R-805558-01)
(PB81-213233; EPA-600/4-01-034) Avail: NTIS HC A05/MF A01 CSCL 13B

The application of air quality models to examine the problems encountered when trying to use these models in makin environmental policy decisions was undertaken It is shown that technical and political constraints exist but that unresolved policy issues, the management of the decision process and conflicting institutional and organizational interests also cause problems Reommendations are made on how to improve the technical planning and management of the decision process so that the air quality models can become a better policy tool within the state of the art, political and organizational constraints. GRA

N82-11306*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
GOLDSTONE (GDSCC) ADMINISTRATIVE COMPUTING
H. MARTIN *In its* The Telecommun. and Data Acquisition Rept. p 182-191 15 Oct. 1981
Avail: NTIS HC A11/MF A01 CSCL 09B

The GDSCC Data Processing Unit provides various administrative computing services for Goldstone Those activities, including finance, manpower and station utilization, deep-space station scheduling and engineering change order (ECO) control are discussed. T.M.

N82-11310*# Jet Propulsion Lab, California Inst. of Tech., Pasadena.
AN OPTIMIZATION MODEL FOR ENERGY GENERATION AND DISTRIBUTION IN A DYNAMIC FACILITY
F. L. LANSING *In its* The Telecommun. and Data Acquisition Rept. p 206-222 15 Oct. 1981 refs
Avail: NTIS HC A11/MF A01 CSCL 05A

An analytical model is described using linear programming for the optimum generation and distribution of energy demands among competing energy resources and different economic criteria. The model, which will be used as a general engineering tool in the analysis of the Deep Space Network ground facility, considers several essential decisions for better design and operation. The decisions sought for the particular energy application include: the optimum time to build an assembly of elements, inclusion of a storage medium of some type, and the size or capacity of the elements that will minimize the total life-cycle cost over a given number of years. The model, which is structured in multiple time divisions, employ the decomposition principle for large-size matrices, the branch-and-bound method in mixed-integer programming, and the revised simplex technique for efficient and economic computer use. T.M.

N82-12092*# Draper (Charles Stark) Lab., Inc, Cambridge, Mass.
STUDY TO DEFINE AN APPROACH FOR DEVELOPING A COMPUTER-BASED SYSTEM CAPABLE OF AUTOMATIC, UNATTENDED ASSEMBLY/DISASSEMBLY OF SPACECRAFT, PHASE 1 Final Report, 1 Jun. - 31 Dec. 1980
J. L. NEVINS, T. L. DEFAZIO, D. S. SELTZER, and D. E. WHITNEY 1981 37 p refs
(Contract NAS5-26187)
(NASA-CR-166740, R-1436) Avail: NTIS HC A03/MF A01 CSCL 22A

The initial set of requirements for additional studies necessary to implement a space-borne, computer-based work system capable of achieving assembly, disassembly, repair, or maintenance in space were developed. The specific functions required of a work system to perform repair and maintenance were discussed. Tasks and relevant technologies were identified and delineated. The interaction of spacecraft design and technology options, including a consideration of the strategic issues of repair versus retrieval-replacement or destruction by removal were considered along with the design tradeoffs for accomplishing each of the options. A concept system design and its accompanying experiment or test plan were discussed. R.J.F.

N82-12884# Stanford Univ., Calif Center for Research on Organizational Efficiency.
TOPICAL SURVEY, 1980-1981 Progress Report
Mar. 1981 36 p refs
(Contract N00014-79-C-0685)
(AD-A105117) Avail: NTIS HC A03/MF A01 CSCL 12A

The work at the center on game-theoretic models of multiperson decision problems has strengthened the analytical tools available to study the phenomena of organizations. There are bright prospects that several of the more intractible topics can be addressed a new with better chances of clear-cut resolution. To take a specific example, we are particularly interested in developing the theory of bargaining modeled as a dynamic game with incomplete information. That is, bargaining or negotiations are typically affected by incomplete information about each other's preferences, resources, and opportunities. At the same time, bargaining is inherently a dynamic process of offers and counteroffers, perhaps interrupted by combative tactics (strikes, lockout, 'war'). It seems clear that the analysis of such a model can proceed smoothly along the lines developed in work to date.
GRA

N82-13777# Messerschmitt-Boelkow-Blohm G.m.b.H., Hamburg (West Germany). Unternehmensbereich Hamburger Flugzeugbau.
INCREASE IN THE PROFITABILITY OF DESIGN AND PROCESS PLANNING BY INTEGRATED AND GRAPHIC DATA PROCESSING, PHASE 1 Final Report
R. FEDDERSEN, U. GRUPE (Vereinigte Flugtechnische Werke GmbH, Bremen, West Germany), and J. NAGEL (Dornier-Werke GmbH, Friedrichshafen, West Germany) Bonn Bundesministerium fuer Forschung und Technologie Jan. 1981 275 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-W-81-005; ISSN-0170-1339) Avail: NTIS HC A12/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 43,90

The basic concepts of computer aided design systems are reviewed and generalized for application throughout the entire production process. Examples from aerospace technology are illustrated. The principles and operation modes of the selected computer-graphics interactive data-processing and programming system are exposed and its utilization assessed in the fields of lofting, structure analysis, tool design, numerical control programming, process planning and order processing. It is found that a favorable basis is thus created for the development of machine independent programs and interactive methods.
Author (ESA)

N82-14527# Societe Nationale Industrielle Aerospatiale, Suresnes (France) Lab. Central.
CONTROL METHODOLOGY: NONDESTRUCTIVE TESTING IN THE AERONAUTICS INDUSTRY [METHODOLOGIE DE CONTROLE: CONTROLE NON DESTRUCTIF DOMAINE AERONAUTIQUE]
J. ODORICO 12 Jun. 1980 39 p refs In FRENCH Presented at l'Ecole d'Ete Franco-Quebecoise Conf., Montreal, 14-23 Jul. 1980
(SNIAS-812-551-110) Avail: NTIS HC A03/MF A01

Quality control in aircraft production using nondestructive tests is considered. Training and administration are covered. Examples of procedures involving suppliers, constructors, and clients are given Topics include: use of X-rays, holography; examination of alloys; and ultrasonic testing. The need for an integrated approach is stressed, involving client, inspectors, etc. Author (ESA)

N82-14976*# Washington Univ , Seattle. Scientific and Technical Communication Program
WRITING AS DECISION-MAKING
J. W. SOUTHER *In* NASA Langley Research Center Tech. Commun., Pt. 1 p 239-243 Dec 1981 refs
Avail: NTIS HC A14/MF A01 CSCL 05B

The need to teach informational writing as a decision-making process is discussed Situational analysis, its relationship to decisions in writing, and the need for relevant assignments are considrered Teaching students to ask the right questions is covered. The need to teach writing responsiveness is described. Three steps to get started and four teaching techniques are described. The information needs of the 'expert' and the 'manager' are contrasted. N.W.

N82-15981# California Univ., Berkeley. Lawrence Berkeley Lab. Engineering and Technical Services Div.
GRAD: A TOOL FOR PROGRAM ANALYSIS AND PROGRESS MONITORING
W W. S. YEN and J D. LAWRENCE Jun. 1981 5 p refs Presented at the Ann. Meeting of the Geothermal Resources Council, Houston, Tex., 25-29 Oct. 1981
(Contract W-7405-ENG-48)
(DE81-028098; LBL-12820; CONF-811015-14) Avail: NTIS HC A02/MF A01

The development and operation of the Geothermal Resource Areas Database (GRAD) is described. The data base was created as part of the National Geothermal Progress Monitor System in 1979. The data base is organized around the concept of a geothermal area and provides broad coverage of geothermal development activities in the United States. Sixteen records, covering pre-lease, lease, and post-lease activities are defined for each area. Data collected in the various subject areas are critically evaluated, and then entered into an on-line interactive computer system. The system is publicly available for retrieval and use DOE

N82-15983# General Accounting Office, Washington, D. C. Procurement, Logistics, and Readiness Div.
FEDERAL RECORDS MANAGEMENT: A HISTORY OF NEGLECT
24 Feb. 1981 47 p refs
(PB81-237133, PLRD-81-2) Avail: NTIS HC A03/MF A01 CSCL 05A

Progress overcoming records management problems under the new legislation, the paperwork reduction act, was assessed. Serious deficiencies with records management have existed for years among Federal Government agencies. The National Archives and Records Service improving management oversight, and the Paperwork Reduction Act was enacted in 1980. The act imposes broad policy setting and oversight responsibilities on the Office of Management and Budget and requires reports to the Congress on agency information management activities. GRA

N82-16006# Department of Energy, Washington, D. C.
MANAGING LARGE-SCALE MODELS: DBS
May 1981 319 p refs
(DE81-028683; DOE/EP-0006) Avail: NTIS HC A14/MF A01

A set of fundamental management tools for developing and operating a large scale model and data base system is presented A broad range of generic management problems are classified into three groups: documentation, operations, and maintenance. System problems are identified, the solutions for gaining management control are discussed. Practical methods for dealing with these problems are presented. DOE

N82-16012# Applied Decision Analysis, Inc., Menlo Park, Calif.
EVALUATING R AND D OPTIONS UNDER UNCERTAINTY. VOLUME 2: ATMOSPHERIC FLUIDIZED-BED COMBUSTION COMMERCIALIZATION STRATEGIES Final Report
A. B BORISON, B. R. JUDD, P. A. MORRIS, and E. C. WALTERS Aug 1981 79 p Sponsored by Electric Power Research Inst.
(Contract EPRI PROJ 1432-1)
(DE81-904246; EPRI-EA-1964-VOL-2) Avail: NTIS HC A05/MF A01

A quantitative framework for analyzing commercialization decisions for emerging electrical power generation technologies was developed. The framework addresses the general question of when to freeze a design for commercialization. The framework was developed to help evaluate the benefits of continuing the development of two different designs for atmospheric fluidized bed combustion boilers. EPRI staff participated actively in specifying the scope of the analysis and in providing technical information on the two designs. The framework was demonstrated using this information, supplemented with probablistic judgments by EPRI staff about possible outcomes from the pilot and demonstration stages of development. Based on the technical data and judgments supplied by EPRI staff, the analysis shows a net benefit for proceeding with the development of two designs DOE

N82-16014# Brookhaven National Lab , Upton, N. Y.
APPLICATION OF AN LP MODEL TO STRATEGIC PLANNING OF MULTINATIONAL COOPERATIVE RD AND D PROGRAMS
V. L. SAILOR 1981 10 p refs
(Contract DE-AC02-76CH-00016)
(DE81-029325; BNL-29857) Avail. NTIS HC A02/MF A01

An analytical study was initiated to serve as a basis for defining a cooperative strategy for RD and D among International Energy Agency member nations A flexible energy system model, MARKAL, was developed as the primary tool for the analysis. The flexibility of MARKAL is demonstrated by the fact that the diverse energy systems of sixteen countries and the aggregated European Economic Community have been modeled successfully. MARKAL is a multi-period linear programming model which describes the energy flows, costs, and resource consumption of national energy systems over an extended period of time (1980 to 2020). Various policy options and assumptions about future world situations create a range of scenarios which control the MARKAL solutions. Such options and such postulated conditions, translated into operational indicators to drive the MARKAL model and constrain its solutions, are described. DOE

N82-16310# Purdue Univ., Lafayette, Ind School of Industrial Engineering.
THE OPTIMAL PLANNING OF COMPUTERIZED MANUFACTURING SYSTEMS
W. C. LEWIS, JR , M. M. BARASH, and J. J. SOLBERG Dec. 1980 207 p refs
(Contract NSF APR-74-15256)
(PB81-241564; NSF/RA-800556, REPT-18) Avail: NTIS HC A10/MF A01 CSCL 13H

A new class of control algorithms for computer operated manufacturing systems (CMS) was defined and tested. The definition is sufficient to permit construction of any element of the new class by a practitioner with backgrounds in electronic devices, NC machine tools, computer operating systems, and data flow

Reliability, repairability, and extensibility were considered. The test applied the new class to control two simulated systems-one similar to existing systems, the other using adaptive machine tools. For each system, the new class functioned successfully. Non-failing machine tool utilization exceeded 95 percent for failure rates from 3-16 percent per machine tool. The batch weights had a strong effect on relative flow time. GRA

N82-16311# Purdue Univ., Lafayette, Ind. School of Industrial Engineering.
THE OPTIMAL PLANNING OF COMPUTERIZED MANUFACTURING SYSTEMS
M. M. BARASH, E. BARTLETT, I I FINFTER, and W. C. LEWIS, JR Dec. 1980 98 p refs
(Contract NSF APR-74-15256)
(PB81-245276, NSF/RA-800555; REPT-17) Avail. NTIS HC A05/MF A01 CSCL 13H

An automated machining process planning systems is demonstrated. Enough information is given to construct any member of the class, which is characterized by use of a recursive algorithm. The algorithm emphasizes the use of one well-defined tool, in one way, at each step of a process plan Functioning is demonstrated by a Pascal program. Testing the generality of the system is proposed. The project illustrates application of selected software development methods to make the software compatible with social verification GRA

N82-16312# Purdue Univ., Lafayette, Ind. School of Industrial Engineering
THE OPTIMAL PLANNING COMPUTERIZED MANUFACTURING SYSTEMS
M. F NEUTS, D. M. LUCANTON, and C GEISZLER Feb 1981 35 p refs
(Contract NSF APR-74-15256)
(PB81-245284; NSF/MEA-81006; REPT-19) Avail. NTIS HC A03/MF A01 CSCL 13H

The utility of interactive computation in answering questions on the behavior, design, and control of certain service systems is demonstrated. The stationary distributions of various waiting times are also discussed. A queue with N servers which may break down and require repair at a facility which has C repair crews is studied Under exponential assumptions, this model has an algorithmically tractable solution It is then a particular case of the M/M/n queue in a Markovian environment. It is shown that during periods when most servers are down, large build-ups may occur which affect the queue adversely for a long time afterwards. Potential applications are in manpower planning, as in a typing pool where persons may be absent, and in determining the size of a battery of machines, where machines may be inoperative due to maintenance and repair. GRA

N82-16924# National Research Inst. for Mathematical Sciences, Pretoria (South Africa).
AN INTERACTIVE APPROACH TO MULTIPLE CRITERIA DECISION MAKING BASED ON STATISTICAL INFERENCE
T. J. STEWART Mar. 1981 31 p refs
(PB82-108747; TWISK-204) Avail: NTIS HC A03/MF A01 CSCL 05A

An interactive algorithm is proposed for the problem of selecting one of a finite number of alternatives, where each is evaluated in terms of a number of conflicting criteria. A simple form of utility function is assumed, and the possibility is modelled probabilistically that the decision maker may at any time indicate a preference between alternatives in conflict with his true utility Author (GRA)

N82-16939# California Univ., Livermore. Lawrence Livermore Lab.
TECHNOLOGY TRANSFER OF COMPUTER-AIDED ENGINEERING TO THE UNIVERSITY COMMUNITY
W. J. COMFORT, III, B. E. BROWN, B. R. BOWMAN, and A. HARRAL, III Apr 1981 17 p refs Presented at the Winter Ann. Meeting of the ASME Technol. and Soc Div., Washington, D.C , 15-20 Nov. 1981
(Contract W-7405-ENG-48)
(UCRL-85694; CONF-811101-1) Avail: NTIS HC A02/MF A01

Computer aided engineering, which includes modeling, analysis, and design, with graphical representation for both input and output, is becoming an increasingly important contributor to national productivity The demand for persons skilled in the field is growing rapidly It is expected that the needs for such skills will far exceed the ability of the university community to supply them, unless something is done now. The Lawrence Livermore National Laboratory (LLNL) has initiated a new project, in cooperation with the university community, to increase the student's use of and familiarity with the computer in engineering schools. The ultimate objective is increasing the national productivity. DOE

N82-16940# California Univ., Livermore. Lawrence Livermore Lab.
TECHNOLOGY TRANSFER AND DEVELOPMENT OF COMPUTER-AIDED ENGINEERING WITH THE UNIVERSITY COMMUNITY
W. J. COMFORT, III, R. E BROWN, B. R. ROWMAN, and A. HARRAL, III Jun. 1981 8 p refs Presented at the Winter Ann. Meeting of the ASME Technol and Soc. Div., Washington, D.C., 15-20 Nov 1981 Submitted for publication
(Contract W-7405-ENG-48)
(DE81-022408; UCRL-85694-REV-1; CONF-811101-1-REV-1)
Avail: NTIS HC A02/MF A01

Computer-aided engineering (CAE), the process of using the computer interactivity for modeling, analysis, and design with graphical representation for both input and output, is becoming an increasingly important contributor to engineering productivity. The demand for persons skilled in this field is growing rapidly. The need for such skills will exceed the ability of the university community to supply them, unless something is done now. The Lawrence Livermore National Laboratory (LLNL) has initiated a new technology transfer project in cooperation with the university community The objectives of this program are to increase the student's use of and familiarity with the computer in engineering schools and ultimately to assist in increasing engineering productivity. DOE

N82-17075*# Baylor Univ., Waco, Tex. Dept. of Mathematics.
MATHEMATICAL PROGRAMMING TECHNIQUES FOR SCHEDULING SPACELAB CREW ACTIVITIES AND EXPERIMENT OPERATIONS
W. C ASKEW *In* Alabama Univ. in Huntsville The 1981 NASA/ASEE Summer Fac. Fellowship Program 19 p Jan. 1982 refs
Avail. NTIS HC A25/MF A01 CSCL 05A

Several mathematical programming techniques which may be applied to the scheduling of experiments and crew activities for Spacelab missions are investigated. The use of currently known methods, in particular zero-one programming and heuristic dispatching is discussed. In addition, a scheduling algorithm and examples to illustrate and test its use are presented. J.M S.

N82-17357# Michigan State Univ., East Lansing. Dept. of Metallurgy, Mechanics, and Materials Science.
FORECASTING CORROSION DAMAGE AND MAINTENANCE COSTS FOR LARGE AIRCRAFT
R. SUMMITT and F. FINK *In* AGARD Aircraft Corrosion 11 p Aug. 1981 refs Sponsored by AF
Avail: NTIS HC A09/MF A01

Studies relating environmental and operational factors of large aircraft to corrosion damage were conducted. They provide a basis for predicting maintenance costs and for logistics decisions. The

studies included: (1) an Environmental corrosion severity index, based on pollutant and weather factors; (2) an atmospheric testing program to determine environmental corrosiveness; and (3) analysis of corrosion maintenance experience in aircraft systems. Results are discussed M.D.K.

N82-18893# Messerschmitt-Boelkow-Blohm G.m b.H., Ottobrunn (West Germany) Betriebsbereich.
EFFICIENT FACSIMILE COMMUNICATION WITH COMPUTER CONTROLLED MEMORY SWITCHING [WIRTSCHAFTLICHE FERNSCHREIBKOMMUNIKATION MIT RECHNERGESTEUERTER SPEICHERVERMITTLUNG]
W BOCHNIG and J. MATARE 1981 13 p refs Reprint from Korrespondenz in Wandel, 1980 p 60-68 In GERMAN
(Contract GS-82/2371)
(MBB-BB-498-81-O) Avail. NTIS HC A02/MF A01

Decision making policies on the installation of a communication system in a large organization are discussed Cost analysis, feasibility studies of real factors, and quantifiable volumes, which are future oriented ways of thinking are considered. It is shown that 60% of management problems are caused, as a whole or partially, by faulty communications. The steadily growing volumes of written and verbal information and the joint communication field are considered Installation of a facsimile copying machine is investigated. The technical development and the practical implications of the text telecommunication is reviewed
Transl. by E.A.K

N82-18925# National Research Inst for Mathematical Sciences, Pretoria (South Africa).
AN APPLICATION OF PARALLEL COMPUTATION TO SEQUENTIAL COMPUTATION: THE PROBLEM OF COST-EFFECTIVE RESOURCE ALLOCATION
N MEGIDDO (Tel-Aviv Univ.) Mar 1981 14 p refs Sponsored in part by Control Data
(PB82-108739, TWISK-202) Avail. NTIS HC A02/MF A01 CSCL 09B

A class of problems is demonstrated where good parallel algorithms become useful for designing efficient sequential algorithms In particular, Valiant's parallel sorting algorithm is applied in the design of an algorithm for the problem of cost-effective resource allocation. GRA

N82-19091# General Accounting Office, Washington, D. C. Accounting and Financial Management Div
NON-FEDERAL COMPUTER ACQUISITION PRACTICES PROVIDE USEFUL INFORMATION FOR STREAMLINING FEDERAL METHODS Report to Congress
2 Oct. 1981 34 p *refs*
(PB82-120924; AFMD-81-104) Avail: NTIS HC A03/MF A01 CSCL 05A

Eighteen non-Federal organizations showed that their managers are committed to using the computer effectively as a tool for achieving business goals Their strategies and plans provide a framework and operational direction for computer acquisitions. Their practices and procedures are understood, followed, and consonant with normal business practices GAO found that the 18 organizations studied normally completed computer equipment acquisitions in under a year The study discusses their practices and procedures. While GAO does not endorse the specific procurement practices, it is believed Federal agencies should consider using the other practices to streamline their acquisition processes within the context of current laws and regulations. GRA

N82-19397# *Purdue Univ., Lafayette, Ind School of Industrial* Engineering.
THE OPTIMAL PLANNING OF COMPUTERIZED MANUFACTURING SYSTEMS
K. E STECKE, J. J. SOLBERG, and M. M. BARASH Feb 1981 323 p refs
(Contract NSF APR-74-15256)
(PB82-110644, NSF/MEA-81010; REPT-20) Avail. NTIS HC A14/MF A01 CSCL 13H

Grouping and loading problems associated with flexible manufacturing systems (FMS) are addressed The solution to the grouping problem is to organize the machines so that each machine in a particular group is able to perform the same operations. The loading problem is to allocate the operations and associated tools of a set of selected part types among the machine groups, subject to the technological and capacity constraints of FMS. A closed network of queues (CNC) model is used. The expected production rate is defined as a function of the number of parts in the system, the number and sizes of machine groups, and the workload assigned to each group. Alternative loading objectives are defined in addition to the balancing and unbalancing objective examined. Nonlinear mixed integer for mutations of the loading problem are developed GRA

N82-20019# Physical Research Lab., Ahmedabad (India).
THE PERIODICAL MANAGEMENT SYSTEM
D R. KULKARNI, R. R. BHARUCHA, and U A GHIYA 1980 42 p
(PB82-116518, PRL/TN-80-02) Avail: NTIS HC A03/MF A01 CSCL 05B

A computerized Periodical Management System was developed and implemented for the Library of the Physical Reseach Laboratory. The system monitors various procedures related to procurement of periodicals It also processes the information related to periodicals and presents it in the form of comprehensive reports. Thus the system leads to better management of periodicals as well as better service to the users. The system was made operational on the Computer System IBM 360/44 under the operating system 44 PS. GRA

N82-20125*# Jet Propulsion Lab., California Inst of Tech., Pasadena.
OPTIMUM EQUIPMENT MAINTENANCE/REPLACEMENT POLICY. PART 2: MARKOV DECISION APPROACH
T CHARNG *In its* The Telecommun. and Data Acquisition Rept p 75-89 15 Feb. 1982 refs
Avail: NTIS HC A07/MF A01 CSCL 14D

Dynamic programming was utilized as an alternative optimization technique to determine an optimal policy over a given time period According to a joint effect of the probabilistic transition of states and the sequence of decision making, the optimal policy is sought such that a set of decisions optimizes the long-run expected average cost (or profit) per unit time. Provision of an alternative measure for the expected long-run total discounted costs is also considered. A computer program based on the concept of the Markov Decision Process was developed and tested. The program code listing, the statement of a sample problem, and the computed results are presented. Author

N82-21002# Department of the Army, Washington, D C.
LEGITIMATE TECHNIQUES FOR IMPROVING THE R-SQUARE AND RELATED STATISTICS OF A MULTIPLE REGRESSION MODEL
E. J CURLE 1981 19 p refs Presented to the 16th Ann Dept. of Defense Cost Analysis Symp., Arlington, Va., 4-7 Oct. 1981
(AD-A109370) Avail: NTIS HC A02/MF A01 CSCL 05C

Cost and analysts and DOD contractors frequently use regression analysis to develop cost estimating relationships, production relationships, and various forecasting equations. Invariably, those regression equations are presented in the text of the final report along, with the statistical properties i.e., the R-Square, the Standard Error of the Estimate, the Durbin-Watson

Statistic. These statistics are often presented as evidence of the validity and accuracy of the resulting equation. The higher the R-square the bolder the print and the more prominently displayed. Unfortunately, high R-square's, favorable Durbin-Watson statistics, can be artificially or inadvertently inflated to appear more favorable. In reality, the equation with good statistical properties may not reflect a valid causal relationship to explain variations in the dependent variable. In many cases the regression equations prove to be of little value in forecasting or explaining the relationships with new data. This paper discusses techniques for artificially raising the R-square and related statistical properties of regression equations. These techniques are presented for the benefit of analysts who are trying to improve the statistical properties of their equations and for the benefit of managers who must approve payment for such analysis. Author (GRA)

N82-21087# South African Bureau of Standards, Pretoria. Design Inst.
WHY DOES VALUE ANALYSIS WORK?
G. BODMAN *In* CSIR Mini-Seminar on Value Eng. p 1-10 Apr. 1981
Avail: NTIS HC A04/MF A01

Value Analysis, Value Engineering, and Value Management, a disciplined analytical thinking process aimed at achieving high levels of effectiveness in decision making is discussed. It provides the capacity to generate a large number of alternatives prior to decision making and so renders decision making highly effective. Since decision making is rooted in the definition and choice of options, the Value disciplines provide a method of proliferating options. N.W.

N82-21095# General Electric Co., Philadelphia, Pa. Space Systems Div.
EVALUATING DATA BASE MANAGEMENT SYSTEMS
E DAVIDSON 3 Nov. 1981 24 p
(DOC-81SDS030) Avail. General Electric Co., Space Systems Div. Library, P O Box 8555, Philadelphia, Pa. 19101

A methodology developed and successfully utilized for the evaluation and selection of data base management software is described. The basic methodology can be utilized in the evaluation of other types of software. The evaluation and selection criteria are discussed. B.W.

N82-21906# Technical Research Centre of Finland, Espoo Electrical Engineering Lab.
GUIDELINES FOR MAN-MACHINE INTERFACE DESIGN
J. RANTA, B WAHLSTROEM, and R WESTESSON Aug 1981 135 p refs
(VTT-RR-23/81; ISBN-951-38-1279-0; ISSN-0358-5077) Avail: NTIS HC A07/MF A01

Guidelines applicable to the design stage of complex process automation systems were designed. Three decision making levels are discerned: (1) decisions are made concerning the launching of the project; general outlines and criteria for later phases are created; (2) the degree of automation, basic interface design, coding system, instrumentation, and procedures are decided; (3) the practical implementation of specified subareas, control system parameter design, or instrumentation scale design The guidelines ensure that factors affecting decision making are taken into account at each level. Author (ESA) control

N82-22083# Army Research Inst. for the Behavioral and Social Sciences, Alexandria, Va. Human Factors Technical Area.
A DECISION SUPPORT FRAMEWORK FOR DECISION AID DESIGNERS Final Technical Report
R H. PHELPS, S. M HALPIN, and E. M. JOHNSON Jan. 1981 24 p refs
(Contract DA PROJ. 2Q1-62717-A-790)
(AD-A110329; ARI-TR-504) Avail. NTIS HC A02/MF A01
CSCL 05A

A Decision Support Framework is presented which serves two purposes: first, to organize and integrate various decision aids according to their function, and secondly to provide the decision aid designer with a systematic context in which to develop decision aids as well as examine which aspects of the decision problem would most benefit from decision aiding The main components of the framework are discussed in detail with Army intelligence decision making examples: (1) analysis of the decision requirements; (2) development of decision aids to provide the decision maker with information as well as tools for evaluating, weighting and integrating the information to make a decision, and (3) evaluation of the success of the decision aids in leading to a logical, rational decision GRA

N82-22084# Oklahoma Univ, Norman. Decision Processes Lab.
DESCRIBING THE REPRESENTATION OF DECISION PROBLEMS: AN APPLICATION OF MULTIDIMENSIONAL SCALING AND CLUSTER ANALYSIS
C. A. MANNING 15 Dec. 1981 53 p refs
(Contract *N00014-80-C-0639*, *NR PROJ. 197-066*)
(AD-A110175, TR-15-12-81) Avail: NTIS HC A04/MF A01
CSCL 05J

Important representations for an example of a common class of decision problems facing a shortage of a commodity are described. Decision problems are typically illstructured, and a decision maker's representation of a problem is not obvious to the experimenter. The dimensions along which a group of subjects judged the similarity of potential solutions to a problem gives insight into various ways in which the problem may be represented. Multidimensional scaling and cluster analysis were used to analyze the similarity of 43 acts suggested to solve the parking problem at the University of Oklahoma. Hierarchical cluster analysis was used to analyze the similarity judgments to examine neighborhoods of acts in the three dimensional space to determine whether an alternative interpretation of the relationships between acts might be obtained. Seven clusters were identified. The three dimensions derived from multidimensional scaling and the set of clusters obtained from cluster analysis describe alternative strategies for solving the parking problem from which individual decision makers sample when representing the problem. E.A.K

N82-22088# Admiralty Marine Technology Establishment, Teddington (England)
STRATEGIES OF COMMAND DECISION MAKING
E. H. I WHEATELY May 1981 19 p refs
(AMTE(E)-TM-81101, BR79602) Avail NTIS HC A02/MF A01

The theoretical and psychological literature on decision making was reviewed A design route to a true man centered system through a full functional analysis of requirements, identifying the sorts of decisions that must be made is advised. A distinction is made between functions amenable to problem solving algorithms, e.g., weapon allocation routines, and functions amenable to the use of decision making heuristics, e.g., choice of search strategies. The latter can then be matched to known decision aiding techniques. Decisions are divided into. probabalistic judgements; choice behavior; and dynamic decision making. Redesign of display facilities, processing with user friendly aids, or choice aids to group decision making using multiattributed utility theory, are suggested. Author (ESA)

N82-22904# Stichting Mathematisch Centrum, Amsterdam (Netherlands).
RECENT DEVELOPMENTS IN DETERMINISTIC SEQUENCING AND SCHEDULING: A SURVEY
E. L. LAWLER (California Univ., Berkeley), J. K. LENSTRA, and A. H. G. RINNOOYKAN (Erasmus Univ.) Aug. 1981 42 p refs Submitted for publication
(Contract NSF MCS-78-20054)
(MC-BW-146/81) Avail: NTIS HC A03/MF A01

The state of the art with respect to optimization and approximation algorithms, interpreted in terms of computational complexity theory is surveyed. Single machine scheduling, identical, uniform and unrelated parallel machine scheduling; and open shop, flow shop and job shop scheduling are considered. The success of complexity theory as a means of differentiating between easy

and hard problems emerges within the very detailed problem classification presented. Elementary reductions are defined that can be used in order to deduce the consequences of the development of a new polynomial time algorithm or an NP hardness proof The area of deterministic sequencing and scheduling is shown to be one of the more fruitful interfaces between computer science and operations research. Author (ESA)

N82-23044*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
INTRODUCTION TO SIMRAND: SIMULATION OF RESEARCH AND DEVELOPMENT PROJECT
R F MILES, JR. 1 Mar 1982 14 p
(Contract NAS7-100; DE-AI01-76ET-20356)
(NASA-CR-168811, JPL-PUB-82-20, DOE/JPL-1012-68; JPL-5105-204, NAS 1.26:168811) Avail: NTIS HC A02/MF A01 CSCL 05A

SIMRAND: SIMulation of Research ANd Development Projects is a methodology developed to aid the engineering and management decision process in the selection of the optimal set of systems or tasks to be funded on a research and development project. A project may have a set of systems or tasks under consideration for which the total cost exceeds the allocated budget. Other factors such as personnel and facilities may also enter as constraints Thus the project's management must select, from among the complete set of systems or tasks under consideration, a partial set that satisfies all project constraints The SIMRAND methodology uses analytical techniques and probability theory, decision analysis of management science, and computer simulation, in the selection of this optimal partial set The SIMRAND methodology is truly a management tool It initially specifies the information that must be generated by the engineers, thus providing information for the management direction of the engineers, and it ranks the alternatives according to the preferences of the decision makers. Author

N82-23999*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
AN APPRAISAL OF SELECTED COST/RESOURCE ESTIMATION MODELS FOR SOFTWARE SYSTEMS
J. F. COOK Dec 1980 42 p refs
(NASA-TM-84179; NAS 1.15:84179, SEL-80-007) Avail NTIS HC A03/MF A01

Several software cost/resource estimation models were applied to historical data of the Software Engineering Laboratory Data Base to appraise their applicability to the Flight Dynamics area. The models are designed to produce cost/resource estimates of software systems given several estimated parameters No attempt was made to determine how the estimation equations were derived. The models were applied as presented. Author

N82-24002*# Xerox Corp., Rochester, N. Y.
SOFTWARE COST/RESOURCE MODELING
J. R GOLDEN, J. R. MUELLER, and B. ANSELM *In* NASA. Goddard Space Flight Center Proc from the Fifth Ann. Software Eng Workshop 6 p 1980 refs
Avail: NTIS HC A11/MF A01 CSCL 09B

The Putnam method for planning the time/work effort component of software development is evaluated This software costing model, based on Norden-Rayleigh product life cycle concepts, was applied to four development projects The time/effort tradeoff leading to savings attainable when development time on a project is extended by a few months is demonstrated. The software equation which relates the principal parameters of development time, total effort, system size, and the development environment is presented. J D.

N82-24003*# Jet Propulsion Lab., California Inst of Tech, Pasadena.
SOFTWARE COST/RESOURCE MODELING: DEEP SPACE NETWORK SOFTWARE COST ESTIMATION MODEL
R. J. TAUSWORTHE *In* NASA. Goddard Space Flight Center Proc from the Fifth Ann. Software Eng. Workshop 46 p 1980 refs
(Contract NAS7-100)
Avail: NTIS HC A03/MF A01 CSCL 09B

A parametric software cost estimation model prepared for JPL deep space network (DSN) data systems implementation tasks is presented. The resource estimation model incorporates principles and data from a number of existing models, such as those of the General Research Corporation, Doty Associates, IBM (Walston-Felix), Rome Air Force Development Center, University of Maryland, and Rayleigh-Norden-Putnam. The model calibrates task magnitude and difficulty, development environment, and software technology effects through prompted responses to a set of approximately 50 questions. Parameters in the model are adjusted to fit JPL software lifecycle statistics. The estimation model output scales a standard DSN work breakdown structure skeleton, which is then input to a PERT/CPM system, producing a detailed schedule and resource budget for the project being planned Author

N82-24012*# National Aeronautics and Space Administration Goddard Space Flight Center, Greenbelt, Md
METHODOLOGY EVALUATION: EFFECTS OF INDEPENDENT VERIFICATION AND INTERGRATION ON ONE CLASS OF APPLICATION
J. PAGE *In its* Proc of the Sixth Ann. Software Eng. Workshop 47 p 1981
Avail: NTIS HC A13/MF A01 CSCL 09B

The effects of an independent verification and integration (V and I) methodology on one class of application are described Resource profiles are discussed. The development environment is reviewed Seven measures are presented to test the hypothesis that V and I improve the development and product. The V and I methodology provided: (1) a decrease in requirements ambiguities and misinterpretation, (2) no decrease in design errors, (3) no decrease in the cost of correcting errors, (4) a decrease in the cost of system and acceptance testing; (5) an increase in early discovery of errors, (6) no improvement in the quality of software put into operation, and (7) a decrease in productivity and an increase in cost. N.W

N82-24217# Centre National d'Etudes Spatiales, Paris (France)
PROSPECTS AND IMPLEMENTATION OF THE FRENCH SCIENTIFIC SPACE PROGRAM [PERSPECTIVES ET MISE EN OEUVRE DU PROGRAMME SPATIALE SCIENTIFIQUE FRANCAIS]
M. M. GUIONNET *In its* The Technol. of Spaceborne Sci Expt. p 11-27 1981 In FRENCH
Avail: NTIS HC A99/MF A01

Ways in which the French space program contributes to science are reviewed Current programs are then outlined and project management methods are explained. Activities of ESA are described, including spaceborne experiments, remote sensing, balloon sounding and other research and development The prospects of the French space program are for continuing European cooperation, collaboration with NASA, and involvement in the space programs of other countries. The selection and financing of these programs are discussed, emphasizing the decision making processes A schematic model of program implementation is offered. Author (ESA)

05 MANAGEMENT TOOLS AND TECHNIQUES

N82-25020# Stanford Univ., Calif. Inst. for Mathematical Studies in the Social Sciences.
HOW RESTRICTIVE ACTUALLY ARE THE VALUE RESTRICTION CONDITIONS
H. J. P. RAYNAUD Aug. 1981 12 p refs
(Contract N00014-79-C-0685)
(AD-A111669; TR-348) Avail: NTIS HC A02/MF A01 CSCL 05J

It has already been shown that the 'value restriction conditions' are in a certain sense the best possible conditions ensuring the transitivity of the majority method of decision in Sen (to appear); nevertheless, the actual restriction demanded by these conditions have not been yet clearly measured. GRA

N82-25022# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
MADAM: MULTIPLE-ATTRIBUTE DECISION ANALYSIS MODEL, VOLUME 1 M.S. Thesis
W. A. STIMPSON Dec. 1981 171 p refs 2 Vol.
(AD-A111104; AFIT/GOR/AA/81D-1-VOL-1) Avail: NTIS HC A08/MF A01 CSCL 09B

An on-line, real-time, computer based decision aid designed to assist the decision maker in clarifying preferences in a complex decision environment is described. It is applicable to problems which may be represented by a hierarchy of objectives to be satisfied. The program is MADAM: Multiple Attribute Decision Analysis Model, and it is written in FORTRAN V and is implemented on the CYBER 175 system. It is designed to aid the decision maker as he or she progresses through problem formulation, parameterization, sensitivity analyses, and a decision, including storage of all data and rationales. Deterministic problems are analyzed through multi-attribute-utility theory concepts and an additive value function is utilized for sensitivity analysis. A user's manual is included. R.J F.

N82-25023# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering
MADAM: MULTIPLE-ATTRIBUTE DECISION ANALYSIS MODEL, VOLUME 2 M.S. Thesis
W. A. STIMPSON Dec. 1981 172 p 2 Vol.
(AD-A111105; AFIT/GOR/AA/81D-1-VOL-2) Avail: NTIS HC A08/MF A01 CSCL 09B

This effort is an on-line, real-time, computer-based decision aid designed to assist the decision-maker in clarifying preferences in a complex decision environment. It is applicable to problems which may be represented by a hierarchy of objectives to be satisfied. The program is MADAM: Multiple-Attribute Decision Analysis Model, and it is written in FORTRAN V and is implemented on the CYBER 175 system, MADAM is designed to aid the decision-maker as he or she progresses through problem formulation, parameterization, sensitivity analyses, and a decision, including storage of all data and rationales. Deterministic problems are analyzed through Multi-Attribute-Utility Theory concepts and an additive value function is utilized for sensitivity analysis. Pairwise preferential independence is tested between attributes. The work is divided into two volumes. Volume I is a theoretical presentation and includes a user's manual. It requires no programming expertise and may be used independently of Volume II. Volume II is a programming manual including the source code. GRA

N82-26024# Duke Univ., Durham, N. C. Graduate School of Business Administration.
MULTIATTRIBUTE RISKY CHOICE BEHAVIOR: THE EDITING OF COMPLEX PROSPECTS
J. W. PAYNE, D. J. LAUGHHUNN, and R. CRUM Feb. 1982 40 p refs
(Contract N00014-80-C-0114; NR PROJ. 197-063)
(AD-A111656; ONR-82-2) Avail: NTIS HC A03/MF A01 CSCL 05J

This investigation draws upon concepts from prospect theory and multiattribute utility theory in an examination of the multiattribute risky choice behavior of 128 managers. The question of how managers code multiattribute prospects, and how coding relates to various independence assumptions, was explored. Results indicate that managers violate attribute independence in its general form, and in the form of the marginality assumption. The most common form of behavior was multiattribute risk aversion for prospects involving only gains and multiattribute risk seeking for prospects involving only losses. This result reinforces the importance of a target, reference point, or aspiration level that has been found in studies of single attribute risky choice. Furthermore, the result casts doubt on such commonly used multiattribute utility functions as the additive, multiplicative, and multilinear forms. Event independence, necessary for expectation models and a consequence of the cancellation of common components of prospects, was found to hold when the common values and probabilities were relatively small. When the common event had relatively large values and probabilities, there was some evidence that such events may influence choice. GRA

N82-26025# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Systems and Logistics.
AN INVESTIGATION OF TIME SERIES GROWTH CURVES AS A PREDICTOR OF DIMINISHING MANUFACTURING SOURCES OF ELECTRONIC COMPONENTS M.S. Thesis
M. E. BROOKS Sep. 1981 121 p refs
(AD-A111375; AFIT-LSSR-98-81) Avail: NTIS HC A06/MF A01 CSCL 15E

A method for forecasting diminishing manufacturing sources (DMS), or the situation occurring when the last manufacturing source discontinues or intends to discontinue production of items required to logistically support weapon systems is presented. A technology's life cycle curve is re-expressed as a specialized time series growth curve known as the s-curve. Unit sales and dollar volume of sales were the two types of annual aggregate commercial sales data used to examine the growth curves of three families of obsolete electronic components. The component types were germanium transistors, germanium diodes/rectifiers, and receiving tubes. It is hypothesized that a standard nonlinear growth curve model could be fitted to each set of obseved data using least squares nonlinear regression. The Pearl function appeared to offer the best mathematical explanation of the underlying economic nature of each time series growth curve in addition to providing the best overall data fit. Growth curve analysis indicated that DMS occurred at or near the saturation level of each curve; however, DMS did not occur at the same point on each curve. GRA

N82-27039# Decisions and Designs, Inc., McLean, Va.
EVALUATING THE RELATIVE EFFECTIVENESS OF DIFFERENT STRUCTURING AND WEIGHTING TECHNIQUES FOR MULTIATTRIBUTE VALUE ASSESSMENT Final Technical Report
L. ADELMAN, P. J. STICHA, and M. L. DONNELL Jan. 1982 121 p refs
(Contract N00014-81-C-0022)
(AD-A111543; TR-82-1-326-13) Avail: NTIS HC A06/MF A01 CSCL 12A

Three experiments were conducted to evaluate the relative effectiveness of different structuring and weighting techniques for Multi-Attribute Value Assessment (MAVA). In particular, the first experiment evaluated the relative effectiveness of two techniques for structuring the MAVA hierarchy; the second experiment evaluated the relative effectiveness of five techniques for obtaining an individual's weights on attributes in the hierarchy; and the third experiment evaluated the relative effectiveness of two weighting techniques, in conjunction with two discussion techniques, for obtaining group weights on attributes in the hierarchy. In all three experiments, the participants were second lieutenants in the U.S. Marine Corps who had completed their training at The Basic School. The external criterion was the MAVA model for the ATTACK Mission Performance Standard (MPS) in the Marine Corps Combat Readiness Evaluation System (MCCRES). GRA

N82-28305# Seville Research Corp., Pensacola, Fla.
OPERATIONAL TEST AND EVALUATION HANDBOOK FOR AIRCREW TRAINING DEVICES. VOLUME 2: OPERATIONAL EFFECTIVENESS EVALUATION Final Report
W. V. HAGIN, S. R OSBORNE, R. L. HOCKENBERGER, J. P SMITH, and T. H GRAY (AFHRL, Williams AFB, Ariz.) Brooks AFB, Texas AFHRL Feb. 1982 290 p refs
(Contract F33615-78-C-0063; AF PROJ. 1123)
(AD-A112570; AFHRL-TR-81-44-VOL-2) Avail: NTIS HC A13/MF A01 CSCL 05I

The Handbook is comprised of three volumes and is intended to provide guidelines and procedures appropriate for Air Force Operational Test and Evaluation (OT&E) personnel to use in planning, conducting and reporting the results of simulator assessment efforts. Although of value to all test personnel, it is primarily for the typical novice test manager/director - a person who has subject matter expertise (e.g., a qualified pilot or operator), but who may have little or no previous OT&E experience. The Handbook provides detailed coverage on OT&E planning and management with special emphasis on measuring device operational effectiveness and suitability. In accord with its objectives, the Handbook was prepared to serve as a supplement to Air Force Manual 55-43. 'Management of Operational Test and Evaluation' by providing those specific additional evaluation concepts and techniques necessary for aircrew training device test and evaluation. Author (GRA)

N82-28306# Seville Research Corp., Pensacola, Fla.
OPERATIONAL TEST AND EVALUATION HANDBOOK FOR AIRCREW TRAINING DEVICES. VOLUME 3: OPERATIONAL SUITABILITY EVALUATION Final Report
W. V. HAGIN, S. R OSBORNE, R. L. HOCKENBERGER, J. P. SMITH, and T. H. GRAY (Operations Training Div., Williams AFB, Ariz.) AFHRL Brooks AFB, Tex. Feb. 1982 128 p refs
(Contract F33615-78-C-0063; AF PROJ. 1123)
(AD-A112569; AFHRL-TR-81-44-VOL-3) Avail: NTIS HC A07/MF A01 CSCL 05I

The Handbook is comprised of three volumes and is intended to provide guidelines and procedures appropriate for Air Force Operational Test and Evaluation (OT&E) personnel to use in planning, conducting and reporting the results of simulator assessment efforts. Although of value to all test personnel, it is primarily for the typical novice test manager/director - a person who has subject matter expertise (e.g., a qualified pilot or operator), but who may have little or no previous OT&E experience. The Handbook provides detailed coverage on OT&E planning and management with special emphasis on measuring device operational effectiveness and suitability. In accord with its objectives, the Handbook was prepared to serve as a supplement to Air Force Manual 55-43. 'Management of Operational Test and Evaluation,' but providing those specific additional evaluation concepts and techniques necessary for aircrew training device test and evaluation. GRA

N82-29010# Purdue Univ., Lafayette, Ind. School of Engineering.
DEVELOPMENT OF A METHODOLOGY FOR ASSESSING AIRCREW WORKLOADS Final Report, Oct. 1978 - Dec. 1980
J. R. BUCK, J. W. BARANY, M. L. LEHTO, D. M. INGS, D. R. PAYNE, R. D. NIXON, and W. H. GROSSE Wright-Patterson AFB, Ohio Aerospace Medical Research Labs. Nov. 1981 95 p refs
(Contract F33615-78-D-0617; AF PROJ. 7184)
(AD-A114364; AFAMRL-TR-81-50) Avail: NTIS HC A05/MF A01 CSCL 05E

The adaptability of industrial methods for setting job and time standards to workload assessment requirements was investigated. Methods considered included direct and indirect time study, synthetic time systems, standard data systems, information content analysis, work sampling and job evaluation. Conventional methods were found to be deficient in accounting for task time variability, divided-attention effects, and cognitive demands which are regarded as critical to effective air crew workload assessment. A combination of synthetic time and standard data system methodologies was proposed as an effective approach to the problem Three experiments were conducted to evaluate the feasibility of developing a Synthetic Data System(SDS) consistent with workload assessment needs. Swithing, communication and perceptual-mediational tasks were paired with tracking to create divided-attention demands characteristic of pilot workloads. Regression analyses showed that significant amounts of variance in task time requirements and error rates could be accounted for in terms of task and man-machine interface design variables. Development of an SDS on the basis of the performance of aircrew members in aircraft simulators is recommended. GRA

N82-29096# Clemson Univ., S.C. Dept. of Mathematical Sciences.
THE BASKET METHOD FOR SELECTING BALANCED SAMPLES. PART 2: APPLICATIONS TO PRICE ESTIMATION
K T. WALLENIUS Dec. 1981 56 p refs
(Contract N00014-75-C-0451; NR PROJ. 365-049)
(AD-A112949; N132; TR-377-PT-2, NPS-NCAR-81-1-PT-2) Avail: NTIS HC A04/MF A01 CSCL 12A

The Basket Method of sampling, a tool designed to achieve statistically balanced samples, is described in intuitive terms. Special reference is made to applications in price analysis where experience has demonstrated the practicality of the technique. The intent is to provide an overview of what the system is intended to do and how it does it in order to assist price analysts and negotiators expedite proposal processing while maintaining acceptable levels of risk. Guidelines and examples are given for implementing a statistical pricing program tailored to local conditions. Underlying theory and documented computer codes are provided separately in Part I and Part III, respectively.
Author (GRA)

N82-29219# RAND Corp., Santa Monica, Calif.
PLANNERS' WORKBENCH: A COMPUTER AID TO THE RE-PLANNING
B. HAYES-ROTH, F. HAYES-ROTH, N. SHAPIRO, and K. WESCOURT Oct. 1981 33 p refs
(AD-A113331; AD-E750422; RAND/P-6688) Avail: NTIS HC A03/MF A01 CSCL 05A

This paper reports the current status of a computer aid to re-planning, the PLANNERS' WORKBENCH Current organizational planning methods support the generation of large, complex configurations of planned activities. However, they do not provide mechanisms for modifying plans in the face of changed assumptions or new environmental conditions. The PLANNERS' WORKBENCH would fill this need by recording the considerations made during plan generation--the plan rationale--and providing facilities for exploiting the rationale during re-planning.
Author (GRA)

N82-29332# Seville Research Corp., Pensacola, Fla.
OPERATIONAL TEST AND EVALUATION HANDBOOK FOR AIRCRAFT TRAINING DEVICES. VOLUME 1: PLANNING AND MANAGEMENT Final Report
T. H. GRAY, S. R. OSBORNE, R. L. HOCKENBERGER, and J. P. SMITH Williams AFB, Ariz. Air Force Human Resources Lab. Feb. 1982 72 p refs
(Contract F33615-78-C-0063; AF PROJ. 1123)
(AD-A112498; AFHRL-TR-81-44-VOL-1) Avail: NTIS HC A04/MF A01 CSCL 05I

The handbook, comprised of three volumes, is intended to provide guidelines and procedures appropriate for Air Force Operational Test and Evaluation (OT/E) personnel to use in planning, conducting, and reporting the results of simulator assessment efforts. Although of value of all test personnel, it is primarily for the typical novice test manager/director-a person who has subject matter expertise (e.g., a qualified pilot or operator), but who may have little or no previous OT/E experience. The handbook provides detailed coverage on OT/E planning and management, with special emphasis on measuring device operational effectiveness and suitability. In accord with its

objectives, the handbook was prepared to serve as a supplement to Air Force Manual 55-43, 'Management of Operational Test and Evaluation', by providing those specific additional evaluation concepts and techniques necessary for aircrew training device (ATD) test and evaluation. Volume 1 is concerned, first with describing both general and specific ATD OT/E planning and management considerations and links those events which occur early in the ATD acquisition process to later ATD OT/E planning and management activities. It defines the various evaluation concepts germane to understanding ATD OT/E, and describes the two major ATD OT/E activities--Initial/Qualification OT/E and Follow-on OT/E; matters of ATD value and worth to the Air Force. The acquisition and life cycle costs associated with modern ATDs make such concerns important. GRA

N82-29711 *British Library Lending Div, Boston Spa (England).*
STATE OF AND PROSPECTS FOR AUTOMATION OF ENERGY-SUPPLY SOURCES OF IRON AND STEEL INDUSTRY ENTERPRISES
G Y KRYUKOV, R. V LYAMBAKH, L. E. LYASHENKO, and A. D SERGEEV 5 Jul 1982 8 p Transl into ENGLISH from Stal (USSR), v. 4, 1981 p 93-95
(BLLD-M-26558-(5828 4F)) Avail: British Library Lending Div, Boston Spa, Engl.

Automation at various levels of items of the energy management of enterprises belonging to the iron and steel industry is considered in the light of recent developments and the energy-supply situation as a whole. Examples of benefits obtained through automation are given. Author

N82-30128# Office of Personnel Management, Washington, D.C.
OFFICE AUTOMATION: AN IDENTIFICATION OF IMPLEMENTED TECHNOLOGIES Interim Report
B. A. YOUNG Nov. 1981 27 p Presented at the Executive Session of the Federal Office Automation Conf, Washington, D C., 4 Nov. 1981
(PB82-149337) Avail: NTIS HC A03/MF A01 CSCL 05A

Technology that was applied in the Federal sector and practical applications that can be shared with the entire Federal community are identified. Ways that integrate office systems can enhance and broaden the capabilities of office workers and provide for a more effective federal workforce are examined. Organizations which have successfully implemented the integrated office concept, utilizing electronic mail, work processing, micrographics and reprographics are identified. GRA

N82-30766# Army Engineer Waterways Experiment Station, Vicksburg, Miss.
PROCESS DESIGN AND COST ESTIMATING ALGORITHMS FOR THE COMPUTER ASSISTED PROCEDURE FOR DESIGN AND EVALUATION OF WASTEWATER TREATMENT SYSTEMS (CAPDET) Final Report
R. W. HARRIS, M. J. CULLINANE, JR., and P. T. SUN Jan. 1982 736 p refs
(AD-A115314) Avail. NTIS HC A99/MF A01 CSCL 13B

The need for a method of accurate and rapid preliminary design, and cost estimating for wastewater treatment plant construction projects has long been recognized Various models have been developed which purport to prepare planning or design level cost estimates. Few of these models are responsive to the requirements of the planner or engineer responsible for accurately projecting construction costs for the purpose of alternative evaluation. The CAPDET model was developed with the specific intent of assisting personnel responsible for wastewater treatment planning in the evaluation of wastewater treatment alternatives based primarily on life cycle costs and degree of treatment provided This cost estimating procedure uses both parametric and unit cost estimating techniques. Author (GRA)

N82-30864*# Systems Research Labs, Inc, Dayton, Ohio.
APPLICATION OF OPTIMAL CONTROL PRINCIPLES TO DESCRIBE THE SUPERVISORY CONTROL BEHAVIOR OF AAA CREW MEMBERS
C. HALE and G. J. VALENTINO (Air Force Aerospace Medical Reseach Lab., Wright-Patterson AFB, Ohio) *In* MIT Proc of the 16th Ann. Conf on Manual Control p 523-532 1980
Avail: NTIS HC A99/MF A01 CSCL 05J

Supervisory decision making and contol behavior within a C to the third power oriented, ground based weapon system was studied The sequence of control strategies used during engagement of aircraft targets was empircally investigated An engagement is conceptually divided into several stages which include initial *information processing activity, tracking, and ongoing adaptive* control decisions. Model parameters are described and two experiments which served as initial investigation into the accuracy of assumptions on the importance of situation assessment in procedure selection are outlined. The validity of the assumptions on strategic information processing and cue criterion relationship learning is upheld. It is indicated that the model structure is useful in studies of supervisory decision behavior E.A K.

N82-30866*# Technische Hogeschool, Delft (Netherlands).
SUPERVISION OF DYNAMIC SYSTEMS: MONITORING, DECISION-MAKING AND CONTROL
T N. WHITE *In* MIT Proc. of the 16th Ann Conf. on Manual Control p 540-547 1980 refs Sponsored by the Netherlands Organization for the Advancement of Pure Research (ZWO)
Avail: NTIS HC A99/MF A01 CSCL 05A

Effects of task variables on the performance of the human supervisor by modelling techniques are discussed. The task variables considered are the dynamics of the system, the task to be performed, the environmental disturbances and the observation noise. A relationship between task variables and parameters of a supervisory model is assumed which consists of three parts: (1) the observer part is a full order optimal observer; (2) the decision making part is a set of decision rules; and (3) the controller part is given by a control law. The identification of the model parameters, by a random search method, and a more psychologically oriented method primarily based on statistics are used. The psychological approach deals with a direct comparison of the number of control actions, the amplitudes of those control actions, and the number of observation actions generated by the operator as a function of the task variables. E.A.K

N82-30869*# Jet Propulsion Lab., California Inst of Tech., Pasadena. Robotics and Teleoperator Group
EXPERIMENTAL EVALUATION OF THE CONCEPT OF SUPERVISORY MANIPULATION
T L. BROOKS and T. B. SHERIDAN (MIT) *In* MIT Proc. of the 16th Ann. Conf. on Manual Control p 593-606 1980 refs
(Contract NAS7-100; N00014-77-C-0256)
Avail: NTIS HC A99/MF A01 CSCL 05H

A computer controlled teleoperator system which is based on task referenced sensor aided control to study supervisory manipulation was developed. This SUPERMAN system, performs complicated tasks in real time by utilizing the operator for high level functions related to the unpredictable, portions of a task, while the subordinate machine performs the more well defined subtasks under human supervision. Supervisoy control schemes were compared with manual control under real time conditions. Six representative tasks were performed under simulated conditions using four forms of manual control, as well as suprvisory control. The effectiveness and quality of control were evaluated on the basis of the time required to complete each portion of the task and the type and number of errors which occurred It is found that supervisory control improves performance for all forms of manual control except force reflecting master-slave which is slightly faster than supervisory control, but more prone to errors. E.A.K.

N82-31054# RAND Corp , Santa Monica, Calif.
PERFORMANCE NORMS IN NON-MARKET ORGANIZATIONS: AN EXPLORATORY SURVEY
C. EBY Apr. 1982 108 p refs Sponsored by Yale Univ.
(RAND/N-1830-YALE) Avail: NTIS HC A06/MF A01

'Internalities', or internal performance norms, are considered among the shortcomings to which non-market organizations (NMOs) and activities are prone. Three classes of internal operating decisions are investigated, relating to. (1) budget allocations, (2) project evaluation, and (3) promotion and termination of personnel. Governmental and non-governmental NMOs are compared.
Author

N82-31574# National Academy of Sciences - National Research Council, Washington, D. C. Committee on Computer-Aided Manufacturing
COMMITTEE ON COMPUTER AIDED MANUFACTURING: REPORT ON ACTIVITIES Final Report, Jan. 1980 - Jun. 1981
1981 53 p
(Contract E49620-78-C-0027)
(PB82-162348) Avail NTIS HC A04/MF A01 CSCL 13H

Various topics related to computer aided manufacturing are discussed A review of the Air Force program on integrated computer-aided manufacturing is given. Strategies for technology transfer are discussed. Human factors, portability, and an economic analysis of the benefits of computer aided manufacturing are discussed. GRA

N82-31797# Midwest Research Inst , Golden, Colo.
DECISION CRITERIA OF POTENTIAL SOLAR IPH ADAPTERS
E. PERWIN, A. LEVINE, G. MIKASA, R. J. NOUN, and D. SCHALLER Dec. 1981 58 p refs
(Contract DE-AC02-77CH-00178)
(DE82-007002, SERI/TR-663-1032) Avail: NTIS HC A04/MF A01

If national programs are to be effective in the research and development of viable renewable resource technologies for the industrial sector, understanding industry's decision criteria will be important. The results of a preliminary investigation of the decision criteria of potential and actual users of solar industrial process heat systems are presented. Detailed interviews were completed with decision-makers from ten manufacturing firms. Based on economic theory, it was assumed that corporate decision-makers assess the expected cost, revenue, and uncertainty of competing investment opportunities. These decision criteria are composed of factors that are financial, technical, and institutional Clearly, the firms interviewed were more concerned with costs than any other category of decision criteria. Most of the firms also believed that there was less uncertainty with competing investments than with current solar technology Based on this preliminary investigation, a more extensive survey of industrial firms is suggested to determine a more comprehensive list of significant decision criteria DOE

N82-32193# Research Inst of National Defence, Stockholm (Sweden)
EVALUATION OF ORGANIZATION DEVELOPMENT (OD). A LITERATURE REVIEW
A. PHILIPS May 1982 67 p refs
(FOA-C-55054-H3) Avail: NTIS HC A04/MF A01

Literature on organiztion development (OD) evaluation was reviewed. The selection of the purpose of, and the audience for the evaluation are discussed. The formulation and selection of evaluation criteria and the selection of evaluation variables are considered. Methodologies, e.g., questionnaires, interviews, are outlined. The choice of an optimal evaluation design is treated. Failures and defects in OD evaluations are attributed to the use of positivistic, functionalistic, science standards. Action science and hermenentical approaches are suggested as alternatie means to ensure the validity and utility of OD evaluations. Author (ESA)

N82-33216# Cambridge Univ. (England) Dept. of Engineering.
A REVIEW OF SOME FORMAL METHODS FOR DECISION-MAKING
S. R. WATSON and G. M. HAYWARD 1981 35 p refs Sponsored by Dept. of the Environment
(PB82-176744; CUED/F-CAMS/TR-208-1981; ISSN-0309-765X)
Avail. NTIS HC A03/MF A01 CSCL 18H

Formal approaches to decision making which might be useful in the management of radioactive wastes are reviewed. The suitability of three formal approaches to decision making are investigated: cost benefit analysis, outranking methods and decision analysis Each technique is described and the advantages and limitations are discussed. Finally, advantages and limitations of the techniques are related to the requirements listed GRA

N82-33274# Pearson and Associates, Springfield, Va.
LOS ALAMOS NATIONAL LABORATORY USER SATISFACTION MEASUREMENT STUDY
Sep. 1981 16 p refs
(Contract W-7405-ENG-36)
(LA-9013-MS) Avail. NTIS HC A02/MF A01

A computer user satisfaction measurement study was conducted. Areas of greatest potential improvement in computing services were identified. A baseline of satisfaction with the computing services and the factors that are most important to the users were established. Data to aid in the establishment of service goals was provided S.L.

N82-33275# Woodard-Clyde Consultants, San Francisco, Calif Decision Analysis Group
DECISION ANALYSIS: STATE OF THE FIELD
R. L. KEENEY Mar. 1982 28 p refs
(Contract N00014-81-C-0536)
(AD-A115964; TR-82-2) Avail: NTIS HC A03/MF A01 CSCL 05J

This article, written for the non-decision analyst, describes what decision analysis is, what it can and cannot do, why one should care to do this, and how one does it. In the process, we also hope to dispel some myths: decision analysis is a tool of operations research and management science; some analyses are objective and value-free; it would be desirable to have 'objective, value-free' analyses; decision analysis solves decision problems, some decision problems are too difficult for decision analysis; decision analysis and decision theory are the same thing. To accomplish these purposes, we set the stage by describing the decision environment Then the article presents an overview of decision analysis and provides additional sources for its foundations, procedures, history, and applications. GRA

N82-33277# National Academy of Sciences - National Research Council, Washington, D C. Committee on Computer-Aided Manufacturing.
INNOVATION AND TRANSFER OF US AIR FORCE MANUFACTURING TECHNOLOGY: THREE CASE STUDIES Final Report
Nov. 1981 52 p
(Contract F49620-78-C-0027)
(PB82-161779) Avail: NTIS HC A04/MF A01 CSCL 05A

Research on attemps to transfer three Air Force-sponsored innovations-projects on hot isostatic pressing, automatic assembly drilling, and composite tape-laying are described. The hot isostatic pressing project was successfully transferred, while attempts to transfer the other two were judged failures by the Air Force. It was found that concepts might transfer at times when particular embodiments (physical configurations) of a concept do not To judge whether an attempted transfer of technology is successful, one should determine whether the concept or the embodiment is the more valuable part. GRA

N82-33573# National Academy of Sciences - National Research Council, Washington, D C.
COMPUTER-AIDED MANUFACTURING: AN INTERNATIONAL COMPARISON Final Report
J. HATVANY (Hungarian Academy of Sciences), K. RATHMILL (Cranfield Robotics and Automation Group), and Y. HIROYUKI (Tokyo Univ , Japan) Jan. 1982 85 p
(Contract F49620-78-C-0027)
(PB82-172321) Avail: NTIS HC A05/MF A01 CSCL 13H

Computer aided manufacturing is discussed. The state of the art, development trends, and a forecast for computer aided manufacturing in Japan and Europe are among the topics covered. Robotics and production engineering are discussed GRA

N82-33981*# National Aeronautics and Space Administration Langley Research Center, Hampton, Va.
AN ASSESSMENT OF PERT AS A TECHNIQUE FOR SCHEDULE PLANNING AND CONTROL
C. W. SIBBERS Jul. 1982 21 p
(NASA-TM-83265; NAS 1 15:83265) Avail NTIS HC A02/MF A01 CSCL 05A

The PERT technique including the types of reports which can be computer generated using the NASA/LaRC PPARS System is described. An assessment is made of the effectiveness of PERT on various types of efforts as well as for specific purposes, namely, schedule planning, schedule analysis, schedule control, monitoring contractor schedule performance, and management reporting. This assessment is based primarily on the author's knowledge of the usage of PERT by NASA/LaRC personnel since the early 1960's. Both strengths and weaknesses of the technique for various applications are discussed. It is intended to serve as a reference guide for personnel performing project planning and control functions and technical personnel whose responsibilities either include schedule planning and control or require a general knowledge of the subject Author

06

RELIABILITY AND QUALITY CONTROL

Includes risks, safety, failure analysis, warranties, guarantees, and maintenance.

A82-10124*# General Dynamics/Convair, San Diego, Calif
DESIGN AND VERIFICATION OF A MULTIPLE FAULT TOLERANT CONTROL SYSTEM FOR STS APPLICATIONS USING COMPUTER SIMULATION
G. P. SZATKOWSKI and J C. KARAS (General Dynamics Corp., Convair Div., San Diego, CA) In: Computers in Aerospace Conference, 3rd, San Diego, CA, October 26-28, 1981, Collection of Technical Papers New York, American Institute of Aeronautics and Astronautics, 1981, p 349-357
(Contract NAS3-22324)
(AIAA 81-2173)

General Dynamics/Convair is under NASA contract to integrate the Centaur upper stage into the space transportation system for future planetary missions. This requires that control of all safety critical functions be two-failure tolerant. The control system developed consists of five asynchronous computers, each contributing at their outputs to a 3-out-of-5 voting plane. Subsystem control is based on an end function redundancy management scheme. Analysis of multiple component failures and worst-case time-phase asynchrony among the computers is performed by a real-time computer simulation. The simulation emulates the hardware and subsystem interfaces, wire by wire, providing assessibility to any component for the insertion of preprogrammed failures. Observability is provided via a graphics system and diagnostic software. The simulation provides an engineering tool where the integrity of control system hardware and imbedded software can be demonstrated. (Author)

A82-13240
FATIGUE METHODOLOGY - A TECHNICAL MANAGEMENT SYSTEM FOR HELICOPTER SAFETY AND DURABILITY
L L. DOUGLAS Vertiflite, vol. 27, Mar.-Apr. 1981, p 14-17.

An account is given of the development since the early 19th century, of the technical disciplines comprising the field of fatigue-related structural safety as it applies to the design and maintenance of helicopters Attention is given such milestones in the development of analytical methods for rotating machinery and vibration and flutter problems as N O. Myklestad's (1944) 'A New Method of Calculating Natural Modes of Uncoupled Bending Vibration of Wings and other Types of Beams', as well as the related topics of the fatigue strength of materials and its improvement by surface treatment, stress concentration, cumulative damage and fatigue crack propagation. A review is also made of more recent developments in the design of fail-safe structures, the production of fracture-tough steel, aluminum and titanium alloys, and the application of composite materials to helicopter rotor blades O C.

A82-13625
FAULT DETECTION, IDENTIFICATION AND RECONFIGURATION FOR SPACECRAFT SYSTEMS
J. J. DEYST, JR., J. V. HARRISON, E. GAI, and K. C. DALY (Charles Stark Draper Laboratory, Inc., Cambridge, MA) Journal of the Astronautical Sciences, vol. 29, Apr.-June 1981, p. 113-126. refs

The trend toward greater autonomy of spacecraft control systems has stimulated interest in fault-tolerant system mechanization. This paper surveys the methodology of automatic fault detection and identification, as it relates to fault tolerance. Recently developed methods for quantitatively evaluating the impact of these methodologies on system performance and reliability are described. The Inertial Upper Stage redundant navigation system is used to illustrate the application of these techniques. (Author)

A82-14714#
FAULT SECURE AVIONIC SYSTEM DEVELOPMENT
R JENNINGS (USAF, Wright Aeronautical Laboratories, Wright-Patterson AFB, OH) In: NAECON 1981; Proceedings of the National Aerospace and Electronics Conference, Dayton, OH, May 19-21, 1981. Volume 1 New York, Institute of Electrical and Electronics Engineers, Inc , 1981, p. 284-293. refs

With the technological improvements that have been made in computer hardware, major limitations now have to do with programmability, integrity, and reliability. It is contended that these limitations can be largely solved at the computer and integrated circuit architecture level through an organizational concept called Fault Secure Avionic Computer (FSAC). The kernel of the FSAC consists of a programmable processor, of a type suitable for mass production, which has provisions for exploiting special purpose VLSI arithmetic and data management hardware to expedite execution of time critical tasks. C.R.

A82-14842
SELECTING TEST-ANALYZE-FIX CONDITIONS TO MAXIMIZE OPERATING AND SUPPORT SAVINGS
S. G. DIZEK (Analytic Sciences Corp., Fairborn, OH) and J. E. LAWLOR (Analytic Sciences Corp., Reading, MA) In: NAECON 1981, Proceedings of the National Aerospace and Electronics Conference, Dayton, OH, May 19-21, 1981. Volume 3. New York, Institute of Electrical and Electronics Engineers, Inc., 1981, p. 1372-1381 refs

In response to DOD Directive 5000 40, program managers must plan tests to assess the effects of combined environments and provide feedback for the correction of deficiencies. The elements of such a test program, referred to as test, analyze and fix (TAF), include: (1) the selection of environmental conditions representative of those encountered by equipment aboard the host aircraft during a typical mission flight profile; (2) the determination of a test strategy through decisions as to whether the failure modes in question will be simulated or stimulated, and (3) the development of data

requirements, including recording procedures, data feedback mechanisms, and reliability growth assessment techniques A discussion is also presented of how the character of the savings maximization problem changes, for the case of multiple-host aircraft applications, and attention is given to a cruise missile carrier mission environmental profile. O C

A82-16561
TRENDS IN MAINTAINABILITY AND RELIABILITY OF AVIONICS SYSTEMS WITH PARTICULAR REFERENCE TO DCAD TECHNICAL PUBLICATION 1/77
A. F. LOY (Ministry of Defence /Procurement Executive/, London, England) IEE Proceedings, Part F - Communications, Radar and Signal Processing, vol. 128, pt. F, no. 7, Dec 1981, p. 433-439. refs

The procurement situation with respect to reliability and maintainability (R&M), prior to the DCAD Technical Publication 1/77 (1978), is reviewed first. The general contents of the document and the translation of the document's principles into a form suitable for contracts are then discussed. Application of the publication is outlined, and an indication is given of the direction R&M activity should proceed in order to meet the challenges of future systems. Particular attention is given to the reliability parameter, which has presented a more serious problem during the design, development, and production phases. J.F.

A82-17277
WHY SAFETY
M. EASTBURN (American Airlines, Inc , New York, NY) In. Safe and efficient management of energy, Proceedings of the Thirty-third Annual International Air Safety Seminar, Christchurch, New Zealand, September 15-18, 1980. Arlington, VA, Flight Safety Foundation, Inc., 1980, p. 13-28.

It is claimed that safety and the prevention of accidents are the greatest conservers of energy. The worldwide commercial jet transport accident experience is briefly described; this description covers the period from 1959, the beginning of the air carrier jet age, through to September 1980. Aircraft lost as a result of sabotage and war-like action, as well as the six Comets lost prior to 1959, are also included in the analysis. Passenger and hull loss liability, and its effect on airline operational costs, are then discussed. Finally, it is estimated that if no action is taken to ensure their prevention, by 1986 there will be an additional 115 hull losses to the present total of 354. J.F.

A82-17278
ACCIDENT PREVENTION - A REGULATORS VIEW
G. V HUGHES (Department of Transport, Canberra, Australia) In: Safe and efficient management of energy; Proceedings of the Thirty-third Annual International Air Safety Seminar, Christchurch, New Zealand, September 15-18, 1980 Arlington, VA, Flight Safety Foundation, Inc., 1980, p. 29-37.

Details of aircraft accidents in the world involving passenger fatalities on scheduled services from 1969 to 1979 are presented and compared to data on general aviation accidents for U S. and Australian operations. It is shown that the fatalities in general aviation are much greater and continue to grow. Safety prevention is then discussed from the viewpoint of a regulator, who is responsible for the development, implementation, and monitoring of compliance with standards covering all matters to do with aircraft. Problems related to the development of comprehensive and precise standards, as well as the decision to vary these standards when necessary, are discussed. Lack of standardization of controls in fuel systems and undercarriages is used to exemplify the extent of the problem J.F.

A82-17283
AIR TRAFFIC CONTROL PROBLEMS AND SOLUTIONS
C. W VIETOR In: Safe and efficient management of energy; Proceedings of the Thirty-third Annual International Air Safety Seminar, Christchurch, New Zealand, September 15-18, 1980 Arlington, VA, Flight Safety Foundation, Inc., 1980, p. 137-152. refs

The inefficiencies of the present Air Traffic Control (ATC) system are both costly and hazardous to the U.S. airlines network. An improved ATC system is sought which will make use of predetermined flight profiles and time schedules as well as airborne and ground-based computers for transmitting and receiving operational data The new system is required to (1) improve safety in flight (2) make more efficient use of the airspace; (3) have greater fuel efficiency; (4) make better use of airport runways; and (5) improve flight instrument systems Several relatively inexpensive solutions to the above criteria are discussed. J.F.

A82-17284
PRODUCTIVITY AND SAFETY
D R. CLIFFORD (Boeing Commercial Airplane, Co , Renton, WA) In. Safe and efficient management of energy; Proceedings of the Thirty-third Annual International Air Safety Seminar, Christchurch, New Zealand, September 15-18, 1980. Arlington, VA, Flight Safety Foundation, Inc , 1980, p. 153-165

Due to the effect of fuel price increases on direct operating costs, more fuel-efficient designs for new transport aircraft are sought. This effort includes the use of increased wing span, advanced air foils, better materials, flight management avionics systems, and more efficient engines. The lower costs available through a reduction in crew complement have also been cited. Results of accident statistics are analyzed in order to resolve the controversial two or three-member flight crew issue. It is concluded that two-crew aircraft have a better safety record than three-crew aircraft, and that a jet transport designed for operation by two pilots can be at least as safe as one designed for operation by three. J F.

A82-17942
PRACTICAL RELIABILITY ENGINEERING
P D. T. OCONNOR (British Aerospace Public, Ltd., Co., Dynamics Group, Stevenage, Herts., England) London and Philadelphia, PA, Heyden, 1981. 313 p. refs
$29

General concepts and mathematical constructs underpinning reliability analysis are introduced, and distribution functions are defined. Attention is given to the analysis of reliability data, and load-strength interference and reliability prediction and modelling are discussed. Reliability in design is examined, along with electronic systems reliability and software reliability. Measuring and improving reliability are explored, methods of solving reliability problems are introduced, and reliability management is outlined. M S K.

A82-20541#
AIRWORTHINESS OF HELICOPTER TRANSMISSIONS
P. D. VINALL (Civil Aviation Authority, London, England) In. Helicopter transmissions; Proceedings of the Symposium, London, England, February 6, 1980. London, Royal Aeronautical Society, 1980. 30 p.

The fatal accident rates caused by the rotor and transmission systems of rotorcraft are almost an order of magnitude worse than those of fixed-wing aircraft This is in part due to the single load path characteristics of the vehicle. Redundancy in the transmission system would mean, however, a change in the current design practice and the possible disadvantages of increased weight and complexity. The standards achieved on rotorcraft transmissions bear comparison with experience on similar dynamic components in turboprop engines. Safety considerations are of greater significance in a helicopter, however, and these aircraft should have higher standards for airworthiness. It is suggested that there be manufacturing control of critical parts for rotorcraft, and that transmissions not be used as a source of power for accessory

functions which might reduce the integrity and reliability of the transmissions. Better diagnostic aids should also be established, including an in-flight indicator of transmission condition and a periodic vibrographic oil and sonic analysis. J.B.

A82-20542#
THE APPLICATION OF CONDITION MONITORING
A. T. DALTON (Civil Aviation Authority, London, England) In: Helicopter transmissions; Proceedings of the Symposium, London, England, February 6, 1980. London, Royal Aeronautical Society, 1980. 14 p.

The development in the application and management of in-service maintenance of commercial helicopters has lagged the advancements in design and operation. The Primary Maintenance Process is discussed in detail, emphasizing its three primary maintenance processes: (1) hard time maintenance for known deterioration; (2) on-condition inspection at regular intervals; and (3) condition monitoring, which relies on in-service information analysis. The primary processes (1 and 2) are applied in detail to each item of a helicopter, after which condition monitoring (3) is used as a secondary surveillance activity for engineering management It is maintained that formalized application of condition monitoring to safely develop maintenance tasks will reduce costs and promote deregulation by delegation of certain activities to the helicopter operator under controlled program conditions. J F

A82-20544#
MINIMUM COST PERFORMANCE MONITORING OF TURBOSHAFT ENGINES
H. I. H. SARAVANAMUTTOO (Carleton University, Ottawa, Canada) In: Helicopter transmissions; Proceedings of the Symposium, London, England, February 6, 1980. London, Royal Aeronautical Society, 1980 13 p

A low-cost Engine Health Monitoring system for turboshaft engines is presented, which is suitable for use by small operators who do not have access to computing facilities. Two approaches are discussed, Gas Path Analysis (GPA) and Trend Analysis, according to which measurements are made of the power fuel flow, inlet conditions, pressure levels, and temperatures. GPA is shown to be the more powerful method, but requires extra instrumentation. Fuel flow errors can be detected either by a large increase in airflow or an increase in turbine efficiency Fuel flow proved to be the most critical measurement (a 1% error gave a 1.4% error in airflow, whereas a 1% error in power only gave a 0.4% error in airflow). This lower sensitivity to power errors results since GPA deduces the airflow from the gross power developed by both turbines, and power absorbed by the compressor is usually greater than that absorbed by the rotor. Trend Analysis, on the other hand, requires no extra instrumentation, but when applied with good judgement, can indicate troubles before they become critical. J.F.

A82-20546#
HELICOPTER TRANSMISSION PHILOSOPHY - THE WAY AHEAD
B. A. SHOTTER (Westland Helicopters, Ltd., Yeovil, Somerset, England) In: Helicopter transmissions; Proceedings of the Symposium, London, England, February 6, 1980. London, Royal Aeronautical Society, 1980. 10 p.

Factors influencing the design of a helicopter transmission system are discussed. The power and speed of the slowest output are of primary importance since these define the maximum torques where the highest weights are likely to be found. The physical arrangement of the aircraft usually demands that the engine axis be near-horizontal, while the main rotor axis be near-vertical; one stage of gearing will therefore be concerned with changing the rotation axis. The physical form of the system is also influenced by the rotor control principles and the nature of the forces emanating from the rotor. The system should also have a light weight, high reliability, a minimum amount of maintenance, and a long life. Improvements in materials can contribute to a consistent performance, and a simple system, based on a large number of units of the same design, will make the unit more problem-free. J.F.

A82-20560
DESIGN FOR MILITARY AIRCRAFT OPERABILITY; PROCEEDINGS OF THE SYMPOSIUM, LONDON, ENGLAND, FEBRUARY 7, 1980
Symposium sponsored by the Royal Aeronautical Society. London, Royal Aeronautical Society, 1981. 58 p.

Topics related to the design, maintenance, operability, and reliability of combat aircraft for the RAF are discussed. Specific attention is paid to front-line maintenance requirements, including the reduction of the numbers of necessary on-hand parts and the turnaround time. Management methods for reliability and maintenance are reviewed, as are particular aircraft design features which enhance operability, such as in the avionics systems. The interface between the procurement agencies, the manufacturers, the design teams, and the end users is explored, noting the effectiveness of contracts with specified reliability and MTBF requirements, and the techniques of producing combat-ready aircraft during peacetime conditions are outlined. M.S.K.

A82-20562#
AIRCRAFT OPERABILITY - RAF ENGINEERING EXPERIENCE AND REQUIREMENTS. II
D. WILLIAMS (RAF, London, England) In: Design for military aircraft operability; Proceedings of the Symposium, London, England, February 7, 1980. London, Royal Aeronautical Society, 1981. 6 p.

The procurement cycle, engineering information, and day-to-day nominal operational procedures of combat aircraft maintenance are reviewed to form a basis for requirements for reliability and maintenance. The procurement cycle is outlined, with emphasis on development costs and production costs and timescales. Engineering data are gathered to predict the expected extent and time of repair of nominal breakdowns and operational damage. Specifications for MTBF are promulgated, and plans are defined for ground service testing, built-in test equipment, automatic test equipment, and all factors which consume time before readiness. All necessary components, times, and teams necessary to fulfill maintenance requirements are detailed, and definitions of reliability are set down. Emphasis is placed on tying reliability and maintenance requirements to contractual guarantees. M.S K.

A82-21597
THE CASE FOR HELICOPTER HOISTING
W. J MADDOX, JR. (Arabian Helicopters, Ltd., Dhahran, Saudi Arabia) Vertiflite, vol 28, Jan.-Feb. 1982, p. 16-19.

Helicopter crew training and operations for hoisting personnel while hovering over offshore oilfields and over tankers, and for personnel transport to and from work in the Persian Gulf area are described Personnel hoisting by commercial helicopters is noted to be illegal in the U S , while oil company helicopter crews receive training for such operations in Louisiana. A 15-ft clear zone is needed for off-the-deck hoisting when landing cannot be achieved, and most work done in the Near East zone comprises delivery of harbor pilots to their craft. The pilot nominally approaches from the upwind side of a ship or platform to provide a safety margin in case of a power-out condition, and flights are limited to two passengers. Improvements are suggested for better ship identification lights and better lighted landing and hoist areas. M.S.K.

A82-24002#
A310 - DESIGN FOR MAINTENANCE
R. CUTLER (Airbus Industrie, Blagnac, Haute-Garonne, France) International Aircraft Maintenance Engineering Exhibition and Conference, Zurich, Switzerland, Feb. 10-12, 1981, Paper. 17 p.

The way in which Airbus Industrie deals with maintenance during the design phase is described, noting that by giving maintenance the attention it merits, its proportion of direct operating costs is kept to a minimum. Aircraft design is continuously subjected to a maintainability and reliability (M & R) review in order to ensure

optimum trade-offs between M & R and other goals. This review process comprises five steps· (1) apportioning M & R goals to systems, components, etc., as required; (2) reviewing in-service experience to identify past problems and areas having the greatest potential for development; (3) evaluating design using M & R analytical techniques to identify questionable areas, (4) holding review meetings with designers and equipment suppliers to determine what improvements can be made; and (5) holding management progress review meetings to assess overall M & R performance in relation to goals, highlighting areas where goal attainment is unlikely, and specifying further actions. C.R.

A82-24007
RELIABLE POWER
J. M. S. KEEN (Rolls-Royce, Ltd., Derby, England) International Aircraft Maintenance Engineering Exhibition and Conference, Zurich, Switzerland, Feb. 10-12, 1981, Paper 20 p.

Current Rolls-Royce engines are reviewed, with specific attention given to the implementation of a three-shaft concept for the modular development of engine thrust increases and fuel consumption decreases. The RB-211 three-shaft concept is reviewed, noting the development followed design goals of a short rigid engine with a minimum number of variables and cooled turbine stages. The E-4 engine employs a wide chord fan blade without snubbers and blends the turbine and bypass duct exhaust flows for passage through a single, final nozzle. Comprehensive access ports have been designed into the big fan engines, along with chip detectors in the oil system and vibration monitoring equipment for on-condition maintenance. Reliability management has resulted in the modular nature of the engines, featuring engine breakdown into separate, self-contained components, with comprehensive use records serving to notify when specific parts are due for inspection or replacement M.S.K.

A82-25611* Massachusetts Inst. of Tech , Cambridge.
ISSUES IN THE DEVELOPMENT OF A GENERAL DESIGN ALGORITHM FOR RELIABLE FAILURE DETECTION
E. Y. CHOW (Schlumberger-Doll Research Center, Ridgefield, CT, MIT, Cambridge, MA) and A. S. WILLSKY (MIT, Cambridge, MA) In· Conference on Decision and Control, 19th, and Symposium on Adaptive Processes, Albuquerque, NM, December 10-12, 1980, Proceedings. Volume 2. New York, Institute of Electrical and Electronics Engineers, Inc , 1980, p 1006-1012. refs
(Contract N00014-77-C-0224; NGL-22-009-124)

The design of residual-generation processes is briefly discussed, the goal being to develop a methodology for designing robust processes of this type. It is noted that analytical redundancy forms the basis for residual-generation, representing the relationships between the outputs of sensors and inputs of actuators via the dynamics of the system. It is because of this relationship that sensor outputs (even those of dissimilar sensors and at different times) can, in effect, be compared to ascertain whether they are consistent with normal system behavior. The residuals can be seen as constituting the discrepancy between the output resulting from such comparisons; they should display noise-like characteristics only in the normal mode. Failures in the system would lead to a discrepancy between the observed and expected behavior of the sensor outputs and hence to abnormal characteristics (failure signatures) in the residual. C.R

A82-27145
PROBLEMS AND OPTIONS IN ADVANCED COMPOSITE REPAIR
S. H. MYHRE and R. W. KIGER (Northrop Corp , Aircraft Div , Hawthorne, CA) In: Fibrous composites in structural design New York, Plenum Press, 1980, p. 359-380. refs
(Contract F33615-76-C-3017)

The development of composite repair criteria and procedures for aircraft component are reported. The repairs are required to last twice the design life of the aircraft, match the ultimate strength capability, maintain the aerodynamic performance levels, and be enacted at a reasonable cost The use of portable heating equipment has proven feasible, and repair tests on honeycomb panels accessible on both sides, on one side, a 50-ply laminate damaged 21 plies deep, and a 50-ply laminate accessible on both sides are reviewed. The failure loads, strains, and failure modes of the repaired panels are provided to demonstrate the possibility of returning a damaged composite to full strength. Specific recommendations are offered for patch material and joining, patch configurations, scarf lengths, hole edge peeling, incipient compression failure, wet laminate repair, thick laminate repair, sandwich panel repair, and blind side repair. M.S.K

A82-27708* Computer Sciences Corp , Silver Spring, Md.
RISK ANALYSIS OF COMPUTER SYSTEM DESIGNS
A. VALLONE (Computer Sciences Corp., System Sciences Div , Silver Spring, MD) In: Asilomar Conference on Circuits, Systems and Computers, 14th, Pacific Grove, CA, November 17-19, 1980, Conference Record New York, Institute of Electrical and Electronics Engineers, Inc., 1981, p 72-76 refs
(Contract NAS5-26122)

Adverse events during implementation can affect final capabilities, schedule and cost of a computer system even though the system was accurately designed and evaluated Risk analysis enables the manager to forecast the impact of those events and to timely ask for design revisions or contingency plans before making any decision. This paper presents a structured procedure for an effective risk analysis The procedure identifies the required activities, separates subjective assessments from objective evaluations, and defines a risk measure to determine the analysis results. The procedure is consistent with the system design evaluation and enables a meaningful comparison among alternative designs. (Author)

A82-27883
AIRLINE MAINTENANCE STRATEGY
W. BROUWER (KLM Royal Dutch Airlines, Engineering and Maintenance Div., Schiphol Airport, Netherlands) In: AUTOTESTCON '80; International Automatic Testing Conference, Washington, DC, November 2-5, 1980, Proceedings. New York, Institute of Electrical and Electronics Engineers, Inc., 1980, p. 38-42.

Problems associated with the maintenance of avionics are discussed, with attention given to the consequences of increases in complexity and reliability, maintenance shop organization, and the role of the technician The efficiency of LRU removals, the use of automatic test equipment, and the role of software are examined B.J.

A82-27886
THE MODULAR ATE
E. I. LEVY (Eastern Air Lines, Inc., Miami, FL) In: AUTOTESTCON '80; International Automatic Testing Conference, Washington, DC, November 2-5, 1980, Proceedings. New York, Institute of Electrical and Electronics Engineers, Inc , 1980, p. 51-53.

The Eastern Air Lines concept of modular ATE is presented, with attention given to both hardware and software aspects. Existing maintenance philosophies and the classical ATE are reviewed to show why present concepts are no longer cost effective Potential problems of the modular ATE concept are examined, and the need for further standardization and close industry cooperation is discussed. B.J

A82-27906
THE ATE PROGRAMMER
J. STRESSING (British Aerospace Public, Ltd , Co , Stevenage, Herts., England) In: AUTOTESTCON '80; International Automatic Testing Conference, Washington, DC, November 2-5, 1980, Proceedings. New York, Institute of Electrical and Electronics Engineers, Inc., 1980, p. 227-232.

Because of the cost of ATE for analog equipment, correct use is considered of the utmost importance. The need to improve the efficiency of ATE programmers and to develop effective software tools, training, and management of the programmer's activities is discussed. C.R.

A82-30147#
DURABILITY AND DAMAGE TOLERANCE CONTROL PLANS FOR USAF AIRCRAFT
M. A. LANDY and O. L. SMITHERS (USAF, Aeronautical Systems Div., Wright-Patterson AFB, OH) In: Structures, Structural Dynamics and Materials Conference, 23rd, New Orleans, LA, May 10-12, 1982, Collection of Technical Papers. Part 2. New York, American Institute of Aeronautics and Astronautics, 1982, p. 166-174. refs
(AIAA 82-0679)

A set of disciplined, integrated procedures involving a number of a contractor's functional organizations is necessary if the requirements for a durable and damage tolerant structure are to be met. To this end, the Air Force requires that Durability and Damage Tolerance Control Plans (DADTCPs) be developed and implemented during aircraft development and manufacturing DADTCPs define all tasks necessary to ensure that the final product meets Air Force durability and damage tolerance requirements. Various aspects to DADTCPs will be discussed in this paper The foundation for a generalized model outlining the tasks in a DADTCP will be presented. Examples from existing DADTCPs will be used to illustrate elements of the generalized model. (Author)

A82-31175
SAAB-FAIRCHILD 340 - REDUCING THE COMMUTER OPERATORS' RISK
M. LAMBERT Interavia, vol. 37, Apr. 1982, p. 317-320.

Features of the development program, performance goals, and components of the Saab-Fairchild 340 34 seater passenger jet for regional carriers are described. Reliability claims include a maximum deterioration in engine performance of 2 5% or less over 6000 hr or three years, and a service life of 45,000 hr with 90,000 landings. The plane sells for $4 75 million. The aircraft will be built in jet and propeller versions, and will have an airframe constructed using metal-to-metal bonding and some metal honeycomb. Control surfaces, flaps, nose cone, the wing/fuselage fairing, and portions of the engine nacelles will be composite sandwich material incorporating Kevlar and glass fiber. The nominal range will be 150 nm with 100 miles reserve at a cruise speed of 260 kn. Digital avionics and electronic displays are standard equipment on the flight deck, with dual main computers for warning displays control. M.S.K.

A82-35049#
NEXT GENERATION TRAINER /NGT/ ENGINE REQUIREMENTS - AN APPLICATION OF LESSONS LEARNED
C. J. BAUER (USAF, Aeronautical Systems Div., Wright-Patterson AFB, OH) AIAA, SAE, and ASME, Joint Propulsion Conference, 18th, Cleveland, OH, June 21-23, 1982, AIAA 7 p.
(AIAA PAPER 82-1184)

A new, four-step approach for turbine engine development is described, as well as the new Engine Structural Integrity Program (ENSIP). Instead of the former two-step qualification process including a preliminary flight rating test and a model qualification test, the new concept emphasizes definition and verification of field maintenance procedures and parts life limits. It includes an initial flight release, full flight release, initial service release, and operational capacity release, each of which is briefly described. ENSIP encompasses five tasks: (1) design information; (2) design analysis, component and materials characterization; (3) component and core engine testing; (4) ground and flight testing; and (5) product quality control and engine life management. The integration of the former procedure with the new concept and procedure is discussed. C.D.

A82-35271
FLAMMABILITY HANDBOOK FOR PLASTICS /3RD EDITION/
C. J. HILADO (Product Safety Corp., Sunnyvale, CA) Westport, CT, Technomic Publishing Co., 1982. 197 p. refs
$35

Materials for the plastics industry are considered, taking into account physical classification, chemical classification, olefin polymers, vinyl polymers, engineering thermoplastics, other thermoplastics, and thermosetting polymers. Aspects of decomposition, combustion, and propagation are discussed along with questions regarding the fire response characteristics, taking into account the burning process on a micro and a macro scale, smolder susceptibility, ignitability, flash-fire propensity, flame spread, heat release, fire endurance, ease of extinguishment, smoke evolution and toxic gas evolution. Attention is given to flammability tests, flame retardance mechanisms, smoke retardance mechanisms, questions of fire control and extinguishment, market acceptance criteria, flammability and product liability, and commercial fire, smoke, and smolder retardants. G.R.

A82-40247
QUALITY ASSURANCE REVIEW TECHNIQUE
R. A FREUND and H. B. TRULLI (Eastman Kodak Co., Management Services Div., Rochester, NY) Journal of Quality Technology, vol. 14, July 1982, p. 122-129.

A means of providing a quick summary of the status of a quality assurance program for management and a detailed progress report for those responsible for implementing the program is presented. The purpose is to focus attention on, and establish priorities for, quality planning and implementation both in the initial stages and in the re-evaluation of delayed elements or modified processes. Through the use of flow charts, cause and effect diagrams, cause and effect flow charts, priority evaluation reviews, and quality assurance status evaluations, it is possible to focus attention on important considerations in a timely manner (Author)

A82-40885#
HUMAN FACTOR AND FLIGHT SAFETY
J. C. WANNER In: International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 1 New York, American Institute of Aeronautics and Astronautics, 1982, p. 83-96

Design considerations developed to assist human operators of the Concorde in emergency situations are explored for principles which may be extended to other complex machine control design problems. Noting that with complex machinery, no one factor can nominally be identified as the only cause of an accident, each accident is considered to be a chain of events. In-flight accidents occur because of pilotability incidents, aircraft control sensitivity to perturbation incidents, and maneuverability incidents, which may have to do solely with changing the functional status of the aircraft. Characteristics of human attentiveness, a natural inclination to search fo; data, and the ability to compensate for an altered workload are outlined. Recommendations are given that information relayed by instruments be useful, that information follow anticipation, alarms be easy to identify, and that necessary appropriate actions be limited in number. M.S.K.

A82-40962#
AGE EXPLORATION IN NAVAL AVIATION
A. D. WILLIAMS (U.S. Navy, Naval Aviation Logistics Center, Patuxent River, MD) In: International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 2. New York, American Institute of Aeronautics and Astronautics, 1982, p. 844-850.

In this paper, an overview of the United States Navy's newly developed aviation age exploration process is given. As age exploration is a subset of the Reliability-Centered Maintenance (RCM) program, the underlying concepts of age exploration, RCM, and their relationship to each other, are explored. Age exploration is depicted as a multi-faceted analyzation, marrying diverse types of information with maintenance engineering logic and statistical formulation. Specific applications of the age exploration process in the Navy's aviation community are presented. It is shown how the knowledge gained from age exploration enables the designer of the RCM requirements to effect maximum uptime of the

equipment at the lowest cost within the bounds of safety.
(Author)

A82-40997#
INFRARED SCANNING FOR IMPROVED MAINTENANCE OF ELECTRONICS SYSTEMS
G. S. EGAN (Hughes Aircraft Co., Culver City, CA) In: International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 2. New York, American Institute of Aeronautics and Astronautics, 1982, p. 1211-1213.

The use of infrared thermography for electronics and electrical fault isolation and diagnosis is discussed, and a typical thermographic system is shown. In the system, the video signal from a thermal imager is digitized to a 512 x 512 pixel matrix which is processed within a digital image processor to compare the test image with a previously stored image of a composite master image The results are translated back to video to provide a display output to the operator from a video monitor. It is demonstrated that time required for fault isolation can be cut from hours to minutes thereby reducing labor costs and downtime on critical equipment. V.L.

A82-41015#
COMPOSITE STRUCTURES REPAIR
H. WICKER (Grumman Aerospace Corp., Bethpage, NY) In: International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 2. New York, American Institute of Aeronautics and Astronautics, 1982, p. 1386-1392.

This paper concerns itself with the repair of composite materials on modern aircraft with particular emphasis on repair techniques and equipment for field use. The high strength to weight ratio of composites make them ideal to meet the demand for increasing the performance of military aircraft However, with the increasing use of composite materials, a need has been created for unique repair methods. To meet the need to simultaneously apply pressure and a uniform temperature to the patch, a composite repair console and integral vacuum/heater blanket was developed by Grumman.
(Author)

A82-41016#
PRINCIPLES OF ACHIEVING DAMAGE TOLERANCE WITH FLEXIBLE MAINTENANCE PROGRAMS FOR NEW AND AGING AIRCRAFT
J. HALL and U. G. GORANSON (Boeing Commercial Airplane Co., Seattle, WA) In: International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 2. New York, American Institute of Aeronautics and Astronautics, 1982, p. 1393-1405.

Boeing has developed new technology and procedures for determining flexible structural maintenance programs that meet damage tolerance regulations. Rating systems, based on past maintenance, are used to develop inspection programs to ensure timely detection of structural damage from environmental deterioration (EDR), accident (ADR), or fatigue (DTR). The inspection program consists of two phases. Initially, the program is based on evaluations for detecting corrosion, stress corrosion, and accidental damage using the EDR and ADR systems. As the fleet matures, inspection tasks for detecting fatigue damage, based on the DTR evaluations are incorporated into the program.
(Author)

A82-41017#
MATERIALS AND PROCESS DEVELOPMENT EFFORTS IN SUPPORT OF THE AIR FORCE MAINTENANCE PROGRAM
J. A. SNIDE (Dayton, University, Dayton, OH) and B. DOBBS (USAF, Wright Aeronautical Laboratories, Wright-Patterson AFB, OH) In: International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 2. New York, American Institute of Aeronautics and Astronautics, 1982, p 1406-1414. refs

The Electronic Failure Analysis Group in the Air Force Wright Aeronautical Laboratories/Materials Laboratory (AFWAL/ML) was established in 1977 to meet the need for detailed analysis of failed electronic components. The various analytical capabilities and techniques applied to electronic component failures are briefly described. Specific examples of several detailed electronic failure analyses are reviewed. After examining all the failure analyses conducted, eighty-three percent of the failures were attributed to materials or manufacturing related defects These studies have resulted in solutions and identified technical approaches for improved electronic component reliability and maintenance.
(Author)

A82-42176
ANNUAL RELIABILITY AND MAINTAINABILITY SYMPOSIUM, LOS ANGELES, CA, JANUARY 26-28, 1982, PROCEEDINGS
Symposium sponsored by IEEE, AIAA, ASME, et al New York, Institute of Electrical and Electronics Engineers, 1982. 548 p.
MEMBERS, $30.; NONMEMBERS, $40

Topics considered include reliability and the rare event, life-cycle costing, screening, new developments in analysis, software reliability, equipment readiness, new developments in mathematics and modeling, R&M data systems, new developments in testability, manufacturing reliability, and reliability testing. Case histories are presented on mechanical reliability, energy, consumer and industrial projects, maintainability, transportation, and military and aerospace. Aspects of reliability in the Space Shuttle program are discussed
B.J.

A82-42177
COMMON CAUSE HAZARD ANALYSIS FOR RANDOM GLITCHES
J. P. RANKIN (Boeing Co., Houston, TX) In: Annual Reliability and Maintainability Symposium, Los Angeles, CA, January 26-28, 1982, Proceedings. New York, Institute of Electrical and Electronics Engineers, 1982, p. 1-4.

A common cause hazard is taken to be any design susceptibility to occurrence of single events which can lead to coexisting failure of multiple channels or independent subsystems such that the system is disabled. This paper describes a checklist approach to the common cause hazard analysis of electrical systems. The checklist method has proved to be practical, effective, and easier to learn and use than fault tree reduction techniques. The present study draws on real cases for which the checklist technique determined the causes of operational problems that had been considered to be random, unrepeatable glitches prior to the analysis. B.J.

A82-42178
REPAIR-DISCARD CONCEPTS IN DESIGN
J. K. SEGER (Lockheed-California Co., Burbank, CA) In: Annual Reliability and Maintainability Symposium, Los Angeles, CA, January 26-28, 1982, Proceedings. New York, Institute of Electrical and Electronics Engineers, 1982, p. 21-24.

The repair-discard and expanded repair-level analysis methodology is being developed at Lockheed, and initial experience shows that this methodology is a practical means for determining LRU (line replaceable unit) and SRU (shop replaceable unit) maintenance policy. This methodology provides a structured approach for proposing design changes and for assessing the impact of economic and operational factors when the objective is to achieve mission and readiness requirements at a minimum life

cycle cost. The methodology complements the logistic support analysis process of MIL-STD 1388. B.J.

A82-42179
OPTIMIZATION OF RELIABILITY FOR MINI-RPV
B. LIVSON, I. MELAMED, and S. SAMUEL (Israel Aircraft Industries, Ltd., Lod, Israel) In: Annual Reliability and Maintainability Symposium, Los Angeles, CA, January 26-28, 1982, Proceedings. New York, Institute of Electrical and Electronics Engineers, 1982, p. 30-33.

Two concepts were selected for reliability evaluation: (1) a reliable but reasonably priced model (ARPV); and (2) the least expensive and least reliable model (BRPV), but with equivalent operational performance. The main reliability differences are in stand-by and functionally redundant devices, military vs mostly industrial components, device screening, and maintenance. The reliability analysis was performed for various types of RPV failures, such as total RPV loss, crash landing, and mission loss (total or partial). The high reliability design concept ARPV was found to have a considerably lower life-cycle cost than BRPV In spite of a significantly higher manufacturing cost for ARPV, the typical successful mission cost for ARPV is 0.54 of that of BRPV. B J.

A82-42180
A RELIABILITY WARRANTY CONCEPT FOR THE FMS ENVIRONMENT
D. K. SHELTON and R. G. PAXMAN (Northrop Corp., Aircraft Div., Hawthorne, CA) In: Annual Reliability and Maintainability Symposium, Los Angeles, CA, January 26-28, 1982, Proceedings. New York, Institute of Electrical and Electronics Engineers, 1982, p. 34-39. refs

Reliability warranties have been applied to a variety of types of equipment and to a variety of situations. This paper discusses a warranty concept which is designed for application in the Foreign Military Sales (FMS) environment. In addition to highlighting the tractability of the basic warranty structure and the phased development of the warranty program, a model is presented which functionally links the key attributes of such an incentive-based reliability warranty concept: a variable charge warranty. (Author)

A82-42181#
R/M/LCC EFFECTS OF COMMERCIAL OFF-THE-SHELF EQUIPMENT
P. R. MACDIARMID, A. D. PETTINATO (USAF, Rome Air Development Center, Griffiss AFB, NY), and B. G. JOHNSON (Rockwell International Corp., Cedar Rapids, IA) In: Annual Reliability and Maintainability Symposium, Los Angeles, CA, January 26-28, 1982, Proceedings. New York, Institute of Electrical and Electronics Engineers, 1982, p. 40-46. refs

This paper addresses the effects of using commercial off-the-shelf equipment in military environments. Comparisons are made of military vs commercial reliability approaches and an analytical approach for choosing the most appropriate acquisition strategy is presented. Life cycle cost comparisons are made of commercial off-the-shelf equipment vs similar militarized equipment in military environments. Examples are presented of assessing risks under varying applications and choosing the best acquisition strategy. (Author)

A82-42182
LOW CYCLE FATIGUE RELIABILITY EXPRESSIONS
R. G. LAMBERT (General Electric Co., Utica, NY) In: Annual Reliability and Maintainability Symposium, Los Angeles, CA, January 26-28, 1982, Proceedings. New York, Institute of Electrical and Electronics Engineers, 1982, p. 47-50.
(Contract N00019-78-C-0407)

Simple closed-form analytical expressions have been developed to accurately predict the fatigue life and other useful reliability parameters for structural elements that are intentionally or inadvertently stressed above the material's elastic limit into the inelastic stress-strain region. The unique feature of these expressions is that both the applied strain and the material's ductility are treated as simultaneous random variables. The developed expressions predict average and minimum cycles to first failure, probability of failure, instantaneous failure rate, hazard rate, and average number of cumulative failures of given designs and manufacturing processes Examples are given for multilayer board plated-through holes and solder joints during thermal cycling (Author)

A82-42184*# National Aeronautics and Space Administration. John F. Kennedy Space Center, Cocoa Beach, Fla.
AEROSPACE MECHANICAL RELIABILITY PRACTICE
O. H. FEDOR (NASA, Kennedy Space Center, Cocoa Beach, FL) In: Annual Reliability and Maintainability Symposium, Los Angeles, CA, January 26-28, 1982, Proceedings. New York, Institute of Electrical and Electronics Engineers, 1982, p. 56-61. refs

The impact of mechanical-reliability practice on the Saturn/Apollo launch program is considered with reference to the interrelationship of analysts and designers with management. Rocket engine development, ground testing, and launch facilities in the Saturn/Apollo program are discussed, and the Saturn reliability approach is examined in regard to management style, decision making, human error control, and reliability analyses. It is noted that the use of conservative design philosophy contributed to achieved reliability. B J.

A82-42186
OPTIMIZING SPARE MODULE BURN-IN
D. M. MARKO and T. D. SCHOONMAKER (General Electric Co., Utica, NY) In: Annual Reliability and Maintainability Symposium, Los Angeles, CA, January 26-28, 1982, Proceedings. New York, Institute of Electrical and Electronics Engineers, 1982, p. 83-86

An approach is presented to optimize spare module burn-in and thereby minimize a segment of life-cycle cost, defined herein as burn-in costs plus field failure costs. The approach is based on the hazard rate concept of declining failure rates with burn-in time Increased costs associated with added burn-in are compared to field savings from failure reductions until an optimal approach is identified. The method permits the manufacturer to use his own failure and cost data. Burn-in time is thus optimized for each manufacturer's specific circumstances. An example is presented. (Author)

A82-42187
VIBRATION-THERMAL SCREENING RELIABILITY PREDICTION
H. B. CHENOWETH (Westinghouse Electric Corp., Baltimore, MD) In: Annual Reliability and Maintainability Symposium, Los Angeles, CA, January 26-28, 1982, Proceedings. New York, Institute of Electrical and Electronics Engineers, 1982, p. 91-96. Research supported by the Westinghouse Electric Corp. refs

The method developed by Coffin-Manson and extended by Lambert for predicting low-level fatigue failure for electronic assemblies is utilized to determine the expected reliability. The reliability is determined for small damping, inelastic low-cycle fatigue with a catastrophic failure mode with a thermal cycling failure mode (correlated). These are integrated into a model to produce a method of characterizing the reliability benefit of screening methodology in terms of material parameters, thermal characteristics, and dynamic variables. An example is developed and a prediction generated. (Author)

A82-42188
SYSTEM INTERFACE FMEA BY MATRIX METHOD
S. A. HERRIN (ESL, Inc., Sunnyvale, CA) In: Annual Reliability and Maintainability Symposium, Los Angeles, CA, January 26-28, 1982, Proceedings. New York, Institute of Electrical and Electronics Engineers, 1982, p 111-116.

This paper describes the application of the Matrix FMEA technique to perform a system interface analysis. A solid fuel rocket motor thermal function taken from a spacecraft design is used as an example. The methodology presented focuses on the thermal control function and the interrelationship of it to the power unit, command unit, telemetry unit, and the associated interconnecting cables and harness wiring. A step-by-step

procedure for performing the analysis is presented starting with the definition of the functional configuration and interconnecting wiring and encompassing the interface wiring failure effects, the source units' failure effects, the thermal control failure effects, and the load units' interface circuitry failure effects. This method is beneficial to the matrix FMEA analyst for incorporating the interconnection circuitry failure effects into subsystem oriented FMEA analyses. (Author)

A82-42189
SYSTEMS SOFTWARE RELIABILITY MODEL
D. J. SIMKINS (IBM Corp., Federal Systems Div., Owego, NY) In: Annual Reliability and Maintainability Symposium, Los Angeles, CA, January 26-28, 1982, Proceedings. New York, Institute of Electrical and Electronics Engineers, 1982, p. 162-166.

The IBM Systems Software Reliability model was developed to provide product assurance management visibility as to the impact of software on system reliability parameters contained in the Prime Weapon System specification, especially during system-proof-of-compliance testing. This model used variables which gave management direct visibility in key aspects of the software program, and, as a result, allowed management to react accordingly if the resulting software reliability estimate was too low. The model was applied to the air subsystem and ship subsystem of the Prime Weapon System by inputting appropriate values into the model variables From these values, the model determined the contribution of software defects to the various reliability requirements. B.J.

A82-42190
APPROACHES TO SOFTWARE RELIABILITY PREDICTION
C. J. DALE and L. N. HARRIS (British Aerospace Public, Ltd., Co., Stevenage, Herts., England) In: Annual Reliability and Maintainability Symposium, Los Angeles, CA, January 26-28, 1982, Proceedings New York, Institute of Electrical and Electronics Engineers, 1982, p. 167-175. refs

This paper considers the problems involved in producing useful predictions of the reliability of software systems, looks briefly at some of the prediction methods proposed over the past few years, identifying some reasons why these have not been as successful as would have been hoped. Three new directions for future research activities are then suggested: the first is based on credibility theory, the second uses time series analysis, and the third is a graphical technique. (Author)

A82-42191
COMBINED HARDWARE/SOFTWARE RELIABILITY MODELS
J. E. ANGUS and L. E. JAMES (Hughes Aircraft Co., Fullerton, CA) In: Annual Reliability and Maintainability Symposium, Los Angeles, CA, January 26-28, 1982, Proceedings. New York, Institute of Electrical and Electronics Engineers, 1982, p. 176-181. refs
(Contract F30602-80-C-0085; F30602-80-C-0273)

A theory for combining well-known hardware and software reliability models is developed on the basis of the principles of Markov processes. This model provides an accurate description of the reliability/maintainability characteristics of systems possessing both HW and SW, and is compatible with the maintenance philosophies utilized for C3 systems. In particular, recovery of the SW operating system without correcting a fault, imperfect debugging, and numerous HW/SW modes of interaction are all features of the model which make it flexible enough to handle most C3 systems. The use of steady-state availability as a reliability-maintainability measure is shown to be misleading for systems exhibiting both HW and SW faults. B.J.

A82-42192
SATELLITE TRAVELLING WAVE TUBES RELIABILITY CONTROLS
F. F. BEHMANN (Telesat Canada, Ottawa, Canada) In: Annual Reliability and Maintainability Symposium, Los Angeles, CA, January 26-28, 1982, Proceedings. New York, Institute of Electrical and Electronics Engineers, 1982, p 193-198

The reduced capability of Telesat's present commercial satellite systems due to malfunctions of traveling wave tubes (TWTs) is considered. Attention is then given to new techniques applied by Telesat to the evaluation and acceptance of new TWTs; these techniques are shown to be very effective in assuring improved products that meet reliability and life requirements with confidence. Reliability controls, including production and special acceptance criteria, are assessed; and product assurance controls used to increase confidence in meeting the improved life capability are discussed B J

A82-42197
REGRESSION MODELS FOR DETECTING RELIABILITY DEGRADATION
J. TOMSKY (Lockheed Research Laboratories, Palo Alto, CA) In: Annual Reliability and Maintainability Symposium, Los Angeles, CA, January 26-28, 1982, Proceedings. New York, Institute of Electrical and Electronics Engineers, 1982, p 238-245.

Two regression models are described that assume repeated measurements over time and concurrently attempt to detect and evaluate component degradation with respect to time. The following statistical results are obtained for each model: estimation of parameters, hypothesis test for the slope, confidence band for the regression mean; and tolerance band for the population These results are illustrated by two numerical examples, one for each model. (Author)

A82-42200
COMBINATORIAL ANALYSIS IN DETERMINING RELIABILITY
S. S. TUNG (Hughes Aircraft Co, Culver City, CA) In: Annual Reliability and Maintainability Symposium, Los Angeles, CA, January 26-28, 1982, Proceedings. New York, Institute of Electrical and Electronics Engineers, 1982, p. 262-266

It is noted that a combinatorial analysis method should be applied to evaluate the reliability of complex systems such as infrared systems, of which the detecting and signal processing portion needs special treatment (due to the complex wiring configuration and intricate failure criteria). In this paper, mathematical models, derived in terms of classical reliability theory and combinatorial analysis, are presented for two different infrared systems: the J2 detector/channel/ preamplifier, and a nonlinear multidetector subsystem. The models are derived on the basis of mathematical induction, which makes it easy to obtain a general analytical solution. B.J.

A82-42201
PITFALLS TO AVOID IN MAINTAINABILITY TESTING
R. W. BENTZ (Mitre Corp., Bedford, MA) In. Annual Reliability and Maintainability Symposium, Los Angeles, CA, January 26-28, 1982, Proceedings. New York, Institute of Electrical and Electronics Engineers, 1982, p. 278-282

Experience with maintainability (M) tests has revealed problems with the M and logistics engineering process, and with the methods typically used to test for M compliance. A case-history approach is employed to list typical M problems encountered in test, and to outline specific deficiencies with methods contained in MIL-STD-471A. Pitfalls to avoid and recommendations for corrective action are given, which have direct implications for contractors The engineering problems concerning M achievement are also considered. B.J

A82-42202
ACHIEVING MAINTAINABILITY BY RANDOM FAULT INJECTION
M. A. RAMIREZ (Westinghouse Defense and Electronics Systems Center, Baltimore, MD) In: Annual Reliability and Maintainability Symposium, Los Angeles, CA, January 26-28, 1982, Proceedings. New York, Institute of Electrical and Electronics Engineers, 1982, p. 291-296.

This paper describes a random fault injection testing technique that, when implemented, will significantly improve the probability of meeting maintainability requirements in the field All too often, maintainability requirements are not met in the field because of inadequate validation and verification that can be traced directly to the lack of a testability growth program and the structured approach to qualification testing The proposed random fault injection technique provides a testability growth program that concentrates on fault detection/isolation effectiveness and Mean-Time-To-Repair (MTTR). Examples of random fault injection data for Built-In-Test (BIT) and diagnostic software are provided to show the development/improvement of BIT capability and the maturation of diagnostic software. (Author)

A82-42203#
A REVIEW OF THE ELECTRONIC RELIABILITY DESIGN HANDBOOK
C. G. MESSENGER (USAF, Rome Air Development Center, Griffiss AFB, NY) In: Annual Reliability and Maintainability Symposium, Los Angeles, CA, January 26-28, 1982, Proceedings New York, Institute of Electrical and Electronics Engineers, 1982, p 297-302. refs

A comprehensive handbook on Electronic Reliability Design has been developed under the auspices of the Rome Air Development Center (RADC) This handbook represents a distillation of the major publications, exhibits, pamphlets, regulations, instructions, and directives on Reliability and Maintainability used within the Department of Defense (DOD). The handbook emphasizes the practical aspects of Reliability and Maintainability design and management techniques and is illustrated by real world examples to give the reader insight on how the techniques might be applied. It provides sufficient theoretical and practical information to solve common reliability and maintainability problems most frequently encountered. In addition, a comprehensive list of reference material has been compiled to allow the reader to explore for himself aspects of the techniques required by those special problems which inevitably appear. (Author)

A82-42204
RELIABILITY OPTIMIZATION - A METHOD FOR THERMAL DESIGN
F. ALTOZ, J. P BRACH, JR., and D. ROSEN (Westinghouse Electric Corp., Baltimore, MD) In: Annual Reliability and Maintainability Symposium, Los Angeles, CA, January 26-28, 1982, Proceedings. New York, Institute of Electrical and Electronics Engineers, 1982, p. 303-308. refs

This paper addresses the allocation of cooling resources to optimize reliability through good thermal design. The sensitivity of reliability to the thermal environment is recognized as an important concern in system design. Where high reliability is a requirement and operation under stringent thermal conditions must be achieved, the thermal design will be a reliability driver. A mathematical optimization method is presented, and the motivation for a graphical solution to the complex equipment problem is discussed. A practical method of cooling allocation is developed using the graphical expression of the functional relationships of failure rate, temperature, and available coolant flow. (Author)

A82-42205
R & M DESIGN - PROBLEM DEFINITION
A. WILD (Atomic Energy Control Board, Ottawa, Canada) In: Annual Reliability and Maintainability Symposium, Los Angeles, CA, January 26-28, 1982, Proceedings. New York, Institute of Electrical and Electronics Engineers, 1982, p. 309-312. refs

Many deficiencies in R & M design are caused by a lack of proper definition of the problems to be solved. This paper indicates that the reason why problems are not properly defined can often be traced to a lack of communication between specialists involved in design. It shows how easily accessible computer tools for fault tree handling and MTBF prediction can help in defining the problems and are more effective for this task than for numerical assessments for which their use is better known. (Author)

A82-42207
A STATISTICAL SYSTEM FOR REINSPECTION SCREENING
M. H. HORN (Columbia Research Corp., Arlington, VA) In. Annual Reliability and Maintainability Symposium, Los Angeles, CA, January 26-28, 1982, Proceedings. New York, Institute of Electrical and Electronics Engineers, 1982, p. 336-342. refs

A data base system is described which has been developed to record the results of production acceptance testing of a weapon system, and the results of identical tests performed on the same units after extended stockpile storage. The system detects abnormal degradation through analysis of means and variances of a large number of tests, even where no single test may indicate such degradation Thus, it is valuable as an early warning of possible reliability problems with a given set of stockpiled units. A unit or set of units, once identified as 'outliers', may be singled out for more rigorous testing, a fuze from this group may be flight-tested and the result compared with flight tests of units randomly selected from the stockpile. It may be determined that units stored in one warehouse experience a different level of degradation from those stored in other facilities; in such a case, the storage environment of that warehouse would be further examined. B J.

A82-42210
FAULT ISOLATION BITE FOR INCREASED PRODUCTIVITY
C. R. STANDER (Boeing Commercial Airplane Co., Seattle, WA) In: Annual Reliability and Maintainability Symposium, Los Angeles, CA, January 26-28, 1982, Proceedings. New York, Institute of Electrical and Electronics Engineers, 1982, p. 365-369.

The paper discusses the potential effect of fault isolation on productivity, the development of BITE (built-in test equipment) on the 757/767 aircraft, and a new analytical method for verifying the level of system fault isolation efficiency. It is noted that the 757/767 BITE is designed for the mechanic, not the engineer. It eliminates such problems as the inability to deal with intermittent faults, and is expected to lead to improved aircraft productivity through improved schedule reliability and decreased maintenance cost. B.J.

A82-42211#
ANALYSIS OF BUILT-IN-TEST ACCURACY
D. GLEASON (USAF, Rome Air Development Center, Griffiss AFB, NY) In: Annual Reliability and Maintainability Symposium, Los Angeles, CA, January 26-28, 1982, Proceedings. New York, Institute of Electrical and Electronics Engineers, 1982, p. 370-372.

Built-in-test (BIT) accuracy is a combined measure of fault detection capability and false alarm occurrences. This paper provides a Markovian analysis of BIT accuracy. The results of the analysis are used to develop tradeoff techniques for achieving optimal BIT accuracy levels. (Author)

A82-42212
PARTS CONTROL AND RELIABILITY ASSURANCE OF RF HYBRIDS
J. R. OSLICA (Westinghouse Defense and Electronic Systems Center, Baltimore, MD) In: Annual Reliability and Maintainability Symposium, Los Angeles, CA, January 26-28, 1982, Proceedings New York, Institute of Electrical and Electronics Engineers, 1982, p. 378-383. refs

The paper examines the methods required for properly controlling RF hybrids in order to ensure the achievement and maintenance of the required reliability of these devices. The discussion, based on a case history, encompasses. (1) preliminary part specification (including the vendor design and construction) and procurement; (2) application (in-house control); and (3) the follow-up corrective action program. It is concluded that the application of proper reliability disciplines to the 'front-end' efforts is essential and can greatly enhance device reliability. B.J.

A82-42214
THE EFFECTS OF PACKAGE INTEGRITY ON DIP RELIABILITY
M. H. DIAMANT (Westinghouse Defense and Electronic Systems Center, Baltimore, MD) In: Annual Reliability and Maintainability Symposium, Los Angeles, CA, January 26-28, 1982, Proceedings. New York, Institute of Electrical and Electronics Engineers, 1982, p. 390-393.

The paper outlines the methodology involved in testing chipped dual-in-line packages (DIP) and presents a factual case history of an analysis of the effects of chips on DIP reliability. It was found that 10% (15 of 150) of the chipped DIPs examined failed. The fine-leak test was selected as the overriding criterion because leaks in the DIP may adversely affect the reliability by allowing moisture to penetrate the cavity. A major finding of the study is that 24-pin packages appear not only to be more susceptible to chipouts, but to larger ones that result in leaks into the cavity. B.J.

A82-42217
COMPUTER MONITORED INSPECTION PROGRAM /CMIP/, A KEY TO INCREASED AIRCRAFT AND PERSONNEL PRODUCTIVITY
H. D. HALL (Lockheed-Georgia Co., Marietta, GA) In: Annual Reliability and Maintainability Symposium, Los Angeles, CA, January 26-28, 1982, Proceedings. New York, Institute of Electrical and Electronics Engineers, 1982, p. 408-416.

A computer program has been developed which permits maintenance managers to maintain aircraft scheduled inspection programs in a dynamic and cost-effective configuration. This program, which is called CMIP (Computer Monitored Inspection Program), was specifically designed to increase the aircraft's and the maintenance manager's productivity by assisting the maintenance manager in evaluating the effectiveness of scheduled maintenance programs. The CMIP gives the maintenance manager the ability to keep inspection programs dynamic and cost-effective while simultaneously maintaining inherent design levels of safety and reliability. (Author)

A82-42218
STATISTICAL TECHNIQUES FOR AGING MODELS
S. DEMSKEY (General Electric Co., Re-entry Systems Div., Philadelphia, PA) and J. FISHER (General Electric Co., Re-entry Systems Div., Clearfield, UT) In: Annual Reliability and Maintainability Symposium, Los Angeles, CA, January 26-28, 1982, Proceedings. New York, Institute of Electrical and Electronics Engineers, 1982, p. 417-424. refs

A multiple modeling procedure is presented which includes criteria for the selection of optimal models to be applied to product shelf life estimate forecasts. Unlike techniques that treat assumptions as mathematical abstractions, the present method employs assumption risks in the determination of optimal models. In application, nonlinear aging phenomena have been identified which provide fits sufficiently representative to yield increased shelf life estimates for some products previously targeted for replacement on the basis of the linear model. Of the nine models constructed, nonlinear models occurred with a 79% frequency. The evaluation of product aging trends has eased the economic and scheduling risks for management with inventory and logistical responsibility O.C

A82-42220
SOFT FAILURES - THE INVISIBLE MODE
D. E. FRANK (Douglas Aircraft Co., Long Beach, CA) In: Annual Reliability and Maintainability Symposium, Los Angeles, CA, January 26-28, 1982, Proceedings. New York, Institute of Electrical and Electronics Engineers, 1982, p. 444-448 refs

In 2-4 years, over 60% of the semiconductor components in avionics will be sensitive to electrostatic charges of less than 100 volts. Such voltages will degrade or even destroy electrostatic discharge sensitive (ESDS) components in the course of manufacture. A proprietary program for the elimination of ESDS system problems is described whose major element is the isolation of failure causes at the site of their occurrence through testing at intermediate points of the manufacturing process Attention is given to the roles of low humidity environments and spray coatings. All manufacturing areas have been rendered static-free by the elimination of nonmetallic surfaces. It is recommended that device switching frequency derating be undertaken wherever possible, since the effect of electrostatic degradation increases with switching speed. O.C.

A82-42221
THE PRACTICAL ASPECTS OF RESTARTING A HIGH RELIABILITY HYBRID LINE
B A. BANG (Westinghouse Electric Corp., Advanced Technology Div., Baltimore, MD) In: Annual Reliability and Maintainability Symposium, Los Angeles, CA, January 26-28, 1982, Proceedings New York, Institute of Electrical and Electronics Engineers, 1982, p. 449-452

Production interruptions of hybrid electronic component manufacturing assembly lines provide an opportunity to assess practices, introduce novel concepts, and thereby improve product quality, which must be balanced against the inherent loss of experienced personnel and process capabilities relying on production continuity. Techniques are described which may be used to improve component selection, design techniques, and process controls, on the basis of the Wong (1981) Unified Field (Failure) Theory. Attention is given to parts screening, vendor selection and source inspection, failure reporting and analysis, and personnel training. O.C.

A82-42222
MODELING THE RELIABILITY AND MAINTAINABILITY CHARACTERISTICS OF MANUFACTURING SYSTEMS
J. W. FOSTER and A. GARCIA-DIAZ (Texas A & M University, College Station, TX) In: Annual Reliability and Maintainability Symposium, Los Angeles, CA, January 26-28, 1982, Proceedings. New York, Institute of Electrical and Electronics Engineers, 1982, p. 453-459 refs

This paper develops mathematical models of production systems by using Markov chains. The models can be used to estimate the effect that reliability and maintainability characteristics of production equipment have on steady-state production rates. Three general classes of models are studied. The first model considers a system with only catastrophic failures; the second model considers a system with elements which cannot be repaired while the system is functioning; the third model considers a system with elements which can be repaired while other elements of the system are in operation. (Author)

A82-42223
ESTABLISHING RELIABILITY GOALS FOR NEW TECHNOLOGY PRODUCTS
H. J. KOHOUTEK (Hewlett-Packard Co., Fort Collins, CO) In: Annual Reliability and Maintainability Symposium, Los Angeles, CA, January 26-28, 1982, Proceedings. New York, Institute of Electrical and Electronics Engineers, 1982, p. 460-465.

This paper presents alternative approaches to reliability goal setting for electronic hardware, with emphasis on in-house manufactured IC components and hybrid subassemblies. It addresses methods taking into account market sensitivity assessment, previous generation performance analysis, cost optimization and technology assessment. It describes the logic and rationale of these methods in terms of total reliability cost and empirical reliability assessment formulas as applied to actual products. Field data allows assessment of presented methods for accuracy (Author)

A82-42225
SPACE SHUTTLE ORBITER - A RELIABILITY CHALLENGE AND ACHIEVEMENT
V. P. OSTRANDER (Rockwell International Corp., Downey, CA) In: Annual Reliability and Maintainability Symposium, Los Angeles, CA, January 26-28, 1982, Proceedings. New York, Institute of Electrical and Electronics Engineers, 1982, p. 468-473.

The Failure Mode Effects Analyses employed in the Space Shuttle program to insure system reliability contained elements designed to provide guidance in the areas of quality control, mission rules, and design and manufacturing. The electrical, electronic and electromechanical parts control program instituted was also important in obtaining a balance between economy and reliability in the Space Shuttle's navigation and guidance systems. Use was also made of a hardware certification and verification process which was complemented by a closed loop problem-reporting and corrective action system. The implementation of this reliability program is presented in flowchart and tabular forms. O.C.

A82-42226
INTERACTION OF RELIABILITY AND SAFETY ON THE SPACELAB PROGRAMME
L. TEDEMAN and R. C. KOHLHEYER (ESA, Noordwijk, Netherlands) In: Annual Reliability and Maintainability Symposium, Los Angeles, CA, January 26-28, 1982, Proceedings. New York, Institute of Electrical and Electronics Engineers, 1982, p. 474, 475.

A three-section Product Assurance Division has been established in order to conduct the Safety and Reliability programs of the Spacelab Project, consisting of Quality Assurance (QA), Parts, Materials and Processes (PMP), and Safety and Reliability. Because there is an overlap of responsibilities in any such organization, the safety and reliability characteristics of parts, materials and processes were generated by the Safety and Reliability section in conjunction with PMP, to which implementation was then assigned. The critical items identification and control program was developed within Safety and Reliability, and implementation after design freeze was assigned to the QA section. It is shown that this organizational approach has been cost-effective in terms of manpower and the levels of effort expended. O.C.

A82-42227
FAULT TOLERANCE ANALYSIS FOR STS PAYLOADS
G. W. EDWARDS (Lockheed Missiles and Space Co., Space Systems Div., Sunnyvale, CA) In: Annual Reliability and Maintainability Symposium, Los Angeles, CA, January 26-28, 1982, Proceedings. New York, Institute of Electrical and Electronics Engineers, 1982, p. 476-478.

NASA document NHB 1700.7A, which specifies STS payload safety requirements, requires that all STS payload organizations verify the conditions that no single payload fault can result in STS equipment damage or require contingency or emergency procedures, and that no two payload faults can result in personnel injury, loss of the Orbiter or ground facilities, or damage to STS equipment. Established methods of analysis do not lend themselves to the verification of compliance with a multifailure tolerance requirement. A systematic and logically complete method for fault tolerance evaluation has accordingly been developed for STS payloads, which adapts reliability modelling and failure mode and effects analysis techniques, and identifies potential areas of safety noncompliance with the STS failure tolerance requirement. The certification of the consideration of all relevant combinations of failures is thereby effected. O.C.

A82-42228
AN APPROACH TO HIGH RELIABILITY FOR A SPACECRAFT IRU
C. GRUBIN, R. B. IRVINE, and D W. TRUNNELL (Teledyne Systems Co, Northridge, CA) In: Annual Reliability and Maintainability Symposium, Los Angeles, CA, January 26-28, 1982, Proceedings. New York, Institute of Electrical and Electronics Engineers, 1982, p. 479-487. refs

This paper presents a design approach and a methodology to extend the life of an existing inertial reference unit (IRU) with a mission probability of success (Ps) of 0 990 for a one (1) year mission to a Ps of 0.999 for a five (5) year mission and 0.993 for an eight (8) year mission. The optimum configuration utilizing the minimum hardware was determined by design trade studies and reliability prediction analyses. (Author)

A82-42229
F/A-18 HORNET RELIABILITY CHALLENGE - STATUS REPORT
M. P. RICKETTS (McDonnell Aircraft Co., St. Louis, MO) In. Annual Reliability and Maintainability Symposium, Los Angeles, CA, January 26-28, 1982, Proceedings. New York, Institute of Electrical and Electronics Engineers, 1982, p. 491-496

A development status report is given for the F/A-18 Hornet Reliability Program, in which an attempt is made to give reliability criteria the same design emphasis as weight, performance and cost. Among the established reliability assurance techniques applied are periodic status assessments for each subsystem manager, failure mode and affects analyses, an approved parts list, selective use of Sneak Circuit Analysis, and a closed loop evaluation and reporting system which reports and tracks all equipment failures. The F/A-18's 3.7-hour mean flight time between failures (MFTBF) requirement was tested in 50 Reliability Demonstration flights, and an 8.4-hour MFTBF was demonstrated. The F/A-18 incorporates such high inherent reliability design components as solid state avionics, improved avionics cooling, a fixed-geometry engine air inlet, simpler hydraulics, and the highly simplified F404 engine. O.C.

A82-42231#
DEVELOPMENT OF THE RELIABILITY PROGRAM FOR THE ADVANCED MEDIUM RANGE AIR-TO-AIR MISSILE /AMRAAM/ [AMRAAM]
B. B. WOOD (U.S. Air Force Academy, Colorado Springs, CO) In: Annual Reliability and Maintainability Symposium, Los Angeles, CA, January 26-28, 1982, Proceedings. New York, Institute of Electrical and Electronics Engineers, 1982, p 510-514.

The Advanced Medium Range Air-to-Air Missile (AMRAAM) program office has developed a validation phase reliability program to implement provisions of DOD 5000, MIL-STD-785B, and the New Look Initiative. Attention is given the systematic development of quantitative requirements, independent testing under combined environments, implementation of warranties and incentives, and independent program assessments. Mission Completion Success Probability (MCSP) is used as the overall effectiveness parameter for the mission profile in question. After establishing representative probabilities of success for each event in the profile, the missile captive carry mode's mean time between maintenance (MTBM) is varied to determine its impact on MCSP. A 500-hour MTBM is considered an acceptable minimum for missile captive carry. O.C.

A82-44363#
RELIABILITY ASSESSMENT OF SOLAR DOMESTIC HOT WATER SYSTEMS
P. Y. WANG and R. M. WOLOSEWICZ (Argonne National Laboratory, Argonne, IL) In. Solar engineering - 1981; Proceedings of the Third Annual Conference on Systems Simulation, Economic Analysis/Solar Heating and Cooling Operational Results, Reno, NV, April 27-May 1, 1981 New York, American Society of Mechanical Engineers, 1981, p. 755-761. Research supported by the U.S. Department of Energy refs

This paper presents reliability and mean-time-between-failure studies of six generic solar domestic hot water systems. Failure rate data for system components were obtained from product literature or from consumer product industries. Reliability block diagrams are employed for the analyses, and exponential distribution functions are assumed for individual components. Since some components do not operate continuously, a duty-cycle factor is developed and defined as the ratio of operating time to total mission time. To accommodate systems experiencing different duty cycles, an averaged duty cycle is introduced to estimate mean lives Large variations in system reliability and mean life were found and result from wide failure-rate bands for some of the components. (Author)

A82-45009
RELIABILITY OF SILICON SOLAR CELLS WITH A PLATED NICKEL-COPPER METALLIZATION SYSTEM
L. A. GRENON, N G SAKIOTIS, and M G. COLEMAN (Motorola, Inc., Semiconductor Group, Phoenix, AZ) In. Photovoltaic Specialists Conference, 15th, Kissimmee, FL, May 12-15, 1981, Conference Record New York, Institute of Electrical and Electronics Engineers, Inc., 1981, p. 522-526. refs

In order to achieve the goal of low cost photovoltaics, low cost processes that contribute to a long solar cell service life must be established In this paper, the interactions between the silicon and the nickel contact are examined with respect to long term reliability. The effects of heat treatment of the contacts on diode performance are empirically examined by studying changes in electrical parameters of cells as a function of time and temperature. The results show that, utilizing the appropriate plating technique and establishing the appropriate assembly technique, a low cost, highly reliable nickel-copper metallization system can be used on silicon solar cells. (Author)

A82-45039
SYSTEM DESIGN AND RELIABILITY CONSIDERATIONS FOR AN INTERMEDIATE-SIZE PHOTOVOLTAIC POWER SYSTEM FOR A REMOTE APPLICATION
G. T. NOEL, L. H. STEMBER, and D. C CARMICHAEL (Battelle Columbus Laboratories, Columbus, OH) In: Photovoltaic Specialists Conference, 15th, Kissimmee, FL, May 12-15, 1981, Conference Record. New York, Institute of Electrical and Electronics Engineers, Inc., 1981, p. 725-731. refs

The design of a photovoltaic power system for remote applications is described. The preliminary requirements placed on the system are high reliability of power and low life-cycle cost, considering equipment, remote installation, and operation and maintenance costs. The design incorporates flat-panel modules assembled onto steel frames and prewired prior to shipment to the site, in order to minimize on-site installation costs, skilled labor requirements, and risk of costly delays and failures Other components include power conditioning units, battery storage, battery charger, back-up diesel generators, and controls. A methodology for system reliability analysis using the fault-tree technique is illustrated to aid in system design, and an assessment is made of mean time between failures (MTBF), mean time to restore/repair (MTTR), and system availability. (Author)

A82-45077
BY-PASS DIODE DESIGN, APPLICATION AND RELIABILITY STUDIES FOR SOLAR CELL ARRAYS
M. GIULIANO, D. STARLEY, D WARFIELD, and T SCHUYLER (Solarex Corp., Rockville, MD) In: Photovoltaic Specialists Conference, 15th, Kissimmee, FL, May 12-15, 1981, Conference Record New York, Institute of Electrical and Electronics Engineers, Inc., 1981, p. 997-1000.

A planar-diffused structure is described for use as an unencapsulated by-pass or shunt diode in solar cell arrays. Design features result in reliable performance, low fabrication cost and ease of handling during assembly. Special consideration is given to heat dissipation related to the manner in which the diodes are mounted in the array Operating life-test curves are presented which indicate excellent stability for continuous current levels as high as 8 amperes at a panel temperature of 60 C. Forward voltage drop for these diodes is less than 800 mV at 2.5 amperes and the reverse current is in the order of microamperes at 7 volts (Author)

A82-45093* Jet Propulsion Lab., California Inst. of Tech., Pasadena.
FIELD FAILURE MECHANISMS FOR PHOTOVOLTAIC MODULES
L. N. DUMAS and A. SHUMKA (California Institute of Technology, Jet Propulsion Laboratory, Pasadena, CA) In: Photovoltaic Specialists Conference, 15th, Kissimmee, FL, May 12-15, 1981, Conference Record. New York, Institute of Electrical and Electronics Engineers, Inc., 1981, p. 1091-1098. Research sponsored by the U.S. Department of Energy and NASA refs

Beginning in 1976, Department of Energy field centers have installed and monitored a number of field tests and application experiments using current state-of-the-art photovoltaic modules. On-site observations of module physical and electrical degradation, together with in-depth laboratory analysis of failed modules, permits an overall assessment of the nature and causes of early field failures. Data on failure rates are presented, and key failure mechanisms are analyzed with respect to origin, effect, and prospects for correction. It is concluded that all failure modes identified to date are avoidable or controllable through sound design and production practices. (Author)

A82-45094* Jet Propulsion Lab., California Inst of Tech., Pasadena.
PHOTOVOLTAIC MODULE HOT SPOT DURABILITY DESIGN AND TEST METHODS
J. C. ARNETT and C. C. GONZALEZ (California Institute of Technology, Jet Propulsion Laboratory, Energy Technology Engineering Section, Pasadena, CA) In: Photovoltaic Specialists Conference, 15th, Kissimmee, FL, May 12-15, 1981, Conference Record New York, Institute of Electrical and Electronics Engineers, Inc., 1981, p. 1099-1105.

As part of the Jet Propulsion Laboratory's Low-Cost Solar Array Project, the susceptibility of fat-plate modules to hot-spot problems is investigated. Hot-spot problems arise in modules when the cells become back-biased and operate in the negative-voltage quadrant, as a result of short-circuit current mismatch, cell cracking or shadowing The details of a qualification test for determining the capability of modules of surviving field hot-spot problems and typical results of this test are presented. In addition, recommended circuit-design techniques for improving the module and array reliability with respect to hot-spot problems are presented. N.B.

A82-45095
EFFECTS OF SHADING AND DEFECTS IN SOLAR CELL ARRAYS - A SIMPLE APPROACH
A. GUPTA and A. G. MILNES (Carnegie-Mellon University, Pittsburgh, PA) In: Photovoltaic Specialists Conference, 15th, Kissimmee, FL, May 12-15, 1981, Conference Record. New York, Institute of Electrical and Electronics Engineers, Inc., 1981, p. 1111-1116. refs

Tradeoffs involved in solar cell array arrangements are discussed with the aid of examples and simple numerical

calculations. The effect of various shading conditions on different arrays is studied, along with the arrays' tolerance of the effects of open or short-circuit cells. The effects of cell failure and the benefits of providing interconnections between series strings in a module spanned by a bypass diode are considered. It is found that bypass diodes are desirable both for reasons of shading and the possible presence of defects. Power losses caused by partial shading depend on the orientation of the shading relative to the line of the bypass diodes. Open circuit defects or spot shading cause loss of the current in the string, while numerous branch circuits reduces the voltage loss caused by short-circuit cells. Interconnections within a module are not likely to be beneficial in arrays where there may be a large number of bypass diodes.
C.D.

A82-45096
SOLAR CELLS FAILURE MODES UNDER REVERSE VOLTAGES AND RELIABILITY
A. M. RICAUD, F. FORGE, and P. E. SARRE (France-Photon, Angouleme, Charente, France) In: Photovoltaic Specialists Conference, 15th, Kissimmee, FL, May 12-15, 1981, Conference Record. New York, Institute of Electrical and Electronics Engineers, Inc., 1981, p. 1117-1121. European Economic Community (Contract EEC-718-78-12-ESF)

Improved reverse power dissipation capabilities in photovoltaic installations are presented. The primary technique involves connecting a bypass diode in parallel to short-circuit the string, once the voltage becomes negative. With a predetermined reverse voltage of 20 V at 60 C, a 36 cell module can be protected by one diode. It is shown that the effects of direct power loss are negligible when compared with advantages in reverse operations A coupling optimization system was tested for efficiency in using the proposed protective devices, and the 6300 W, 220 V system can offer a limited power loss, a possible decoupling per branch allowing continual function of the system, and a reduction of the number of bypass diodes. Further investigation of the decoupling optimization may lead to more reliable photovoltaic systems.
R.K.R.

A82-45097* Jet Propulsion Lab., California Inst. of Tech., Pasadena.
THE APPLICATION OF FRACTURE MECHANICS TO FAILURE ANALYSIS OF PHOTOVOLTAIC SOLAR MODULES
C. P. CHEN and M. H. LEIPOLD (California Institute of Technology, Jet Propulsion Laboratory, Applied Mechanics Technology Section, Pasadena, CA) In: Photovoltaic Specialists Conference, 15th, Kissimmee, FL, May 12-15, 1981, Conference Record. New York, Institute of Electrical and Electronics Engineers, Inc., 1981, p. 1122-1125. Research sponsored by the U.S. Department of Energy and NASA. refs

Cracking of silicon solar cells and solar module transparent cover panels such as glass or polymethylmethacrylate (PMMA) is a major cause of photovoltaic solar module failure in field service. Silicon and cover materials are brittle, and cracking of these materials is expected to result from the extension of preexisting flaws under stress. Study of the cracking mechanisms is therefore an appropriate area for the application of fracture mechanics principles In this study, fracture mechanics techniques were employed to identify the mode of crack propagation, to examine the fracture-initiating flaw, to estimate the nature and magnitude of fracture stress in the field, and to predict analytically the service lifetime. Recommendations for corrective actions are also made.
(Author)

A82-45101
PHOTOVOLTAIC SYSTEMS RELIABILITY ANALYSIS
L. H. STEMBER (Battelle Columbus Laboratories, Columbus, OH) In: Photovoltaic Specialists Conference, 15th, Kissimmee, FL, May 12-15, 1981, Conference Record. New York, Institute of Electrical and Electronics Engineers, Inc., 1981, p. 1153-1156. Research supported by the U.S. Department of Energy. refs

A study is discussed whose aim is to develop alternative system analysis models which incorporate design, maintenance, cost, and reliability information, and predict both annual maintenance cost and energy production over the life of a photovoltaic power system. For several models, methods of calculating system availability are described, including block diagrams and fault trees, state variables and Markov chains, and simulation. Relationships between the availability and lifecycle energy cost models are graphically shown, and diagrams illustrate the methods.
C.D

A82-45102* Jet Propulsion Lab., California Inst. of Tech., Pasadena.
PHOTOVOLTAIC MODULE AND ARRAY RELIABILITY
R. G. ROSS, JR. (California Institute of Technology, Jet Propulsion Laboratory, Energy Technology Engineering Section, Pasadena, CA) In: Photovoltaic Specialists Conference, 15th, Kissimmee, FL, May 12-15, 1981, Conference Record. New York, Institute of Electrical and Electronics Engineers, Inc., 1981, p. 1157-1163. Research supported by the U.S. Department of Energy and NASA. refs

Several statistical reliability studies have been conducted in areas of photovoltaic component design covering cell failure, interconnect fatigue, glass breakage and electrical insulation breakdown. This paper integrates the results from these various studies and draws general conclusions relative to optimal reliability features for future modules. The described analysis is based on designing for specified low levels of component failures and then controlling the degrading effects of the failures through the use of fault tolerant circuitry and module replacement. Means of selecting the cost-optimal level of component failures, circuit redundancy, and module replacement are described.
(Author)

A82-45132
RELIABILITY AND MAINTAINABILITY CONSIDERATIONS OF CONNECTOR SYSTEM FOR PHOTOVOLTAIC MODULES
T. SOTOLONGO (AMP, Inc., Largo, FL) In: Photovoltaic Specialists Conference, 15th, Kissimmee, FL, May 12-15, 1981, Conference Record New York, Institute of Electrical and Electronics Engineers, Inc., 1981, p. 1382-1385.

Solar cells, usually 4 in. in diameter, are assembled into modules or panels, usually composed of 36 or 48 cells, which are in turn combined into arrays. Once the modules are assembled into arrays, they must be connected electrically to each other A description is provided of a connector which electrically combines individual modules into arrays and protects the connections themselves against the elements of nature. The strong, rigid material used, the versatility and ease of handling of the rubber seals which provide environmental protection for the electrical contact, the quick releasing mechanism used make the considered connector a logical choice when protection from environmental hazards and longevity are needed.
G.R.

A82-46252*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
THE ROLE OF COMMUNICATIONS, SOCIO-PSYCHOLOGICAL, AND PERSONALITY FACTORS IN THE MAINTENANCE OF CREW COORDINATION
H. C. FOUSHEE (NASA, Ames Research Center, Moffett Field, CA) In: Symposium on Aviation Psychology, 1st, Columbus, OH, April 21, 22, 1981, Proceedings. Columbus, OH, Ohio State University, 1981, p. 1-11. refs

The influence of group dynamics on the capability of aircraft crew members to make full use of the resources available on the flight deck in order to maintain flight safety is discussed. Instances of crewmembers withholding altimeter or heading information from the captain are cited as examples of domineering attitudes from command pilots and overconscientiousness on the parts of copilots, who may refuse to relay information forcefully enough or to take control of the aircraft in the case of pilot incapacitation. NASA studies of crew performance in controlled, simulator settings, concentrating on communication, decision making, crew interaction, and integration showed that efficient communication reduced errors. Acknowledgements served to encourage correct communication. The best crew performance is suggested to occur with personnel who are capable of both goal and group orientation. Finally, one

bad effect of computer controlled flight is cited to be the tendency of the flight crew to think that someone else is taking care of difficulties in threatening situations. M.S.K.

A82-46253#
HUMAN FACTORS AND AVIATION SAFETY - A PROGRAM OF RESEARCH ON HUMAN FACTORS IN AVIATION
S. N. ROSCOE (New Mexico State University, Las Cruces, NM) In: Symposium on Aviation Psychology, 1st, Columbus, OH, April 21, 22, 1981, Proceedings. Columbus, OH, Ohio State University, 1981, p. 21-27.

The use of statistical methods for human factors engineering in aviation system design are discussed. Designers of systems are noted to require information on display dimensions and sensitivity, sensing direction, visibility, access distance, combinations of indicators within a display, the feel of the controls, coding and functions of control apparatus, grouping of functionally related operations, and logic and coding of caution and warning indications. A horizontal program of research is recommended as a means to establishing a data base of human engineering principles applicable to a broad range of apparatus design goals. It is noted that the costs of producing total flight fidelity in a simulator would increase the price of simulators beyond the cost of the flight time potentially saved by use of a simulator. The successful operation of multifactor transfer experiments for choosing among the design variables for a simulator is noted. M.S K.

A82-46255#
THE PERFORMANCE OF WARNING SYSTEMS IN AVOIDING CONTROLLED-FLIGHT-INTO-TERRAIN /CFIT/ ACCIDENTS
J. P. LOOMIS and R. F. PORTER (Battelle Columbus Laboratories, Columbus, OH) In: Symposium on Aviation Psychology, 1st, Columbus, OH, April 21, 22, 1981, Proceedings. Columbus, OH, Ohio State University, 1981, p. 38-50. refs

This paper examines the performance of two systems to prevent Controlled-Flight-Into-Terrain accidents, including their development and preimplementation issues and attitudes. The airborne version, the Ground Proximity Warning System, was required for certain large turbine-powered airplanes. The ground-based system, the Minimum Safe Altitude Warning, is a feature of the ARTS-3 system. Accident data from National Transportation Safety Board (NTSB) and reports from the Aviation Safety Reporting System (ASRS) were used in assessing performance. It is concluded that these systems have dramatically reduced accidents. Although false and nuisance alarms continue, no evidence suggests that they have caused any accident. The tenacity of the alarms - especially the GPWS - as well as appropriate triggering criteria seem to be basic to their success. (Author)

A82-46259#
GENERAL AVIATION COCKPIT DESIGN FEATURES RELATED TO INADVERTENT LANDING GEAR RETRACTION ACCIDENTS
A. DIEHL In: Symposium on Aviation Psychology, 1st, Columbus, OH, April 21, 22, 1981, Proceedings. Columbus, OH, Ohio State University, 1981, p. 84-93. refs

A detailed review was made of all National Transportation Safety Board (NTSB) files of inadvertent landing gear retraction accidents occurring to general aviation aircraft in the U.S. from 1975 to 1978. The data indicated that two particular types of airplanes were involved in the majority of these accidents although they comprised only one-quarter of the active light aircraft with retractable landing gears. Pilot comments and human engineering evaluations of contemporary light aircraft cockpits revealed that these two particular aircraft types have four design features which should tend to increase the probability of inadvertent landing gear retraction accidents. (Author)

A82-48064#
THE DEVELOPMENT OF SAFETY REQUIREMENTS FOR GAS PAYLOADS
A J. MATTHEWS (OAO Corp., Greenbelt, MD) In: Sounding Rocket Conference, 6th, Orlando, FL, October 26-28, 1982, Collection of Technical Papers. New York, American Institute of Aeronautics and Astronautics, 1982, p 278-281.
(AIAA 82-1760)

The paper discusses the Get Away Special (GAS) program with respect to the safety implementation and review process, as detailed in the Safety Manual for Get Away Specials. Because of the restricted scope of GAS payloads, and the relative inexperience of GAS users, the safety process for GAS payloads has been adapted, and a set of guidelines describing these changes has been produced. A workbook providing a step by step guide to GAS payload safety analysis has also been produced, and the guidelines and workbook have been formed into a single manual for issue to GAS users A brief description of the GAS program is given. The restrictions on GAS payloads, as detailed in the guidelines, are discussed, along with the technical consequences of these restrictions in the safety analysis. The revised implementation procedure for safety review is explained. (Author)

N82-10411# Westinghouse Electric Corp , Mercury, Nev. Advanced Energy Systems Div.
QUALITY-ASSURANCE PROGRAM PLAN
R. A. KETTELL May 1981 74 p
(Contract DE-AC08-80NV-10061)
(DE81-028257, DOE/NV-10061/7) Avail: NTIS HC A04/MF A01

The quality assurance program which is applied to radioactive waste management activities conducted at the Nevada test site is presented. The systematic and administrative controls to assure quality, safety, reliability, and maintainability during design, procurement, fabrication, inspection, shipments, tests, and storage are described. DOE

N82-12668# Sandia Labs., Albuquerque, N. Mex.
GUIDANCE FOR IMPLEMENTING AN ENVIRONMENTAL, SAFETY AND HEALTH ASSURANCE PROGRAM. VOLUME 12: MODEL GUIDELINES FOR LINE ORGANIZATION ENVIRONMENTAL, SAFETY AND HEALTH INSPECTION AND MONITORING ACTIVITIES
A. C. ELLINGSON Aug. 1981 44 p refs
(Contract DE-AC04-76DP-00789)
(DE81-030991; SAND-81-0643) Avail: NTIS HC A03/MF A01

The implementation of environmental safety and health (ES and H) assurance program is reported. The standard which specifies that the operational level of an institution must have internal control and assurance functions is discussed. Guidance for the inspection and monitoring activities which are a very basic part of assurance functions are provided. DOE

N82-12669# Sandia Labs., Albuquerque, N. Mex.
GUIDANCE FOR IMPLEMENTING AN ENVIRONMENTAL, SAFETY AND HEALTH ASSURANCE PROGRAM. VOLUME 13: MODEL GUIDELINES FOR LINE ORGANIZATION ENVIRONMENTAL, SAFETY AND HEALTH MEETINGS
A. C. ELLINGSON Aug. 1981 38 p refs
(Contract DE-AC04-76DP-00789)
(DE81-030980; SAND-81-0644) Avail: NTIS HC A03/MF A01

The implementation of environmental safety and health (ES and H) assurance program is described. The participation by and feedback from employees in ES and H matters is stressed. It is shown how ES and H meetings are used as a framework for employee involvement in the ES and H program. It is found that involvement is essential for defining the acceptability of ES and H controls from an employee's perspective. DOE

N82-12788# Engins Matra, Velizy (France).
METHODICAL STUDY OF THE CONTRIBUTION OF THE HUMAN SYSTEM TO THE INSECURITY OF TECHNOLOGICAL SYSTEMS [ETUDE METHODIQUE DE LA CONTRIBUTION DU SYSTEM HUMAIN A L'INSECURITE DES SYSTEMES TECHNOLOGIQUES]
J. L. DESCHAMPS 1981 18 p In FRENCH
Avail: NTIS HC A02/MF A01

The use of probability studies to increase system safety is advocated. The danger of overlooking human error when attributing blame for the failure of a piece of equipment is emphasized. The links between professional competence and physical and mental health are pointed out. It is recommended that serious accidents should be analyzed in terms of: the industry (petrochemical, construction, etc.); production unit (number of employees, foremen, etc.); job description; trades of persons involved, individual characteristics of persons involved (age, education, etc); and the scenario (time, place, etc.). Author (ESA)

N82-12987# Scientific Service, Inc., Redwood City, Calif
AN APPROACH TO THE MANAGEMENT OF HAZARDOUS MATERIALS Final Report
J. V. ZACCOR, H. L HSU, and C. WILTON Sep 1981 103 p refs
(Contract EMW-C-0432)
(AD-A104869; SSI-8043-4) Avail: NTIS HC A06/MF A01
CSCL 13L

This report describes an approach to hazardous material emergency management that includes organizing, relating, and keeping track of decision information being developed in the various operating sectors. Ongoing hazardous materials data collection, done by different Federal, State, local, and private agencies, is not coordinated. A simple, pragmatic decision information system with a standard data acquisition format is needed. A matrix approach, where data are acquired and developed to determine ranking problems, may be an answer. Information exchange media are examined and assessed for potential effectiveness in transferring the acquired and developed information to the area where information needs are greatest - the level of first responder. Test communities should be established to participate in information exchange programs. Author (GRA)

N82-13726# Carl-Cranz-Gesellschaft e.V., Brunswick (West Germany). Lehrgangsreihe Flugtechnik
TAXONOMY OF THE HUMAN FACTORS IN MAN MACHINE SYSTEMS [TAXONOMIE DER HUMANFAKTOREN IN MENSCH-MASCHINE-SYSTEMEN]
K. STEININGER (DFVLR, Hamburg) 1980 30 p refs In GERMAN
Avail: NTIS HC A03/MF A01

The human factors in man-machine systems are presented in a global model showing the manifold interplay between man, technical system and management. The psychic and social constraints involved are stressed The nature of human error is also treated by means of a classification and the relation between work load and perceived stress is discussed On the basis of these classifications, ergonometric methods and concepts for human factor engineering are derived and proposed for further investigations are formulated. Author (ESA)

N82-13814# Army Materiel Systems Analysis Activity, Aberdeen Proving Ground, Md.
CONFIDENCE INTERVALS FOR THE RELIABILITY OF A FUTURE SYSTEM CONFIGURATION
G. W. MILLER Sep 1981 15 p refs
(AD-A105031; AMSAA-TR-343) Avail: NTIS HC A02/MF A01
CSCL 12A

An inferential procedure is presented which provides confidence intervals for a future reliability parameter when reliability growth testing is only partially completed. Hypothesis tests based on this method are uniformly most powerful unbiased. These results are applicable if (1) the system failure rate can be modeled as the intensity function of a Weibull process; and (2) efforts to improve reliability are assumed to continue at a steady rate throughout the intervening period of testing. The usefulness of this methodology is illustrated by evaluating the risk of not reaching some future reliability milestone. If such risk is unacceptably high, program management may have time to identify problem areas and take corrective action before testing has ended. As a consequence, a more reliable system may be developed without incurring overruns in the scheduling or cost of the development program Author (GRA)

N82-14526# Centre National d'Etudes Spatiales, Toulouse (France). Centre Spatial.
COMPUTER PROGRAM DESIGN: METHODOLOGY, RELIABILITY, AND QUALITY CONTROL [GENIE LOGICIEL: METHODOLOGIE, ASSURANCE ET CONTROLE QUALITE]
E DORIO Jan. 1981 289 p In FRENCH, ENGLISH summary
(CNES-NT-98) Avail: NTIS HC A13/MF A01

Software methodologies are considered, including definition of program requirements, program design, coding, tests and maintenance. Project management on the levels of computer program production, verification, and certification is discussed. The need for discipline in software engineering practices in order to find realistic solutions to programming problems is emphasized. A program quality control method is presented as an example. Inspection techniques, operations organization, objectives and expected results are specified Author (ESA)

N82-15009# Societe Nationale Industrielle Aerospatiale, Suresnes (France) Direction de la Qualite.
THE AIRBUS PROGRAM: QUALITY POLICY [LE PROGRAMME AIRBUS: STRATEGIE DE LA QUALITE]
G. SERTOUR 1981 17 p In FRENCH Presented at Congr EOQC, Jun 1981
(SNIAS-812-551-101) Avail: NTIS HC A02/MF A01

The organization of a management system for quality which is based on key points, compromise quality/cost, optimization and intention to satisfy certification authorities and customers alike is described. The commercial success of Airbus is reviewed. Marketing and the manufacturing consortium are discussed. The principal phases of product construction and life are treated, (design, procurement, fabrication, inspection, and utilization). Particularities of the management system for quality are revealed at each stage. Author (ESA)

N82-15115*#, National Aeronautics and Space Administration. John F. Kennedy Space Center, Cocoa Beach, Fla.
SPACE TRANSPORTATION SYSTEM CARGO PROJECTS: INERTIAL STAGE/SPACECRAFT INTEGRATION PLAN. VOLUME 1: MANAGEMENT PLAN
15 Dec 1981 76 p
(NASA-CR-165068; KSC-K-DPM-09.1-VOL-1) Avail. NTIS HC A05/MF A01 CSCL 22A

The Kennedy Space Center (KSC) Management System for the Inertial Upper Stage (IUS) - spacecraft processing from KSC arrival through launch is described. The roles and responsibilities of the agencies and test team organizations involved in IUS-S/C processing at KSC for non-Department of Defense missions are described Working relationships are defined with respect to documentation preparation, coordination and aproval, schedule development and maintenance, test conduct and control, configuration management, quality control and safety. The policy regarding the use of spacecraft contractor test procedures, IUS contractor detailed operating procedures and KSC operations and maintenance instructions is defined. Review and approval requirements for each documentation system are described.
R.J.F

N82-15130# Engins Matra, Velizy (France).
QUALITY CONTROL OF COMPOSITES: ACTIVITIES AND INSTITUTED MEANS [QUALITE CONTROLE DES COMPOSITES: ACTIONS ET MOYENS MISES EN OEUVRES]
A. PAYS and P DERIGNE *In* COMELIN Groupe Matra Composites Conf. 19 p 1981 In FRENCH
(N-25.855/R.E.Q C.) Avail. NTIS HC A06/MF A01

Quality control of raw materials, of the fabrication process, and of the finished composite part is described The organization of a quality control methodology is considered. Raw material quality characteristics are defined. Parameterization of composite materials fabrication is explained. The testing of finished materials is discussed. Three methods are presented: thermal analysis, scanning electron microscopy; and nondestructive examination by ultrasonics. Author (ESA)

N82-15640# Delamer, Inc., Cupertino, Calif.
RESEARCH OUTLOOK, 1981 Annual Report
E. FELDMAN, ed. Dec 1980 195 p
(Contract EPA-68-02-3644)
(PB81-243495; EPA-600/9-80-061) Avail: NTIS HC A09/MF A01 CSCL 13B

Research Outlook 1981 is the sixth in a series of EPA annual reports mandated by Congress. It describes the research currently performed and the program that is expected to be implemented over the next five years. Topics include environmental research and planning, air pollution, nonionizing radiation, pesticides, water quality and waste water. The structure of the EPA Office of Research and Development is described The priorities for research center around finding cost effective ways of controlling and monitoring toxic hazards are included. GRA

N82-15789# National Inst. for Occupational Safety and Health, Cincinnati, Ohio. Div of Physical Sciences and Engineering.
AN EVALUATION OF ENGINEERING CONTROL TECHNOLOGY FOR SPRAY PAINTING
D. M. OBRIEN and D. E. HURLEY Jun 1981 185 p refs
(PB81-243123, DHHS/PUB/NIOSH-81-121) Avail: NTIS MF A01; HC SOD CSCL 06J

Field surveys of 11 finishing operations provided information for an evaluation of control technology for spray painting and coating processes Studies were conducted in the automobile refinishing, wood and metal furniture, transportation equipment (nonautomotive), heavy machinery, and appliance finishing industries Processes selected provide representative coverage of spray finishing operations relative to the number of exposed workers, different control techniques, physical size of the workpiece, and the coating systems that are typically used. Control of selected health hazards is discussed; available control options evaluated. Case study summaries include analysis of. hazards, engineering controls and work practices, ventilation measurements, air sampling data and personal protective equipment. Results should be usable as a reference source. GRA

N82-15800# Oak Ridge Y-12 Plant, Tenn.
MINICOMPUTER AND COMPUTER NUMERICAL CONTROL MAINTENANCE
G. R BRIGHT 1981 23 p refs Presented at 1981 Joint Elec. Engr Seminar Div. of Union Carbide, Nashville, 17-18 Sep. 1981
(Contract W-7405-ENG-26)
(DE81-030645; Y/IA-152; CONF-810952-1) Avail: NTIS HC A02/MF A01

Difficult requirements placed upon the electrical and electronics maintenance department by the acquisition of large numbers of computers and precision computer numerical controlled machines, combined with a rapidly changing technology are discussed. The equipment to be maintained, the personnel who perform the maintenance activities, the techniques utilized, the support requirements, and future trends in equipment and maintenance techniques are discussed. Cost reductions and the reduction of downtime are emphasized DOE

N82-16128*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
OPTIMUM EQUIPMENT MAINTENANCE/REPLACEMENT POLICY. PART 1: DYNAMIC PROGRAMMING APPROACH
T. CHARNG *In its* The Telecommun. and Data Acquisition Rept. p 236-245 15 Dec. 1981 refs
Avail: NTIS HC A16/MF A01 CSCL 05A

The optimization of equipment maintenance and/or replacement policy is considered. Over a given life-span of equipment, optimum policy is determined based on present costs, inflation rates, operating characteristics, future equipment developments, and other factors. A computer program utilizing the dynamic programming technique together with a numerical example is included. J.D.H.

N82-16142*# National Aeronautics and Space Administration, Washington, D. C.
REPORT BY THE AEROSPACE SAFETY ADVISORY PANEL Annual Report, 1981
1981 37 p refs
(NASA-TM-84094) Avail: NTIS HC A03/MF A01 CSCL 22A

The process of preparation for the first two shuttle flights was observed and information from both flights was gathered in order to confirm the concept and performance of the major elements of the space transportation system. To achieve truly operational operating safety, regularity, and minimum practical cost, the organization of efforts between the R&D community and any transportation service organization should be clearly separated with the latter organization assuming responsibilities for marketing its services, planning and acquiring prime hardware and spares, maintainance; certification of procedures, training, and creation of requirements for future development. A technical audit of the application of redundancy concepts to shuttle systems is suggested. The state of the art of space transportation hardware suggests that a number of concept changes may improve reliability, costs, and operational safety. For the remaining R&D flights, it is suggested that a redline audit be made of limits that should not be exceeded for ready to launch. A.R.H.

N82-17356# KLM Royal Dutch Airlines, Amsterdam (Netherlands).
DESIGN AND MAINTENANCE AGAINST CORROSION OF AIRCRAFT STRUCTURES
H. J. VERSTEEGEN and M J M. VERSTEEG *In* AGARD Aircraft Corrosion 7 p Aug. 1981
Avail: NTIS HC A09/MF A01

The publication 'Guidance Material on Design and Maintenance against Corrosion of Aircraft Structures' is reviewed. A greater understanding among manufacturers and airline managements of the magnitude of the corrosion problems and the need for measures to be taken at the design stage is considered. The best available anti-corrosion design knowledge in critical areas as a basic standard is addressed The guidelines cover basic requirements, including material choice, design principles and manufacturing procedures Furthermore, they cover the critical areas including origin of problems, design objectives and protective requirements. They are supplemented by an appendix giving a detailed acceptable means of compliance. N.W.

N82-18621# *Messerschmitt-Boelkow-Blohm* G.m.b.H., Ottobrunn (West Germany). Betriebsbereich.
WHAT ENGINEERS SHOULD DO TO ASSURE THE RELIABILITY OF TECHNICAL SYSTEMS [WAS SOLLTE DER INGENIEUR FUER DIE SICHERHEIT TECHNISCHER SYSTEME TUN]
W. D. PILZ 11 May 1981 25 p refs In GERMAN
(MBB-UR-478-81-O) Avail: NTIS HC A02/MF A01

Industrial safety in technical facilities and their implementation are examined. The following topics are discussed: safety aspects of facility policies; present situation of technical safety in operation methods; proposal for a procedural safety method; evaluation of safety conditions; introduction of a general users model, basic considerations; criteria for safety methods in production establishments; logistic of users schedule. Transl. by E.A.K.

N82-19105# Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany). Betriebsbereich.
RELIABILITY METHODOLOGY IN TASK IDENTIFICATION FOR THE DEVELOPMENT OF NEW TRANSPORTATION SYSTEMS [SICHERHEITSMETHODISCNE ARBEITSWEISEN BEI DER ENTWICKLUNG NEUARTIGER VERKEHRSSYSTEME]
W. D. PILZ 15 May 1981 26 p refs In GERMAN Presented at 2nd Tech. Zuverlaessigkeit Session, Nuernberg, 13-15 May, 1981
(MBB-UR-473-81-O) Avail: NTIS HC A03/MF A01

The development of new technologies, especially in new tranportation systems, is discussed. Safety engineering and reliability in labor methods are emphasized. The following topics are discussed. the present situation in operation methods, a proposal for a safety methods in labor operations; systematic evaluation of structural conditions; deriving a general action scheme; fundamental considerations; critical safety methods in production engineering; logics of action schemes.
Transl. by E.A.K.

N82-19242# Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany). Product Assurance Dept. RQ11.
REPORT ON A STUDY OF THE MAINTENANCE IN READINESS OF ON-GROUND SPACECRAFT SYSTEMS FOR OPERATIONAL APPLICATION PROGRAMS
W. G. CUSSEN Paris ESA 24 Jun. 1981 46 p refs
(Contract ESA-4468/80/NL-AB)
(MBB-80-162/150, ESA-CR(P)-1513) Avail: NTIS HC A03/MF A01

Practical aspects of storage and maintenance of typical spacecraft equipment and program aspects relating to a decision to store such equipment were studied Literature and experienced personnel were consulted. The long-term storage of operational equipment is expensive and should only be imposed on a project where there is a positively identified need. Where there is such a need it should be subject to a planned and coordinated approach recognized and directed at project management level from very early in the program. Onboard storage should be used as much as possible. Author (ESA)

N82-19551# Mitre Corp., Bedford, Mass.
RIW WORKSHOP REPORT
W. P. CROSSLEY and S. A. GREENBERG Hanscom AFB, Mass. Electronic Systems Div. Nov. 1981 56 p
(Contract F19628-82-C-0001; AF PROJ. 5170)
(AD-A108798; MTR-8255; ESD-TR-81-257) Avail: NTIS HC A04/MF A01 CSCL 14D

A reliability improvement warranty (RIW) workshop was convened on 9 to 10 December 1980 at the MITRE Corporation, Bedford, Mass., to explore the feasibility of RIW for current and future production JTIDS (Joint Tactical Information Distribution System) contracts. In particular, RIW suitability for the Class 1 JTIDS production buy was discussed The concensus of the group was that RIW is not appropriate for the Class 1 production buy, but that it can be useful on other programs including Class 2 JTIDS if certain conditions are met and the RIW contract is tailored to the program. Author (GRA)

N82-21597# Rolls-Royce Ltd., Derby (England). Aero Dept.
PRODUCT ASSURANCE IN THE 1980'S
A. G. BOWLING 1980 7 p Presented at 6th John Loxham Lecture, England Submitted for publication
(PNR-90037) Avail: NTIS HC A02/MF A01

The importance of product assurance in disciplines outside manufacturing is discussed, particular emphasis being given to engineering and product support. The professional in the prime functions must realize that he is in charge of the problem and that it is his duty to minimize resource losses. An ethical approach including pride in one's job, training audits, and the importance of listening to the people doing the work is required. The rate at which technology is used in everyday situations is challenged. Objectives are suggested to help people to understand their problems, but not do their jobs for them. Managing directors, chief engineers, operators, plant managers and draftsmen are the most important numbers of the product assurance profession.
Author (ESA)

N82-22228*# Boeing Aerospace Co., Houston, Tex.
A SYSTEM SAFETY MODEL FOR DEVELOPMENTAL AIRCRAFT PROGRAMS
E. J. AMBERBOY and R. L. STOKELD Washington NASA Apr. 1982 84 p refs
(Contract NAS2-10361)
(NASA-CR-3534; NAS 1.26:3534) Avail: NTIS HC A05/MF A01 CSCL 01C

Basic tenets of safety as applied to developmental aircraft programs are presented. The integration of safety into the project management aspects of planning, organizing, directing and controlling is illustrated by examples. The basis for project management use of safety and the relationship of these management functions to 'real-world' situations is presented. The rationale which led to the safety-related project decision and the lessons learned as they may apply to future projects are presented N W.

N82-22275# Rolls-Royce Ltd., Derby (England).
RELIABLE POWER
J. M. S. KEEN Feb 1981 21 p Presented at Intern. Aircraft Maintenance Eng. Exhibition and Conf., Zurich, Feb. 1981
(PNR-90078) Avail: NTIS HC A02/MF A01

The Rolls Royce RB211 engine design is reviewed The three shaft concept increases engine thrust and cuts fuel consumption. The highest thrust version of the RB211 cuts fuel consumption of Boeing 747's by 17%. The 535E4 blends turbine and bypass flows in a buried nozzle within a longer cowl. The resultant gases are exhausted through a single final nozzle. This device provides an automatic rematching of the engine cycle at climb ratings, thereby saving fuel and reducing turbine entry temperature. Reverse thrust is increased by up to 38% relative to an unmixed engine. The on-condition maintenance policy reduces costs without reducing safety. The reliability management program ensures the most cost effective maintainance schedule. Author (ESA)

N82-22510# Engins Matra, Velizy (France). Div. Assurance Produit.
QUALITY CONTROL OF LSI AND VLSI INTEGRATED CIRCUITS: VLSI ASSEMBLY AND NEW TRENDS [L'ASSURANCE QUALITE DANS LES CIRCUITS INTEGRE LSI ET VLSI: ASSEMBLAGE DES VLSI ET NOUVELLES TENDANCES]
B. G. BRISABOIS and J. ROBINEAU May 1981 39 p In FRENCH Presented at ADERA Sem. Assurance Qualite
(BB-81) Avail: NTIS HC A03/MF A01

A management program that assures quality/total reliability of VLSI circuits is described. The program has a bearing on every aspect of product development and evolution. Interaction between the different stages is emphasized. The establishment of strict quality standards in the execution of the various procedures, leading up to delivery of a product are emphasized. The management program assures that these standards are met, that they are only changed to improve the product, and that effective coordination exists. Author (ESA)

N82-24237# Centre National d'Etudes Spatiales, Toulouse (France).
ELECTRONIC COMPONENTS [LES COMPOSANTS ELECTRONIQUES]
F. LINDER *In its* The Technol. of Spaceborne Sci. Expt. p 625-647 1981 refs In FRENCH
Avail: NTIS HC A99/MF A01

Characterization and test methods, applied in order to assure the quality and reliability of spaceborne electronic components, are described. Laboratory procedure is reviewed with reference to the Ariane and SPOT projects. The choice of type and manufacturer of components is explained. The setting of quality standards is dealt with and procurement policy is stated. Design application rules are summarized and fault analysis is outlined. A list of

preferred components is given. Space qualification and evaluation procedures are set forth Semiconductor technology is reviewed and performance of the different families of devices is given.
Author (ESA)

N82-24362# European Space Agency, Paris (France).
SECOND ESA PRODUCT ASSURANCE SYMPOSIUM
W R. BURKE, comp Jan. 1982 239 p refs Proc. held at Noordwijk, Netherlands, 10-12 Nov. 1981
(ESA-SP-163, ISSN-0379-6566) Avail: NTIS HC A11/MF A01; ESA, Paris FF 140 Member States, AU, CN and NO (+20% others)

Developments in product assurance in ESA, NASA, and the Chinese, Japanese, and Indian space programs were discussed Contractors' experience was summarized and quality control and recent technologies, including integrated optical devices, were treated. Microprocessor and software assurance techniques were reviewed. *The problems of assurance management and manned* space flight were also covered.
Author (ESA)

N82-24364# European Space Research and Technology Center, Noordwijk (Netherlands).
THE ESA PRODUCT ASSURANCE SPECIFICATION SYSTEM
A J. S. CAPELLA and M. VONHOEGEN *In* ESA 2nd ESA Prod. Assurance Symp. p 13-20 Jan 1982
Avail: NTIS HC A11/MF A01; ESA, Paris FF 120 Member States, AU, CN and NO (+20% others)

The ESA PSS-01 documentation series is introduced. Specifications are rewritten or reidentified to fit a three-level structure which provides for the separation of basic requirements and their expansion into groups of specifications, covering a major technology or discipline. Specifications of lower level importance can be added to each group and groups can be created for new technologies and disciplines with only minor modification to existing specifications Author (ESA)

N82-24366# Centre National d'Etudes Spatiales, Toulouse (France).
FUTURE TRENDS OF ARIANE PROJECT AND CNES QUALITY ASSURANCE
P. QUEMAREC *In* ESA 2nd Prod. Assurance Symp. p 27-30 Jan. 1982 refs
Avail: NTIS HC A11/MF A01; ESA, Paris FF 140 Member States, AU, CN and NO (+20% others)

A quality assurance approach which standardizes manufacturer and customer procedures is outlined. Terminology, methodology and formats (e.g., control documents) are harmonized. Experience with Ariane and other CNES projects (SPOT, Telecom) shows that this approach is needed to overcome difficulties which arise, e.g., when one project includes reliability in quality specifications, a second includes configurations, but not reliability, and both use the same manufacturer. Author (ESA)

N82-24367# European Space Agency, Paris (France). Contracts Dept.
PRODUCT LIABILITY: PRESENT STATUS, TRENDS AND PREVENTIVE MEASURES
W. THOMA *In its* 2nd ESA Prod. Assurance Symp. p 31-38 Jan. 1982
Avail: NTIS HC A11/MF A01; ESA, Paris FF 140 Member States, AU, CN and NO (+20% others)

Legal aspects of product failure are discussed Liability can either be contractural or tort. For tort liability, an injury caused by a defect, arising from the defendant's negligence, must be proved. The trend towards stricter consumer legislation is expected to influence contracts for space products If a communication satellite crashes onto a crowded beach there is no product liability since there is no user injury, but the broadcasting company can sue for interruption of services. Space shuttles illustrate the need for careful contract preparation, since hardware is subject to repair and maintenance, and the risk to life increases with the increasing number of people working in space, e.g., on Spacelab.
Author (ESA)

N82-24368# Indian Space Research Organization, Bangalore Satellite Centre.
PRODUCT ASSURANCE POLICY AND MANAGEMENT APPLIED TO INDIAN SPACE PROGRAMS
K. R. RAMGOPAL *In* ESA 2nd ESA Prod Assurance Symp. p 37-42 Jan 1982
Avail: NTIS HC A11/MF A01, ESA, Paris FF 140 Member States, AU, CN and NO (+20% others)

The role of the product assurance department (PAD) in Indian space programs is outlined. The PAD procures and qualifies component parts; estimates and analyzes satellite reliability; quality controls spacecraft hardware manufacture and assembly; and tests and evaluates spacecraft hardware The PAD is involved in design reviews and launch operations, advising on configuration, parts, materials and processes The Indian policy of planning, designing, and building in-house means that if they have to buy from outside, the PAD cooperates in integration programs, and programs for developing the item for future projects Author (ESA)

N82-24369# National Space Development Agency, Tokyo (Japan).
QUALITY ASSURANCE ON JAPANESE SPACE PROGRAMMES
T. MAKINO and M. SHIMODAIRA *In* ESA 2nd ESA Prod Assurance Symp. p 43-48 Jan. 1982
Avail: NTIS HC A11/MF A01; ESA, Paris FF 140 Member States, AU, CN and NO (+20% others)

Quality assurance is discussed in the application of a valid design and development plan in coordination with reliability, quality and configuration control management. Quality assurance functions include component standardization, checking imported parts, assuring the quality of domestic parts from the earliest stages, and collecting and transmitting reliability information.
Author (ESA)

N82-24370# Communications Satellite Corp., Clarksburg, Md.
PRODUCT ASSURANCE REQUIREMENTS FOR THE INTELSAT 6 SATELLITE SERIES
R. STRAUSS and I. FEIGENBAUM *In* ESA 2nd ESA Product Assurance Symp. p 49-56 Jan. 1982 refs Sponsored in part by International Telecommunications Satellite Oganization
Avail: NTIS HC A11/MF A01; ESA, Paris FF 140 Member States, AU, CN and NO (+20% others)

The use of product assurance requirements and programs in INTELSAT programs is reviewed. Both INTELSAT 1 and 2 used NASA procedures. The INTELSAT 3 program contained formalized reliability goals, quality assurance specifications, and incentive payments .The product assurance program was the basis for improved designs for later satellites The INTELSAT 4 series included a product assurance program from the precontract stage. The INTELSAT 5 plan emphasizes improved failure reporting, and reliability stress analysis. For Intelsat 6, the definition of primary and secondary responsibilities for product assurance personnel and interfacing organizations is stressed. The contract requires subcontractor assurance plans, schedules for program status reviews, and participation of contractor and INTELSAT personnel in review boards and contractor, subcontractor and vendor activities. Author (ESA)

N82-24372# Aerospace Corp., Los Angeles, Calif.
NAVSTAR/GLOBAL POSITIONING SYSTEM PRODUCT ASSURANCE PROGRAM
A. J BOARDMAN *In* ESA 2nd Prod Assurance Symp. p 63-72 Jan. 1982
Avail: NTIS HC A11/MF A01; ESA, Paris FF 140 Member States, AU, CN and NO (+20% others)

The global positioning system (GPS) is introduced and the product assurance program is reviewed. The GPS is a satellite based system for all weather, real time, three dimensional navigation and positioning at any location on or near the Earth. System accuracy is 16 m spherical error probability in positioning,

0.1 m/sec in velocity, and 35 nsec in time. The satellites are subjected to a contractor test program 90% compliant with MIL-STD-1540. For parts control, an internal specification based on Space Division standard 73-2C is applied. On an average, 16 part failures in component tests and 3 in system tests are recorded per satellite The operational control system (OCS) availability requirement of 0.98 can be met 24 hr/day for 10 yr by each OCS element. Author (ESA)

N82-24373# British Aerospace Dynamics Group, Stevenage (England)
PRIME PRODUCT ASSURANCE MANAGEMENT (FUTURE TRENDS)
S. G. WILSON *In* ESA 2nd ESA Prod. Assurance Symp. p 75-78 Jan. 1982
Avail: NTIS HC A11/MF A01; ESA, Paris FF 140 Member States, AU, CN and NO (+20% others)

Safety, reliability, and parts engineering, materials and process control, radiation protection quality assurance and management are discussed. Streamlining procedures are suggested, including the removal of radiation and safety from product assurance responsibilities, and the formation of a pool of approved companies through a control auditing agency is suggested to reduce audit and assurance plan writing. Author (ESA)

N82-24374# Selenia S.p A., Rome (Italy).
A SUBCONTRACTOR'S APPROACH TO PRODUCT ASSURANCE AND SPECIAL PROBLEMS ENCOUNTERED
A. VITACOLONNA *In* ESA 2nd ESA Prod. Assurance Symp. p 79-84 Jan. 1982
Avail: NTIS HC A11/MF A01; ESA, Paris FF 140 Member States, AU, CN and NO (+20% others)

Greater standardization by ESA in preferred component listing, the specification system, and procurement policy is urged. Centralized procurement, with policy defined at program outset, and parts issued free to users is advocated. The experience of the Selenia company in aerospace contracts illustrates the problems caused by the disjointed approach of ESA, e.g., the three different product assurance programs for Ariane, Spacelab and satellites. Author (ESA)

N82-24375# Royal Netherlands Aircraft Factories Fokker, Schiphol-Oost. Space Div.
SERVING MANY DIFFERENT CUSTOMERS IN SPACE ACTIVITIES
H. B. ROUWS *In* ESA 2nd ESA Prod Assurance Symp. p 85-93 Jan. 1982 refs
Avail. NTIS HC A11/MF A01; ESA, Paris FF 140 Members States, AU, CN and NO (+20% others)

Fokker product assurance programs for Ariane, Dutch space projects and ESA programs are discussed. For Ariane, in-house procedures were approved by the main contractors For national programs, a consortium level plan is agreed upon with other contractors. The ESA quality assurance and configuration management procedures are criticized as time wasting and costly. The use of in-house systems, open to evaluation and audit, is advocated Author (ESA)

N82-24381# Fleet Missile Systems Analysis and Evaluation Group Annex, Corona, Calif. GIDEP Operations Center.
GIDEP, A TOOL FOR PRODUCT ASSURANCE
E. T. RICHARDS *In* ESA 2nd ESA Prod. Assurance Symp p 139-143 Jan. 1982
Avail: NTIS HC A11/MF A01; ESA, Paris FF 140 Member States, AU, CN and NO (+20% others)

Techniques of data exchange through centralized technical data banks are reviewed, and program functions, e.g., the ALERT system and the urgent data request, are explained. The expansion of GIDEP into defective parts and components control and international reliability data exchange is discussed. Examples of cooperation achieved between government agencies and industry participants, and the benefits they gain through active program utilization, are described. Author (ESA)

N82-24386# TRW, Inc., Redondo Beach, Calif. Space and Technology Group.
SOFTWARE PRODUCT ASSURANCE: LEARNING LESSONS FROM HARDWARE
E. SLOANE and J. WROBLESKI *In* ESA 2nd ESA Prod. Assurance Symp. p 191-200 Jan. 1982 refs
Avail. NTIS HC A11/MF A01; ESA, Paris FF 140 Member States, AU, CN and NO (+20% others)

The application of failure mode and effects analysis (FMEA) and critical item control to software is discussed. System FMEA for a satellite computer is shown. It emphasizes software functions, e.g., attitude control, and the effects of software failure on hardware performance. Unit interface FMEA is achieved by analyzing logic flow between routines in a program or between programs. Software errors are hypothesized and failure effects followed through in order to determine effects on hardware and software Piece part FMEA is limited to elements whose failure causes immediate loss of the mission. Critical item plans can be generated for mission critical software and software deemed risky because of unusual procedures of difficulty in meeting specifications. Variables can be tested at or over limits. Critical timing threads can be stress tested to the maximum Error checking and redundant software can be used Author (ESA)

N82-24854# Comptroller General of the United States, Washington, D.C
MOST FEDERAL AGENCIES HAVE DONE LITTLE PLANNING FOR ADP DISASTERS Report to the Congress
18 Dec. 1980 28 p
(AFMD-81-16) Avail: NTIS HC A02/MF A01

Vulnerability of Federal ADP systems to disasters such as floods, fires, earthquakes, or terrorist attacks is addressed. A lack of understanding in the Federal government of the importance of ADP backup planning was found. Of 55 activities reviewed, none was considered adequate. Risk analysis and ADP backup planning are considered. Five ADP backup recommendations are included: (1) increased management involvement, (2) periodic testing of plans, (3) evaluation of plans and review of tests and test results, (4) development of standards, and (5) policy cautioning against modifying operating system software. N.W.

N82-25019# Committee on Science and Technology (U. S. House).
EMERGENCY MANAGEMENT INFORMATION AND TECHNOLOGY
Washington GPO 1981 303 p Hearings before the Subcomm. on Invest. and Oversight of the Comm. on Sci. and Technol., 97th congr., 1st Sess., No. 55, 29-30 Sep. 1981
(GPO-88-582) Avail: Subcommittee on Investigations and Oversight

Energency management is discussed. Telecommunications capabilities are assessed. The problems of information dissemination during emergencies is discussed. Data processing, decision making and security concerns are discussed. Natural disasters and war are considered. R.J.F.

N82-26698# Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Industrial Engineering and Operations Research.
MULTICHARACTERISTIC QUALITY CONTROL Final Report, 1 Sep. 1978 - 31 Aug. 1981
D. R. JENSEN, P. M. GHARE, and M. R. REYNOLDS Feb. 1982 6 p refs
(Contract DAAG29-78-G-0172)
(AD-A112123; ARO-15194.12-M) Avail: NTIS HC A02/MF A01 CSCL 13H

Results are presented for research whose purpose was to develop quality control procedures for use when several quality characteristics are observed for each item Special emphasis was to be given to developing diagnostic procedures for assigning causes when product quality is unacceptable Author (GRA)

N82-27217# Logistics Management Inst., Washington, D. C.
DEPOT SUPPORT OF GAS TURBINE ENGINES Final Report
T. J. OMALLEY and D. V GLASS Oct. 1981 39 p
(Contract MDA903-81-C-0166)
(AD-A107141; LMI-ML103) Avail: NTIS HC A03/MF A01
CSCL 15E

This report assesses the DoD's capacity and capability to support the depot maintenance requirements of gas turbine engines over the next 5-10 years. Special attention is given to newer nonaeronautical applications (tanks, marine propulsion, and cruise missile) Gas turbine engines used in fixed and rotary wing aircraft will continue to dominate the engine workload; the gas turbines used in cruise missiles, tanks, and ships will comprise less than 10 percent of the total engine workload by 1990 Additional depot maintenance capacity to support gas turbine engines is not required The depots have adequate capacity today, and since the gas turbine workload is projected to increase by only 6 percent between FY 82 and FY 87, capacity should remain adequate through the 1980s. The Military Departments have the required capabilities to support the new nonaeronautical gas turbine engines entering the DoD inventory They have repaired similar engines, both in size and technology, for several years. Author (GRA)

N82-27241# Naval Postgraduate School, Monterey, Calif. Dept. of Aeronautics.
PROPOSED RESEARCH TASKS FOR THE REDUCTION OF HUMAN ERROR IN NAVAL AVIATION MISHAPS Final Report, 1 Jul. 1980 - Sep. 1981
D. M. LAYTON Oct 1981 24 p
(AD-A112339; NPS67-81-018) Avail NTIS HC A02/MF A01
CSCL 01B

Seven possible areas of research are proposed that could lead to the reduction and/or mitigation of the human error involvement in Navy aircraft mishaps. These include tasks for the Naval Aerospace Medical Research Laboratory, other Navy and contracted activities. The following research actions have been recommended: Review of existing mishap reports; Cockpit review/analysis of existing Aircraft; Review and revision of standard anthrometrical data; Critical Incident Technique; Design/T&E cooperation procedures; Basic research into error causes; and Broad research functions. GRA

N82-27754# Office of Naval Research, London (England).
THIRD NATIONAL RELIABILITY CONFERENCE BIRMINGHAM, ENGLAND
M. B. KLINE 1 Sep 1981 11 p refs
(AD-A107449, ONRL-C-8-81) Avail. NTIS HC A02/MF A01
CSCL 14D

This conference on the subject of reliability covered a broad range of topics, from the many aspects of reliability management to considerations of hardware, software, and the human factors involved. GRA

N82-29013* National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
RECONFIGURING REDUNDANCY MANAGEMENT Patent
H. J. C. GELDERLOOS, inventor (to NASA) (Honeywell, Inc., St. Petersburg, Fla.) 27 Apr. 1982 10 p Filed 30 Jul. 1980
Supersedes N80-30050 (18 - 20, p 2758)
(NASA-CASE-MSC-18498-1; US-PATENT-4,327,437, US-PATENT-APPL-SN-173518; US-PATENT-CLASS-371-68; US-PATENT-CLASS-244-194; US-PATENT-CLASS-318-564)
Avail. US Patent and Trademark Office CSCL 09B

A redundancy management system is described wherein input signals from a sensor are provided redundantly in parallel so that a primary control signal may be selected. Median value signals for groups of three sensors are detected in median value selectors of selection filter. The detected median value signals are then also compared in a subtractor/comparator to determine whether any of them exceed the others by an amount greater than the signal level for a failed sensor. If so, the exceeding detected medium value signal is sent to a control computer as the primary control signal. If not, the lowest level detected medium value signal is sent as the primary control signal
Official Gazette of the U.S. Patent and Trademark Office

N82-29218# Meridian Corp., Falls Church, Va.
PRELIMINARY ANALYSIS OF TECHNICAL RISK AND COST UNCERTAINTY IN SELECTED DARPA PROGRAMS Final Report
6 Oct. 1981 37 p
(Contract MDA903-81-C-0375; DARPA ORDER 4287)
(AD-A107402) Avail: NTIS HC A03/MF A01 CSCL 05A

This report documents the analytical results and conclusions of a four-month investigation of cost and uncertainty in selected DARPA programs. The analysis focuses on risk and the management of risk from a technical, cost, and schedule perspective through a comparison of DARPA experience to a large experience base of other federal programs. The results indicate that DARPA experience in the management of high technology programs can be interpreted (and to some degree of accuracy, forecasted) using this experience base. In addition, this analytical and empirical approach can be used to assist DARPA in complying with recent DOD directives to recognize risk in budgeting and planning estimates Most importantly, the study effort demonstrates that it is possible to identify qualitative indicators to characterize risk and to use such descriptors as the basis for risk management. GRA

N82-30421# Oak Ridge National Lab., Tenn. Regional and Urban Studies Section.
A PROPOSED NEW HANDBOOK FOR THE FEDERAL EMERGENCY MANAGEMENT AGENCY: RADIATION SAFETY IN SHELTERS
C. M. HAALAND Sep 1981 146 p refs Prepared for Federal Emergency Management Agency, Washington, D.C
(Contract W-7405-ENG-26)
(ORNL-5766) Avail. NTIS HC A07/MF A01

A proposed replacement for the portion of the current Handbook for Radiological Monitoring that deals with protection of people in shelters from radiation from fallout resulting from nuclear war is presented. Basic information at a high school level is given on how to detect nuclear radiation, how to find and improve the safest places in a shelter, the necessity for and how to keep records on individual radiation exposures, and how to minimize exposures. Several procedures are introduced, some of which are based more on theoretical considerations than on actual experiments. These procedures include: (1) the method of time averaging radiation readings taken with one instrument in different locations of a large shelter while fallout is coming down and radiation levels ar climbing too rapidly for direct comparison of readings to determine the safest location; (2) the method of using one's own body to obtain directionality in radiation readings taken with a standard Civil Defense survey meter, (3) the method of using mutual shielding to reduce the average radiation exposure to shelter occupants; and (4) the ratio method for estimating radiation levels in hazardous areas. Author

N82-30973# Naval Postgraduate School, Monterey, Calif.
EVALUATION OF SECNAVINST 3560.1 TACTICAL DIGITAL SYSTEMS DOCUMENTATION STANDARD FOR SOFTWARE MAINTENANCE Final Report, 1 Jan. 1980 - 1 Jan. 1982
N. F. SCHNEIDEWIND 22 Feb. 1982 30 p refs
(AD-A114501; NPS54-82-003) Avail. NTIS HC A03/MF A01
CSCL 09B

Management and developers have given insufficient attention to software maintenance, the most expensive phase of the software life cycle Standards have improved the ability to develop and design software, but most standards do not deal with the maintenance phase in a substantive way. SECNAVINST 3560.1, Tactical Digital Systems Documentation Standard for Software Maintenance, was evaluated with respect to its usability for software maintenance Recommendations are made for improving the maintainability aspects of this instruction. Author (GRA)

N82-30986# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. Dept. of Computer Information Systems.
SOFTWARE QUALITY METRICS: A SOFTWARE MANAGEMENT MONITORING METHOD FOR AIR FORCE LOGISTICS COMMAND IN ITS SOFTWARE QUALITY ASSURANCE PROGRAM FOR THE QUANTITATIVE ASSESSMENT OF THE SYSTEM DEVELOPMENT LIFE CYCLE UNDER CONFIGURATION MANAGEMENT M.S. Thesis
S. J. JARZOMBEK, JR. Mar. 1982 327 p refs
(AD-A115501; AFIT/GCS/MA/82M-1) Avail: NTIS HC A15/MF A01 CSCL 09B

Software Quality Assurance (SQA) is recognized as an essential function needed to monitor the software system development life cycle (SDLC). The framework established for Software Quality Metrics (SQM) provides goal-directed system specifications and the ability to quantitatively assess the quality of the system under development. The Automated Measurement Tool (AMT), which operationalizes the application of SQM, functions as the core of a Decision Support System, providing quantitative measures and various levels of reports. A literature survey of SQA aids enabled the recommendation of a minimum set of tools and techniques to be used by the SQA program for monitoring the SDLC, which has been envisioned as an iterative process controlled by management. Recognizing the functional impact of specific information as the key to objectively monitoring and controlling the software system development, the decision-making model was conceptualized as three subsystems within each phase of the SDLC: scanning (afferent), organizing (intelligence), and decision (efferent). The use of checklists by system developers highlights a prescriptive method of goal-directed development. The thesis provides justification for using SQM by reviewing the need and demonstrating how the concepts can now be used. Author (GRA)

N82-31402# Air Force Inst. of Tech, Wright-Patterson AFB, Ohio.
ANALYSIS OF REPAIRABLE SPARE PARTS STOCKAGE POLICIES FOR THE SPACE SHUTTLE M.S. Thesis
K. M. CONLEY Jan. 1982 128 p refs
(AD-A116746, AFIT/NR-82-4T) Avail: NTIS HC A07/MF A01 CSCL 05J

In determining policies for the acquisition and management of repairable spares for the Space Shuttle, two objectives are paramount. First is the optimization of some measure of system performance such as the expected number of shuttles launched on time per year. Second, since the cost of a spares mix can run into the hundreds of millions of dollars, we would like to minimize the cost of achieving a certain performance level. Both requirements suggest a need for mathematical models of the supply system. The high cost, low demand rate items found on the shuttle are usually controlled via an (s-l,s) inventory system An (s-l,s) policy involves sending an item to a repair depot immediately upon failure. Using an assumed (s-l,s) repair policy, this thesis will examine ways of choosing a spares mix according to three different mathematical models of system performance. GRA

N82-31826# Sandia Labs, Albuquerque, N. Mex.
ASSURING ACCEPTABLE LEVELS OF PROTECTION FROM ENVIRONMENTAL SAFETY AND HEALTH HAZARDS
C. A. TRAUTH, JR. 1981 30 p refs Presented at Natl. Safety Congr., Chicago, 21 Oct. 1981
(Contract DE-AC04-76DP-00789)
(DE82-002551; SAND-81-2399C) Avail. NTIS HC A03/MF A01

A summary is presented of the results of a systems research effort to develop a management system for administering environmental, safety and health programs that provides assurance (credible evidence) that positive steps are being taken to limit risk to levels acceptable to those at risk. The management approach discussed here is adapted from proven approaches in other fields and offers, for the first time, a management system in which environmental safety and health accountability is on a par with modern fiscal accountability. DOE

N82-33005# Allied-General Nuclear Services, Barnwell, S.C.
EVALUATION OF IN-HOUSE VERSUS CONTRACT COMPUTER HARDWARE MAINTENANCE
H. P. WRIGHT Sep. 1981 23 p
(Contract DE-AC09-78ET-35900)
(DE82-003280; AGNS-35900-2.3-147) Avail: NTIS HC A02/MF A01

The issue of in-house versus contract computer hardware maintenance is discussed. The advantages and disadvantages of both approaches to computer maintenance, the costs involved, and the maintenance experience to date are addressed. DOE

N82-33276# Elliott-Automation Space and Advanced Military Systems Ltd., Frimley (England).
RELIABILITY, AVAILABILITY MAINTAINABILITY, PLANNING FOR PROJECT DEVELOPMENT
J. F. LEE 1981 12 p Presented at Marconi 81 Symp., 24 Jun. 1981
(REPT-92) Avail: NTIS HC A02/MF A01

A reliability and maintenance (RM) plan which can be adapted by customers and contractors to any project is presented. Individual/group responsabilities, procedures, and documentation are outlined. The plan includes independent maintenance support systems and operational systems. This approach allows the additional, RM requirements of the maintenance subsystem to be met, without confusing the operational system RM program. Author (ESA)

N82-33366# Flight Safety Foundation, Inc., Arlington, Va.
A SAFETY APPRAISAL OF THE AIR TRAFFIC CONTROL SYSTEM
J. H. ENDERS 29 Jan. 1982 77 p refs
(Contract DTFA01-81-C-10109)
(AD-A115743; FSF-ATC-1142-1-82U) Avail: NTIS HC A05/MF A01 CSCL 17G

In August 1981, the FAA Administrator, Lynn Helms, requested the Flight Safety Foundation to evaluate the safety of the U S. Air Traffic Control system during the period following the August 3 strike to air traffic controllers. The evaluation was to provide the Administrator with an independent and objective appraisal of the strengths and weaknesses of the existing air traffic control system during the period of approximately late-August to mid December 1981, and to inform the Administrator of the findings of this appraisal as the developed. Presented in the following pages are the results of this 120-day appraisal conducted by the Flight Safety Foundation. Factors examined pertained to safety, management, fatigue, morale, and rehiring. GRA

N82-34109# Systems Architects, Inc., Randolph, Mass.
IMPROVING SOFTWARE QUALITY ASSURANCE METHODS Final Technical Report, 21 Aug. 1980 - 21 Dec. 1981
J. J. DAVLIN and M. WEEDON Apr. 1982 133 p
(Contract F30602-80-C-0252; AF PROJ. 2531)
(AD-A116980; RADC-TR-82-106) Avail: NTIS HC A07/MF A01 CSCL 05A

This effort was coordinated among Rome Air Development Center (RADC), Defense Logistics Agency Headquarters (DLA Hq), Air Force Contracts Management Division Headquarters (AFCMD Hq), and Electronic Systems Division (ESD). System Architects, Inc. (SAI) performed this effort and has examined, analyzed, and evaluated the current software acquisition and contract administration management documents, software quality assurance tools, techniques and communication methods and has developed a series of recommendations for improved methods for assuring quality software. These improved methods encompass the entire software development life cycle which consists of five phases: (1) Requirement Analysis, (2) Design, (3) Code and Checkout, (4) Test and Integration, and (5) Operation and maintenance. SAI examined relevant documentation, conducted interviews and compiled the results from a comprehensive questionnaire as the basis for the analysis, evaluation and recommendations which can be found herein. SAI's recommendations for improved methods of assuring quality software are classified in four groups: (1) Establish

clear, unambiguous Government Software Quality Assurance Guidance Documents, (2) Includes Software Quality Assurance Functions in all phases of the Software Development Life Cycle, (3) Improve communication methods and model documents primarily by mutual agreement regarding allocation of functional responsibilities between CAO's and Program Offices, and (4) Provide up-to-date training and people skilled in software to government SQA organizations. GRA

N82-34296# General Accounting Office, Washington, D. C. Procurement Logistics and Readiness Div.
AIRCRAFT THRUST/POWER MANAGEMENT CAN SAVE DEFENSE FUEL, REDUCE ENGINE MAINTENANCE COSTS AND IMPROVE READINESS
29 Jul. 1982 52 p refs
(AD-A117935; GA/PLRD-82-74) Avail: NTIS HC A04/MF A01 CSCL 05A

The Department of Defense spends billions of dollars annually on aircraft fuel and engine maintenance Thrust/power management offers Defense the potential to save fuel and reduce engine maintenance by improving fuel efficiency and extending engine parts life. Improved fuel efficiency can increase flying hours and thus improve aircrew proficiency and readiness. Extended engine life can reduce frequency of maintenance and thereby increase aircraft availability and readiness. An effective thrust/power management program is vital to the Defense mission from a readiness, energy, and maintenance standpoint. The implications on readiness are quickly apparent when considering that flying hours were reduced in face of rapidly rising fuel costs. When considering the billions of dollars spent of aircraft fuel and maintenance, thrust/power management offers great potential for reducing these costs. GRA

07

ECONOMIC FACTORS

Includes expenditures, financial management, budgeting, life-cycle costs, design-cost, cost estimating, cost effectiveness, cost analysis, and marketing

A82-10095#
COST EFFECTIVENESS OF CAD/CAM
G. P. TOWNSEND and B E. HAMILTON (United Technologies Corp., Hamilton Standard Div., Windsor Locks, CT) In: Computers in Aerospace Conference, 3rd, San Diego, CA, October 26-28, 1981, Collection of Technical Papers. New York, American Institute of Aeronautics and Astronautics, 1981, p. 140-143.
(AIAA 81-2133)

For the purposes of the reported investigation, CAD/CAM is defined as a special form of computing in support of design and manufacturing where the description of a part of its properties are built up step-by-step in a common data base. The data is available to and contributed to by all groups in Engineering and Manufacturing who are directly concerned with the design, manufacture, and performance of the part. The data building process is continuous beginning in Design and extending through Manufacturing and Quality Control. The fundamental mode of computing is interactive. An integrated CAD/CAM system of the considered type is illustrated in a graph. The overall system contains components for which cost effectivity might vary considerably from one element to another and the cost effectivity of one element may depend on the existence of another. The saving associated with two of the CAD/CAM subsystems is discussed. G.R.

A82-14006#
ANALYSIS OF ELECTRIC UTILITY INVESTMENTS INTO WIND POWER
F. MARCH, E. H DLOTT, and R. C. MCARTHUR (Arthur D. Little, Inc., Cambridge, MA) American Institute of Aeronautics and Astronautics, Terrestrial Energy Systems Conference, 2nd, Colorado Springs, CO, Dec. 1-3, 1981, 9 p.
(AIAA PAPER 81-2537)

This paper uses a synthetic utility typical of the northeast United States, to evaluate an investment into 1000 MW of wind power, as a fuel saver, in the mid-1980s. The results of models that simulate the production cost savings, and the financial implications to the regulated utility are displayed Under current regulatory and financial market conditions, an investor owned utility has no incentive to invest in wind energy, particularly when the technology is considered risky. A series of policy changes affecting the regulatory rules under which the utility operates are explored using the financial model to measure common stock issued, bond coverage, allowance for funds during conservation as percent of earnings, earnings, and cost to consumer. These results are projected over a 15 year period, providing insight into which policies are likely to result in effective incentives for wind energy investment. (Author)

A82-14757
'SOFCOST' - GRUMMAN'S SOFTWARE COST ESTIMATING MODEL
H. F. DIRCKS (Grumman Aerospace Corp., Bethpage, NY) In: NAECON 1981; Proceedings of the National Aerospace and Electronics Conference, Dayton, OH, May 19-21, 1981. Volume 2. New York, Institute of Electrical and Electronics Engineers, Inc., 1981, p. 674-683. refs

SOFCOST is a means by which managers, analysts, and programmers can estimate the effort and elapsed time that it takes to produce computer software; it is a parametric model derived from statistical software history using functional size as its primary parameter. The design of SOFCOST has three basic objectives. (1) to construct a software work breakdown structure; (2) to determine a credible size for the functions being estimated; and (3) to estimate software cost and schedule for each functional task. The model methodology and calibration are described. B.J.

A82-14785
BALANCING READINESS AND LIFE-CYCLE COST OBJECTIVES IN AVIONICS ACQUISITION
A. B. CALVO and J. E. KRONENFELD (Analytic Sciences Corp., Reading, MA) In: NAECON 1981; Proceedings of the National Aerospace and Electronics Conference, Dayton, OH, May 19-21, 1981. Volume 2. New York, Institute of Electrical and Electronics Engineers, Inc., 1981, p. 891-897. refs

Life-cycle cost/readiness analysis methods and issues emerging in studies conducted at TASC are discussed in order to establish a balance between life-cycle cost requirements during peacetime conditions, and operational readiness needs in wartime employment. Specific areas which provide a basis for the design team are reviewed, including assessment of logistic support impacts, the identification of principle system design parameters, and exploration of tradeoffs on investment options. In addition, recommendations on incorporating the analysis efforts in the systems acquisition planning process are offered. D.L.G.

A82-14786
INSIGHTS INTO ESTIMATING AVIONICS HARDWARE COSTS USING PRICE PARAMETRIC ESTIMATING MODEL
K. F. MOLZ (RCA, New York, NY) In: NAECON 1981; Proceedings of the National Aerospace and Electronics Conference, Dayton, OH, May 19-21, 1981. Volume 2. New York, Institute of Electrical and Electronics Engineers, Inc., 1981, p. 898-902

The PRICE estimating model can be applied to a wide variety of electronic, mechanical, and structural systems, and can address tradeoff analysis, design-to-cost, and proposal evaluations. Calibration procedures are discussed, showing how the model can be programmed to the skills and capability of a particular

organization Examples from the experience of various users is used to illustrate the versatility of the model B.J.

A82-14793
THE PAYOFF FROM U.S. INVESTMENT IN AERONAUTICAL RESEARCH AND DEVELOPMENT
R. C. LENZ (Dayton, University, Dayton, OH) In: NAECON 1981; Proceedings of the National Aerospace and Electronics Conference, Dayton, OH, May 19-21, 1981. Volume 3. New York, Institute of Electrical and Electronics Engineers, Inc., 1981, p. 984-991
(Contract NSF SRS-79-10397)

This paper presents a quantitative analysis of the returns on U.S. investments in aeronautical research and development over the fifty years from 1926 to 1976. The returns on the investment are those obtained through productivity improvements in the airline industry, independently of any other returns. The net gains from the R&D expenditures are very large in comparison with standard commercial opportunities during the same period. However, neither the aircraft builders who performed most of the R&D, nor the airlines who bought and used the aircraft, received the largest part of the gain Instead, the gains were distributed primarily to the traveling public, and to a lesser extent to airline employees. A key point of the research is the construction of probable aeronautical R&D expenditures for the years before 1957, the first year for which National Science Foundation statistics are available. Another feature is the use of seat-mile data as the appropriate measure for airline output in the productivity calculations. An innovative concept, the use of hypothetical 'phantom fleets' to determine productivity gains, is introduced. (Author)

A82-19262
OPTIMUM CAPITALIZATION FOR THIRD-LEVEL AIRLINES
J. D. GARNER (Mitre Corp., McLean, VA) In: Summer Computer Simulation Conference, Washington, DC, July 15-17, 1981, Proceedings. Arlington, VA, AFIPS Press, 1981, p. 717-720.

Projects that should prove profitable in the long-term often fail in the short-term because of a lack of adequate capitalization. A method termed 'optimum coverage analysis' is developed which uses cumulative-cashflow outputs from a risk analysis program to protect against this type of failure Optimum coverage analysis considers the project's uncertainties, the size of the investment, and the ease with which the investment may be protected. It is equally applicable in the perfect or imperfect capital market. And, it is especially valuable where multiple projects are involved, because of the uncertainties of the cashflows and timings within and between the projects Optimum coverage principles can be extended to dividend determination, once the project(s) is making a return-on-investment. The principles of optimum coverage analysis are used to analyze the start-up of a third-level (commuter) airline as an example. (Author)

A82-22885
AN INTRODUCTION TO AIRLINE ECONOMICS /2ND EDITION/
W. E OCONNOR New York, Praeger, 1982 298 p. refs
$18.95

This book is an introduction to the economics of the airline services of the United States, both domestic and international, for the reader whose need is for a relatively simple, yet college-level, text. An overall look at the structure of air transportation is provided, taking into account a definition of economic regulation, regulatory reform, the Federal Aviation Act of 1958, special economic characteristics, characteristics of international service, and the structure of the U.S airline industry. U.S. public interest objectives are considered along with objectives of international airline service, airline entry and exit policies, and bilateral agreements regarding international entry. Attention is given to the costs of airline service, the demand for airline service, airline rates, air cargo, and current problem areas. G.R.

A82-27146
A CAD APPROACH TO COST ESTIMATING COMPOSITE AIRCRAFT
R A. CAMIN (General Dynamics Corp., Fort Worth, TX) In: Fibrous composites in structural design. New York, Plenum Press, 1980, p. 381-398 refs

The current state-of-the-art in aircraft cost estimating centers around vast collections of historical cost data. Probably the greatest deficiency of the current procedure is related to the absence of historical data for new technologies. An American aerospace company has developed a new approach with regard to cost estimation in the case of composite structures. The approach makes extensive use of a data base management system tailored to aircraft design and manufacturing, and interactive graphics techniques. Best described as a deterministic computer-aided design tool, STEP (Structural Technology Evaluation Program) is designed to capitalize on currently available data. Yet it remains sufficiently flexible to accept new data as it becomes available A detailed description is presented of the methodology STEP uses during each phase of its operation. G R

A82-27913
DESIGN TACTICS FOR OPTIMAL MODULARITY
G. A. WALZ (Grumman Aerospace Corp., Bethpage, NY) In. AUTOTESTCON '80; International Automatic Testing Conference, Washington, DC, November 2-5, 1980, Proceedings. New York, Institute of Electrical and Electronics Engineers, Inc., 1980, p 281-284.

Today's designers of Automatic Test Equipment (ATE) are talking about a significant increase in standardization of ATE elements for use in multiple applications. Several categories of recurring and nonrecurring costs have been cited as having the potential for cost reduction by means of modularity. These are related to engineering, production labor, material, parts, spares, and maintenance labor costs. It is suggested that the potential savings actually result from four fundamental cost reduction mechanisms, and that the ATE designer can use these fundamentals to accurately include the effects of modularity in his design tradeoffs. The cost reduction mechanisms are related to the 'learning curve' effect, parts and material 'price breaks', the avoidance of redundant development effort, and the failure density function. G.R

A82-36857
THE AIRPORT OPERATORS' VIEW
C. J BOWERS (Manchester International Airport, Wythenshawe, Ches., England) Aeronautical Journal, vol. 86, May 1982, p. 165-168.

An analysis is conducted of the way in which the airports play their part in the Industry, taking into account the extent to which they understand the airlines' financial problems It is pointed out that while most airports in the United Kingdom are operated by public or local authorities, they are nevertheless commercial undertakings, and are called upon by their owners to provide a return upon their investment. However, returns to airports have, in fact, been minimal and in many cases nonexistent, since the War. Airports are trying to provide particular assistance to new scheduled services and shorthaul or multiterminal domestic services. Attention is given to questions regarding the feasibility of more help provided by the airport, a closer cooperation between airports and airlines, the reasonableness of ICAO recommendations with respect to airport charges, the extent to which airports comply with the ICAO recommendations, and the main causes of increases in airport charges. G.R

A82-36858
THE CREDIT STATUS OF AIRLINES
P. OSULLIVAN (Bank of America, London, England) Aeronautical Journal, vol. 86, May 1982, p. 168-171.

Aspects of financing an airline and the credit treatment to be given to the airline industry by the banks are investigated. It is found that with respect to a number of characteristics the airline industry is not really different from shipping companies or North

Sea oilfields. There are, however, certain factors which are unique to the airline industry. This situation leads to special problems in connection with the assessment of airline credit risks by banks. Before providing funds, the banks will have to ask the airlines to prove that they can remain viable over a ten year period. G.R.

A82-39498
THE EFFECT OF SCALE ON SATELLITE COSTING
J. A. VANDENKERCKKOVE (ESA, Paris, France) Advances in Earth Oriented Applications of Space Technology, vol. 1, no. 4, 1982, p. 251-260. refs

This paper propses a simplified model whereby the total costs of a project can be calculated as a function of its size or scale Spacecraft procurement costs, test and check-out costs, operations and launch costs are accounted for, as well as the internal costs of the sponsoring agency (ESA, NASA, etc.), differentiating between recurrent and non-recurrent costs. Examples are given of two typical satellite families varying in scale. geostationary telecommunications satellites and earth observation satellites in sun-synchronous orbit Finally, the results for the telecommunications spacecraft are compared with cost formulae of U.S. origin. (Author)

A82-39884
MANUFACTURING COST/DESIGN TRADE-OFF METHODOLOGY
B. R. NOTON (Battelle Columbus Laboratories, Columbus, OH) In. Composite materials: Mechanics, mechanical properties and fabrication; Proceedings of the Japan-U.S. Conference, Tokyo, Japan, January 12-14, 1981. Barking, Essex, England, Applied Science Publishers, 1982, p. 383-399.

Problems of inflation and increasing systems sophistication make it increasingly difficult to satisfy designing-to-lowest cost requirements The utilization of the 'Manufacturing Cost/Design Guide' (MC/DG) is expected to alleviate substantially the arising difficulties. In connection with a utilization of the MC/DG in the design process, design teams can be motivated to adopt a design-to-lowest cost attitude. Design teams must be provided with tools which make it possible to identify and document cost-drivers and cost reduction methods. In addition, cost targets against which performance of design personnel can be measured must be provided. The MC/DG provides structural designers with simple, relative, and quantitative cost comparisons of manufacturing processes that can be rapidly applied. Attention is given to designer-oriented format design criteria, methodologies for presenting manufacturing data, and ground rules for advanced composites fabrication. G.R.

A82-40915*# Pilatus Aircraft Ltd., Stans (Switzerland).
ADVANCED TECHNOLOGIES APPLIED TO REDUCE THE OPERATING COSTS OF SMALL COMMUTER TRANSPORT AIRCRAFT
O. MASEFIELD, A. TURI, and M. REINICKE (Pilatus Aircraft, Ltd , Stans, Switzerland) In: International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 1. New York, American Institute of Aeronautics and Astronautics, 1982, p. 352-358. NASA-supported research.

The application of new aerodynamic, structural, and propulsion technologies to a specified baseline commuter aircraft is studied. The assessment models can be used on a desktop calculator and include a sizing program, operating cost program, and passenger ride qualities model. Evaluation is done with a step-by-step approach and is applied to range, number and type of engines, structure, wing selection, and configuration. A 40 percent direct operating cost saving is anticipated compared to current well established commuter aircraft. C.D

A82-41014#
OPTIMIZING AEROSPACE STRUCTURES FOR MANUFACTURING COST
B R. NOTON (Battelle Memorial Institute, Columbus, OH) In. International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 2. New York, American Institute of Aeronautics and Astronautics, 1982, p. 1368-1385.

The evolution of design/manufacturing interaction reveals the need for design methodologies to reduce aerospace systems cost Cost-driver identification related to performance, design, materials, and manufacturing emphasizes the importance of the preliminary design phase. Data are required on designer-influenced cost elements, for example, with composites these are, hybrids, ply count, curing method, and quality requirements. A 'Manufacturing Cost/Design Guide' (MC/DG) for composite and metallic airframes, and also electronics, is discussed. Using examples of components and fuselage panels, the utilization of designer-oriented formats for relative and quantitative costs of manufacturing processes in trade-studies involving structural performance is shown. The MC/DC will also indicate potential cost savings of emerging technologies which accelerate technology transfer. (Author)

A82-42208
ECONOMIC ANALYSIS FOR DATA BASE MANAGEMENT
F M. HALL (Evaluation Research Corp , Arlington, VA) In· Annual Reliability and Maintainability Symposium, Los Angeles, CA, January 26-28, 1982, Proceedings. New York, Institute of Electrical and Electronics Engineers, 1982, p. 343-352. refs

The purpose of this paper is to establish those factors which must be evaluated and properly structured to institute a cost effective field data collection system to support a system readiness improvement program. Factors outlined in this paper represent decision points to tailor a data collection system which effectively contributes to a readiness improvement program at a level which is equal to the cost of the data system. Cost-effectiveness is determined through a detailed evaluation and comparison of: (1) the cost of obtaining information; and (2) the value and benefits of information obtained In order to relate some practical experience in the use of field data for operational readiness improvement, a brief review is provided on Department of Defense experience with large-scale field data collection systems. The proposed analysis procedure does not assume that a dedicated readiness data collection system is required for any program. The functions of data collection and analysis are evaluated for return on investment in the same manner as other systems effectiveness engineering elements within a program. If a cost-benefit analysis of a proposed data collection system indicates a low rate of return, resources should be reallocated to other functions, such as reliability design analysis, parts and material control, production readiness planning, or testing (Author)

A82-44335#
THE ECONOMIC FEASIBILITY OF FLAT-PLATE SOLAR HOT WATER SYSTEMS - RETROFIT APPLICATIONS FOR VIRGINIA PUBLIC BUILDINGS
R. R. SOMERS, II, A. C. PRITCHARD, M. R. SEXTON (Virginia, University, Charlottesville, VA), M C HOFFMAN (Syska and Hennessy, Inc., Washington, DC), and L. S. FLETCHER (Texas A & M University, College Station, TX) In· Solar engineering - 1981; Proceedings of the Third Annual Conference on Systems Simulation, Economic Analysis/Solar Heating and Cooling Operational Results, Reno, NV, April 27-May 1, 1981. New York, American Society of Mechanical Engineers, 1981, p. 431-438. refs

A82-44338#
ECONOMICS OF SOLAR ENERGY - SHORT TERM COSTING
H. KLEE (Central Florida, University, Orlando, FL) In: Solar engineering - 1981; Proceedings of the Third Annual Conference on Systems Simulation, Economic Analysis/Solar Heating and Cooling Operational Results, Reno, NV, April 27-May 1, 1981. New York, American Society of Mechanical Engineers, 1981, p. 458-464. refs

A method of short-term costing analysis for solar water heating systems is presented as a basis for homeowner investment decisions. The payback period is neglected because of the possibility that the house will be sold before the period elapses, and return on investment (ROI) is employed as the critical factor. A cash flow analysis is developed for annualized ROI over a 20 yr system lifetime, taking into account items such as initial cost, first year utility saving, first year maintenance, inflation rate, and the utility escalation rate. Weight is also given to a 30% federal tax credit and to the cash flow for the purchaser of a home already equipped with a solar system. The added value to the home is modeled numerically, and the annual ROI is projected over the lifetime of the system. Scenarios are presented which cover the ranges from no additional value with the solar system installed to the solar system being worth more than the purchase price. M S.K.

A82-44339#
AN ECONOMIC COMPARISON OF ACTIVE SOLAR ENERGY AND CONVENTIONAL FUELS FOR WATER AND SPACE HEATING
J. G. SHINGLETON (Mueller Associates, Inc., Baltimore, MD) In: Solar engineering - 1981; Proceedings of the Third Annual Conference on Systems Simulation, Economic Analysis/Solar Heating and Cooling Operational Results, Reno, NV, April 27-May 1, 1981 New York, American Society of Mechanical Engineers, 1981, p. 465-474. Research supported by the U.S. Department of Energy.

This paper describes in simple terms the economic considerations involved in the decision to buy a solar energy system. In addition, a realistic evaluation is presented of the current cost-effectiveness of solar water and space heating systems in all regions of the country and under various economic conditions based on the best available information. A reference long-term economic scenario and several typical systems were used as the basis for the analyses. The sensitivity of the results to differences from the reference case is described The paper summarizes a series of reports produced for the U S Department of Energy All results are not provided for each application type against each type of conventional fuel. However, sufficient results are presented to obtain an understanding of the extent to which solar water and space heating applications compete with conventional fuels. (Author)

A82-44340#
EFFECTS OF THE PROVISIONS OF THE CORPORATE AND PERSONAL INCOME TAX CODES ON SOLAR INVESTMENT DECISIONS
M. R. SEDMAK (Booz, Allin and Hamilton, Inc., Washington, DC) In: Solar engineering - 1981; Proceedings of the Third Annual Conference on Systems Simulation, Economic Analysis/Solar Heating and Cooling Operational Results, Reno, NV, April 27-May 1, 1981. New York, American Society of Mechanical Engineers, 1981, p. 475-484.

A quantitative analysis is presented of the effects of the present corporate income tax provisions on corporation decisions to invest in solar, and attention is also given to personal tax provisions and individual decisions to invest in solar. The analysis is based on the assumption that corporations make decisions on capital improvements by relying on life-cycle cost comparisons. Attention is given to the ability of existing solar tax credit laws to distort corporate tax laws sufficiently to offset the capital intensive nature of solar equipment. It is noted that accelerated depreciation and interest on borrowed money are both legitimate corporate tax deductions, and analytical examples are provided of factors which two corporations, with strong and weak financial positions, need to consider before investing in solar. It is demonstrated that federal 25% investment tax credits contribute significantly to corporate investment decisions in solar Finally, existing personal income tax credits are shown to adequately encourage individual use of solar rather than conventionally fueled systems. M.S.K.

A82-44341#
A COMPARISON OF FUEL SAVINGS IN THE RESIDENTIAL AND COMMERCIAL SECTORS GENERATED BY THE INSTALLATION OF SOLAR HEATING AND COOLING SYSTEMS UNDER THREE TAX CREDIT SCENARIOS
R MODEN (U.S Department of Energy, Washington, DC) In. Solar engineering - 1981; Proceedings of the Third Annual Conference on Systems Simulation, Economic Analysis/Solar Heating and Cooling Operational Results, Reno, NV, April 27-May 1, 1981. New York, American Society of Mechanical Engineers, 1981, p. 485-494. refs

This paper presents an analysis of expected energy savings between 1977 and 1980, under three different solar tax credit scenarios The results were obtained through the Solar Heating and Cooling of Buildings (SHACOB) Commercialization model, originally developed in 1977 by Arthur D. Little, Inc. This simulation provides projected savings of conventional fuels through the installation of solar heating and cooling systems on buildings in the residential and commercial sectors. The three scenarios analyzed considered the tax credits contained in the Windfall Profits Tax of April 1980, The National Tax Act of November 1978, and a case where no tax credit is in effect. (Author)

A82-44345#
COST ANALYSIS OF DAWT INNOVATIVE WIND ENERGY SYSTEMS
K. M FOREMAN (Grumman Aerospace Corp., Bethpage, NY) In: Solar engineering - 1981; Proceedings of the Third Annual Conference on Systems Simulation, Economic Analysis/Solar Heating and Cooling Operational Results, Reno, NV, April 27-May 1, 1981. New York, American Society of Mechanical Engineers, 1981, p. 532-540. refs
(Contract XH-9-8073-1)

The results of studies of system engineering design alternatives and cost and energy output characteristics for diffuser augmented wind turbines (DAWT) are summarized A DAWT configuration is effected by surrounding the wind turbine with an aerodynamic diffuser which lowers the atmospheric pressure downstream of the rotors to augment the flow past the blades. Research concentrated on defining short-length diffusers which can be built at low cost and still guarantee satisfactory performance. Design alternatives were found to be constrained by the unit system size and rating, structural design criteria, material selection, operational and environmental factors, manufacturing approach, production and scale economics, and siting characteristics, which are discussed. Cost analyses on DAWTs up to 150 kW indicate technical and financial feasibility with current technology. M.S.K.

A82-44656#
ORBITAL FACILITY OPERATIONS THROUGH AN ASSURED MARKET SCENARIO
T. C. TAYLOR (Taylor and Associates, Inc., Wrightwood, CA) International Astronautical Federation, International Astronautical Congress, 33rd, Paris, France, Sept. 27-Oct. 2, 1982, 7 p.
(IAF PAPER 82-33)

A financial mechanism is suggested which could be used internationally to assist the establishment of an orbital facility. The 'Assured Market Scenario' is based on the consolidation of future orbital customers into a group of organizations willing to prepurchase specific orbital services from a cooperative orbital facility. With the assurance of a near-term market, venture capital could be attracted to supplement US and international governmental funding. It is estimated that a $400 million investment from the private sector to build and operate a $4 billion facility would be involved. Calculations seem to indicate that a modest orbital facility can produce an adequate rate of return after a 10

year assured market period. A modified and expanded version of present NASA Joint Endeavor Agreements could be employed for private and international participation. A.B.

A82-44675#
NOAA PRICES FOR LANDSAT DATA PRODUCTS AND SERVICES
R KOFFLER and D. J. COTTER (NOAA, National Earth Satellite Service, Washington, DC) International Astronautical Federation, International Astronautical Congress, 33rd, Paris, France, Sept 27-Oct. 2, 1982, 4 p.
(IAF PAPER 82-115)

NOAA will begin an operational land satellite program based on the Landsat D and D' spacecraft on January 31, 1983, which will continue through 1988 Each satellite will carry a Multispectral Scanner (MSS) and a Thematic Mapper (TM), with TM operations beginning in January 1985. The Landsat system will provide scheduled data collections, production line processing, and direct read-out for foreign ground stations. Atmospheric profiles of temperature and humidity will be provided by the MSS along with cloud observations and surface temperature measurements. In addition, customers may request special acquisitions of MSS data for an added system access fee. On October 1, 1982, new prices for Landsat products became effective, which on the average are 2.7 times greater than the previous prices For example, 10 inch black and white negative film products are now $35, up from $12. The new prices are meant to more accurately reflect the actual cost of providing these products and services A B.

A82-44694#
THE ANALYSIS OF VALUE - A USE OF COST CONTROL ADAPTED TO SPACE PRODUCTS [L'ANALYSE DE LA VALEUR - UN OUTIL DE MAITRISE DES COUTS ADAPTE AUX PRODUITS SPATIAUX]
J. CHEVALLIER (Centre National d'Etudes Spatiales, Toulouse, France) International Astronautical Federation, International Astronautical Congress, 33rd, Paris, France, Sept. 27-Oct. 2, 1982, 6 p. In French.
(IAF PAPER 82-219)

The development of a system of value analysis is presented as a means of cost control in the production of cost effective and competitive equipment for spacecraft and launch systems. It is noted that devices manufactured for use in space are constructed to answer specific commercial or scientific needs, and are constrained by factors such as availability of suitable parts and operations in a space environment. The value analysis method directs the fabrication of hardware to proceed in specific goal-oriented, design-to-cost manner, and is applied at systems, equipment and construction levels Examples of the use of the method are provided for the fabrication of a sensor, a fire-wall, and the choice of satellite components M.S.K

A82-44985#
STATUS AND ASSESSMENT OF COLLECTOR COST-REDUCTION EFFORTS
L. M. MAGID (U.S. Department of Energy, Div. of Photovoltaic Energy Systems, Washington, DC) In. Photovoltaic Specialists Conference, 15th, Kissimmee, FL, May 12-15, 1981, Conference Record New York, Institute of Electrical and Electronics Engineers, Inc., 1981, p. 353-360. refs

The current status of approaches for reducing the price of photovoltaic collectors, to $2.80/ peak watt (Wp) and then to $0.70/ Wp (FOB factory module price in 1980 dollars), is discussed. Two baseline technologies, for flat-plate and concentrating collectors, are available which should easily be able to achieve the $2.80/Wp target and which are making significant progress toward the $0.70/Wp target. Two concerns regarding flat-plate collectors are the need for accelerated testing to establish the desired 20-year system lifetime, and the need for lower cost slicing techniques for use with the Advanced Czochralski, HEM, and SEMIX ingot growing technologies The quoted costs are found to be within the grasp of the concentrating collector industry, providing an adequate sales volume exists for the 100-1000 megawatt plants that would be needed to achieve these goals. In this regard, the lack of significant commercialization of concentrator systems is a concern. A.B

A82-45038
A REALISTIC COMPARISON OF MINIMUM PHOTOVOLTAIC MODULE COST PROJECTIONS
M. G. COLEMAN and L. A. GRENON (Motorola, Inc., Semiconductor Group, Phoenix, AZ) In: Photovoltaic Specialists Conference, 15th, Kissimmee, FL, May 12-15, 1981, Conference Record. New York, Institute of Electrical and Electronics Engineers, Inc., 1981, p. 713-717. refs

Some long-term cost projections for thin film photovoltaic devices indicate a major advantage for these technologies over crystalline silicon photovoltaics, ultimately replacing silicon as the predominant material. This paper addresses the assumptions made for the thin film cost projections and compares them with the analogous assumptions for silicon. Analysis of cell manufacturing, encapsulation, and balance of systems costs are performed to show that it is unlikely that the thin film materials, even if free, will ever realize a cost advantage in photovoltaic systems over silicon. (Author)

A82-45142
UPDATE OF PHOTOVOLTAIC SYSTEM COST EXPERIENCE FOR INTERMEDIATE-SIZED APPLICATIONS
E. L. BURGESS, K. L. BIRINGER, and D. G. SCHUELER (Sandia National Laboratory, Albuquerque, NM) In: Photovoltaic Specialists Conference, 15th, Kissimmee, FL, May 12-15, 1981, Conference Record New York, Institute of Electrical and Electronics Engineers, Inc., 1981, p. 1453-1457. Research supported by the U.S. Department of Energy refs

This paper presents the costs of six photovoltaic flat plate systems broken down into eight cost account categories. A typical ground mounted system from this group is compared to the costs of three lower cost systems. (1) a system using all of the best design features from among the six systems, (2) a mid-term system, and (3) a long-range system. A logical path to lower cost economically competitive systems is described. The major features of these low cost systems are standard modular design and recently developed low-cost design features (Author)

A82-46480*# National Aeronautics and Space Administration, Washington, D. C
STS PRICING POLICY
C. M. LEE and B STONE (NASA, Washington, DC) AIAA, DGLR, AAS, and BIS, Space Systems Conference: The Space Transportation System: A Review of Its Present Capability and Probable Evolution, Washington, DC, Oct 18-20, 1982, AIAA 5 p.
(AIAA PAPER 82-1786)

In 1977 NASA published Shuttle Reimbursement Policies for Civil U.S. Government, DOD and Commercial and Foreign Users. These policies were based on the principle of total cost recovery over a period of time with a fixed flat price for initial period to time to enhance transition. This fixed period was to be followed with annual adjustments thereafter, NASA is establishing a new price for 1986 and beyond In order to recover costs, that price must be higher than the initial fixed price through FY 1985 NASA intends to remain competitive. Competitive posture includes not only price, but other factors such as assured launch, reliability, and unique services. NASA's pricing policy considers all these factors. (Author)

A82-47272
THE DEVELOPMENT OF A COMMERCIALLY VIABLE REMOTE SENSING INDUSTRY
D. C WALKLET (Terra-Mar Associates, Los Altos, CA) In: Making space work for mankind, Proceedings of the Nineteenth Space Congress, Cocoa Beach, FL, April 28-30, 1982. Cape Canaveral, FL, Canaveral Council of Technical Societies, 1982, p. 6-7 to 6-9.

The market for remote sensing technology is discussed, and its future prospects are assessed. The evaluation of a baseline or

minimum market is discussed, and methods of presenting facts, figures, and case study analysis for presentation to decision makers are summarized The suitability of present technology for full exploitation of the remote sensing market is discussed, and a hands-off attitude on the part of government toward this market is recommended. Finally, the role of the private sector is briefly examined, with the attitude of the entrepreneur being compared with that of the aerospace executive. C.D.

A82-47999
BREAKEVEN COSTS OF STORAGE IN OPTIMIZED SOLAR ENERGY SYSTEMS
R. W. LEIGH (Brookhaven National Laboratory, Upton, NY) Energy (UK), vol. 7, Aug. 1982, p. 689-703. refs
(Contract DE-AC02-76CH-00016)

This paper describes the results of an analysis of the breakeven cost, or value, of energy storage to solar energy systems. The value of storage depends strongly both on the solar fraction of the solar energy system in which the storage is employed and on the cost of the collectors used in the system. Various strategies for dealing with this ambiguity are presented. For a broad class of technically and economically practical solar energy systems, storage costs need only be low enough to make a system employing very small amounts of storage practical. Reductions in the cost of collectors will thereafter produce greater reductions in the total system costs or provide greater fuel displacement at constant total system cost than will reductions in the cost of storage, within the limits discussed in the body of the paper. The analysis makes use of a simple, accurate representation of solar energy system performance which may prove useful in other contexts. (Author)

A82-48060*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
THE RUGGEDIZED STD BUS MICROCOMPUTER - A LOW COST COMPUTER SUITABLE FOR SPACE SHUTTLE EXPERIMENTS
T. J. BUDNEY and R. W. STONE (NASA, Goddard Space Flight Center, Special Payloads Div , Greenbelt, MD) In· Sounding Rocket Conference, 6th, Orlando, FL, October 26-28, 1982, Collection of Technical Papers. New York, American Institute of Aeronautics and Astronautics, 1982, p. 248-251
(AIAA 82-1756)

Previous space flight computers have been costly in terms of both hardware and software. The Ruggedized STD Bus Microcomputer is based on the commercial Mostek/Pro-Log STD Bus. Ruggedized PC cards can be based on commercial cards from more than 60 manufacturers, reducing hardware cost and design time. Software costs are minimized by using standard 8-bit microprocessors and by debugging code using commercial versions of the ruggedized flight boards while the flight hardware is being fabricated. (Author)

N82-11980# National Science Foundation, Washington, D C. Div. of Science Resource Studies.
UNIQUE CHARACTERISTICS OF FINANCING SCIENCE IN THE USSR
E. I. VALUEV, L. S. GLYAZER, V. L. GROSHEV, V. I. KUSHLIN, M. R KOKONINA, G A. LAKHTIN, V. G. LEBEDEV, Y. K. PETROV, S. V. PIROGOV, and S. M. RYUMIN 12 Jun 1981 69 p Transl. into ENGLISH of the mono. "Osobennosti Finansirovaniya Nauki v SSSR" Moscow, 1976 p 1-107 Sponsored in part by JPRS
(PB81-212243) Avail. NTIS HC A04/MF A01 CSCL 05A

The general principles of Soviet scientific policy, the mechanism of the planning and financing of science on various levels of administration, the ways and forms of the realization of the expenditures allocated for the maintenance and development of scientific organizations are examined. GRA

N82-12652 Washington Univ., Seattle.
BENEFIT-COST ANALYSIS WITH UNCERTAIN INFORMATION: AN APPLICATION IN AIR POLLUTION CONTROL Ph.D. Thesis
M. G. RUBY 1981 196 p
Avail: Univ. Microfilms Order No. 8121241

A form of the net present value decision rule for evaluating the economic advisability of policies and projects was developed and demonstrated. It discounts future benefits and costs at the social rate of time preference but accounts for the lost opportunity costs of the higher returns available to private investments. The uncertainties in the resulting calculations, due to inadequate data, for an air pollution control project at a model stationary source of sulfur dioxide air emissions were examined Each of the variables in the rule for both a meso-scale and a long-range transport case at three levels of background pollutant concentrations were examined. Estimates are given for both the dominance of the variables at specific nominal values and the uncertainty in the individual terms. Dissert. Abstr

N82-12986# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Systems and Logistics.
AN EXPLORATORY STUDY OF COSTS TO OPERATE GOVERNMENT-OWNED, CONTRACTOR-OPERATED (GOCO) FACILITIES M.S. Thesis
W. O. BENNETT and M L. HODGES, JR. Jun 1981 124 p refs
(AD-A104854, AFIT-LSSR-43-81) Avail: NTIS HC A06/MF A01 CSCL 05A

During World War II, the U.S Government recognized a need to expand the nation's industrial base. The government decision was to build production facilities and contract with private firms to operate them In 1970 the Secretary of Defense issued a directive to sell many government facilities. As of 1980, 147 remained in government possession, being managed differently by each DOD component. The researchers sought to determine if management structure impacted upon operational costs of GOCOs. The researchers discovered that operational cost data were not readily available DOD-wide. A study of Army ammunition GOCOs was conducted to determine if sufficient correlation between costs of operating GOCOs could be found to justify the expense of data collection for hypothesis testing. The results of the study showed positive correlation between operation and maintenance costs of GOCOs and total costs of GOCOs. Production costs were not found to be significantly correlated to operation and maintenance costs. Evidence of a structural variable impacting upon production cost was found. The study recommended further study to refine the cost data, then further research into operational costs and management structure. Author (GRA)

N82-13979# RAND Corp , Santa Monica, Calif
A NEW APPROACH TO MODELING THE COST OF OWNERSHIP FOR AIRCRAFT SYSTEMS Interim Report
K. E. MARKS, H. G MASSEY, B. D BRADLEY, and J. LU Aug. 1981 151 p refs
(Contract F49620-77-C-0023)
(AD-A104434, RAND/R-2601-AF) Avail: NTIS HC A08/MF A01 CSCL 05A

Support investment costs and recurring operations and support costs are through determined using a model for estimating aircraft cost of ownership (MACO), which also provides a framework for future research. An outgrowth of an earlier evaluation of the strengths and weaknesses of the most widely used aircraft life cycle cost models, MACO combines algorithms for major, maintenance related costs with formulas drawn from existing models for other cost elements. A full set of ownership cost elements is related to component level reliability and maintainability characteristics and to aircraft design, operations, logistics, and deployment parameters. Resource quantities are computed in units that can be related directly to Air Force programming categories, including base maintenance manning (by work center), depot manning, and recoverable spares inventory levels. Output and input parameters accommodate annual changes in system parameters

and operating conditions such as component reliability and aircraft inventory size and activity rates. Author

N82-15643# Environmental Protection Agency, Seattle, Wash. Analytic Center.
QUANTIFYING ENVIRONMENTAL IMPACTS
C. A SHENK and W. RILEY May 1981 46 p refs
(PB81-244915; EPA-910/9-81-086) Avail NTIS HC A03/MF A01 CSCL 13B

The inclusion of environmental impacts in cost effectiveness determinations is examined. Methodologies and research used for quantifying those impacts were reported. A methodology to assess the cost effectiveness of proposed electric power projects was developed. Difficulties in physically measuring environmental impacts and in subsequently placing dollar values on them are discussed Impact mitigation costs and expert judgement techniques are reviewed to determine the appropriateness for this process. Property structuring of the decision making process to avoid the need for comparing completely unlike alternatives is suggested. GRA

N82-15833# California Univ, Livermore Lawrence Livermore Lab.
METHODOLOGY AND BASIC ALGORITHMS OF THE LIVERMORE ECONOMIC MODELING SYSTEMS
R. B. BELL 17 Mar 1981 43 p refs
(Contract W-7405-ENG-48)
(DE81-029430; UCRL-53131) Avail: NTIS HC A03/MF A01

The methodology and the basic pricing algorithms used in the Livermore economic modeling system (EMS) are described. Each algorithm's function is analyzed and a detailed derivation of the actual mathematical expressions used to implement the algorithm is presented DOE

N82-15984# Dayton Univ., Ohio. Research Inst.
THE INFLUENCE OF AERONAUTICAL R&D EXPENDITURES UPON THE PRODUCTIVITY OF AIR TRANSPORTATION Final Report, 1926-1976
R. C. LENZ, J A MACHNIC, and A. W ELKINS Jul 1981 248 p refs
(Contract NSF SRS-79-10397)
(PB81-247140, UDR-TR-81-72; NSF/SIU-81-1) Avail. NTIS HC A11/MF A01 CSCL 05A

The impact which aeronautical R&D expenditures have had upon productivity growth in the air transportation industry over the 50-year period from 1926 to 1976 is examined. Quantitative analyses of the returns on U.S. investments in aeronautical R&D show that the net gains from such investments are very large in comparison with standard commercial opportunities during the same period The gains were distributed primarily to the traveling public and, to a lesser extent, to the airline employees. Author

N82-16123*# Jet Propulsion Lab., California Inst of Tech., Pasadena
LIFE-CYCLE COST ANALYSIS OF PROJECTS USING A POLYNOMIAL CASH FLOW MODEL FOR NONUNIFORM MAINTENANCE AND OPERATIONS COSTS
D S. REMER and G. LORDEN (California Inst. of Technology) *In its* The Telecommun. and Data Acquisition Rept. p 191-201 15 Dec. 1981 refs
Avail NTIS HC A16/MF A01 CSCL 05C

A mathematical model is developed for calculating the life-cycle costs for a project where the maintenance and operations (M&O) costs change in a nonlinear manner with time. Closed-form solutions are presented for computing the present worth of projects with periodic cash flow profiles that can be approximated by polynomial functions The results show that the life-cycle cost for a project can be grossly underestimated (or overestimated) if the M&O costs increase or decrease nonuniformly over time rather than being constant or linear as is often assumed in project economic evaluations. The following range of variables is examined: (1) project life from 2 to 15 years, (2) interest rate from 0 to 30 percent per year, and (3) polynomials of order 0 to 5. Simplified solutions or the present worth are presented for two limiting cases: extented project lifetime and negligible interest rate. Also a simplified expression is provided for accurate present worth M&O estimates for DSN projects. In addition, a sensitivity analysis of the model based on graphical results and a numerical example plus tables and graphs are given to help the reader calculate M&O life-cycle costs over a wide range of variables. Author

N82-16130*# Jet Propulsion Lab., California Inst. of Tech., Pasadena
A COMPUTERIZED LIFE-CYCLE COST METHODOLOGY FOR ENGINEERING ANALYSIS
R. D HUGHES *In its* The Telecommun. and Data Acquisition Rept p 268-287 15 Dec 1981 refs
Avail: NTIS HC A16/MF A01 CSCL 05C

Life-Cycle Costing (LCC) is an essential selection criterion in making economical engineering decisions about alternative routes in design or investments. A discussion of LCC concepts is presented, along with a selected calculation procedure. A computer program (LCOMP) was written in FORTRAN to perform that calculation procedure. The program details are discussed, a sample calculation is presented, and a listing of the program is included Author

N82-16265# Fulton Energy Corp, Tulsa, Okla
ASSESSMENT OF THE ECONOMIC, TECHNICAL, AND ENVIRONMENTAL FEASIBILITY OF DEVELOPING, CONSTRUCTING, AND OPERATING A 25-MILLION-GALLON-PER-YEAR ON FACILITY. VOLUME 1: EXECUTIVE SUMMARY
May 1981 47 p 4 Vol
(Contract DE-FG07-80RA-50365)
(DE82-000294, DOE/RA-50365/T1-VOL-1) Avail: NTIS HC A03/MF A01

The economic, technical, and environmental feasibility of developing, constructing, and operating a 25 million gallon per year ethanol facility in northeastern Oklahoma was determined. The executive summary is presented. A site providing the necessary grain, energy, and labor resources; flexible transportation methods and alternatives for receiving and shipping; nearby markets for products and by-products; an existing environmental quality able to withstand the minor impacts of the process; and a receptive and growing business and community environment was selected. The ability to produce a high quality product at a reasonable and competitive price with or without federal assistance or state assistance in the form of tax exemptions is demonstrated. It is shown that coal burning technologies are efficient, whether conventional burning methods or innovative methods such as fluidized-bed combustion are used All resources for the process are available nearby The grains required come from carryover reserves, thus not impacting the food supply. The residual by-products are in high demand. DOE

N82-16266# Fulton Energy Corp, Tulsa, Okla.
ASSESSMENT OF THE ECONOMIC, TECHNICAL, AND ENVIRONMENTAL FEASIBILITY OF DEVELOPING, CONSTRUCTING, AND OPERATING A 25-MILLION-GALLON-PER-YEAR ON FACILITY. VOLUME 2: TECHNICAL ANALYSIS
May 1981 178 p 4 Vol
(Contract DE-FG07-80RA-50365)
(DE82-000479, DOE/RA-50365/T1-VOL-2) Avail: NTIS HC A09/MF A01

The technical analysis of a study to determine the economic technical, and environmental feasibility of developing, constructing, and operating a 25 million-gallon per year ethanol facility in northeastern Oklahoma is presented. It is shown that coal burning technologies are efficient, whether conventional burning methods or innovative methods such a fluidized-bed combustion are used. All resources for the process are available nearby The grains required come from carryover reserves, thus not impacting the food supply. The residual by-products are in high demand. DOE

07 ECONOMIC FACTORS

N82-16267# Fulton Energy Corp., Tulsa, Okla.
ASSESSMENT OF THE ECONOMIC, TECHNICAL, AND ENVIRONMENTAL FEASIBILITY OF DEVELOPING, CONSTRUCTING, AND OPERATING A 25-MILLION-GALLON-PER-YEAR ON FACILITY. VOLUME 3: PROCUREMENT ANALYSIS, MARKETING ANALYSIS, AND ENVIRONMENTAL AND REGULATORY ANALYSIS
May 1981 260 p 4 Vol
(Contract DE-FG07-80RA-50365)
(DE82-000478; DOE/RA-50365/T1-VOL-3) Avail. NTIS HC A12/MF A01

The economic, technical, and environmental feasibility of developing, constructing and operating a 25 million-gallon per year ethanol facility in northeastern Oklahoma was investigated. The resource procurement analysis, the marketing analysis, and the environmental, health, safety, and socioeconomic analyses are presented. DOE

N82-16268# Fulton Energy Corp., Tulsa, Okla.
ASSESSMENT OF THE ECONOMIC, TECHNICAL, AND ENVIRONMENTAL FEASIBILITY OF DEVELOPING, CONSTRUCTING, AND OPERATING A 25-MILLION-GALLON-PER-YEAR ON FACILITY. VOLUME 4: ECONOMIC AND FINANCIAL ANALYSIS, MANAGEMENT ANALYSIS
May 1981 286 p refs 4 Vol.
(Contract DE-FG07-80RA-50365)
(DE82-000477; DOE/RA-50365/T1-VOL-4) Avail: NTIS HC A13/MF A01

The economic, technical, and environmental feasibility of developing, constructing and operating a 25 million-gallon per year ethanol facility in northeastern Oklahoma was investigated. The economic and financial analysis portion of the investigation is presented. DOE

N82-19087# Messerschmitt-Boelkow-Blohm G.m.b.H , Ottobrunn (West Germany). Unternehmensbereich Raumfahrt.
EFFECTIVE METHODS FOR OVERALL PROJECT COST REDUCTION [EFFEKTIVE VERFAHREN ZUR GESAMT-PROJEKTKOSTEN-REDUZIERUNG]
B. J. MADAUSS 16 Oct. 1980 26 p refs Partly in GERMAN and ENGLISH Submitted for publication
(MBB-UR-456-80-O) Avail: NTIS HC A03/MF A01

Effective techniques for life cycle cost reduction are discussed. Life cycle cost, or total project cost are: development cost, production, import, operation and if necessary, termination of a system. The total cost analysis for a newly developed system, like airplanes of power plants, is introduced as early as possible to avoid errors, since not only the initial system purchase cost (development and construction), but also the later added expenses are of great importance. Effective measures for total project cost reduction are proposed. Transl. by E.A.K.

N82-19096# Mitre Corp., McLean, Va.
ARMY LIBRARY CONVERSION: COST ASSESSMENT PLAN
J. S. LOVELACE 1981 37 p refs Sponsored in part by *National Library of Medicine, National Institutes of Health, Public* Health Service and Dept. of Health and Human Services
(Contract N01-LM-8-4720)
(PB82-120353; WP-79W00237; LHNCBC-CR-81-11) Avail: NTIS HC A03/MF A01 CSCL 05B

A work plan for gathering cost data at the Army Library during conversion of its manual circulation system to the automated circulation module of the Integrated Library System (ILS) is presented. The plan describes the activities to be studied, discusses the costs involved and outlines how these will be collected and reported. GRA

N82-19248*# Stanford Univ., Calif. Dept. of Engineering-Economic Systems.
FINANCIAL ASSESSMENT OF THE SPACE OPERATIONS CENTER AS A PRIVATE BUSINESS VENTURE Final Report
M. SIMON Jan. 1982 28 p refs Presented at Am. Astronautical Soc. Ann Meeting, San Diego, Calif., 26-29 Oct. 1981 Submitted for publication
(Contract NASW-3204)
(NASA-CR-168636; REPT-39) Avail. NTIS HC A03/MF A01 CSCL 14B

The possibility of private financing and operation of the Space Operations Center (SOC) is considered as an alternative to SOC development by the government. A hypothetical revenue model for SOC services is constructed and is compared with NASA estimates of SOC development and operating costs. A present value analysis based on a 1985 to 2000 investment horizon shows a potential for substantial profit in a private SOC venture, although the possibility of large losses is not discounted. Present value estimates range from $8.6 billion down to a low minus $3.3 billion. Author

N82-19879# *Mitre Corp., Bedford, Mass.*
THE SOFTWARE ACQUISITION RESOURCE EXPENDITURE (SARE) METHODOLOGY, DATA REQUIREMENTS AND DATA UTILIZATION
W. E. BYRNE 7 Oct. 1981 20 p *Presented at the 16th Ann.* DOD Cost Anal. Symp., Arlington, Va., 4-7 Oct. 1981
(AD-A109372) Avail: NTIS HC A02/MF A01 CSCL 09B

SARE reporting is a data collection methodology used to collect software-unique financial data plus technical data that make the financial data meaningful. The data can be used to monitor the progress of software development work on the contract in which the data is collected. Also, the data is to be submitted to a multiproject Air Force Systems Command (AFSC) software data base. The data base will help formulate, calibrate, and validate software cost/schedule estimation methods. GRA

N82-20009# Carnegie-Mellon Univ., Pittsburgh, Pa. Center for Cybernetics Studies.
AN MDI MODEL AND AN ALGORITHM FOR COMPOSITE HYPOTHESES TESTING AND ESTIMATION IN MARKETING
A. CHARNES, W. W. COOPER, D. B. LEANER (Market Research Corp. of America), and F. Y. PHILLIPS (Market Research Corp. of America) Sep. 1981 33 p refs Prepared in cooperation with Carnegie-Mellon Univ.
(Contract N00014-81-C-0236; N00014-81-C-0410; NR PROJ. 047-021)
(AD-A109147; CCS-397) Avail: NTIS HC A03/MF A01 CSCL 05A

A strategy is provided for using constrained versions of the MDI (minimum discrimination information) statistic to test and estimate market relations involving composite hypotheses. An algorithm for applying the tests and effecting the estimates is also provided along with numerical illustrations. Other, more general, developments in statistics and mathematical programming (duality) theories and methods are also briefly discussed for their possible bearing on further uses in marketing research and management. Author (GRA)

N82-20014# Booz-Allen and Hamilton, Inc., New York.
COST DATA BASE DEVELOPMENT: A TWELVE-YEAR PERSPECTIVE
A. C. LEGGITT 7 Oct. 1981 14 p *Presented at the 16th Ann.* DOD Cost Anal. Symp., Arlington, Va., 4-7 Oct. 1981
(AD-A109371) Avail: NTIS HC A02/MF A01 CSCL 05B

We have a way to go in compiling the data needed to accomplish various cost estimating and analysis tasks Data currently exists to answer most questions that arise and that for the most part it is partitionable to the extent required for particular applications. The real issue is one of obtaining the data in a timely manner and of reducing the redundant data collection effort needed every time a cost effectiveness question arises in the decision making arena. GRA

N82-20027# Market Facts, Inc., Arlington, Va. Public Sector Research Group.
CONSUMER BEHAVIOR TOWARDS FUEL EFFICIENT VEHICLES. VOLUME 1: EXECUTIVE SUMMARY Final Report Oct. 1977 - Mar. 1981
J. T. HEISLER and S. GROENEMAN Mar. 1981 22 p
(Contract DOT-HS-7-01781)
(PB82-103300; DOT-HS-805936) Avail: NTIS HC A02/MF A01 CSCL 10A

Information on likely market response to various vehicle design and performance collected to minimize the possibility of market rejection is discussed. Group discussion and consumer experiments with drivers in different vehicle size classes were used. Analysis focuses on the believability of the energy crisis and concern about its effects, the acceptability of possible fuel economy options, consumer preference with respect to vehicles embodying selected design and engineering changes, and predicted purchase and usage patterns under different future scenarios GRA

N82-21108# Naval Postgraduate School, Monterey, Calif.
AN ANALYSIS OF COST GROWTH IN THE F/A-18 AIRPLANE ACQUISITION PROGRAM M.S. Thesis
J. W. DYER Dec. 1981 231 p refs
(AD-A109673) Avail: NTIS HC A11/MF A01 CSCL 15C

This research analyzes the F/A-18 airplane acquisition program with respect to cost growth. It is noted that the development estimate of total program cost addressed the acquisition of only 800 airplanes, but that a decision was made in 1978 to increase the inventory objective to 1366 airplanes. Additionally, the estimates of inflation (escalation) issued by the Office of the Secretary of Defense are observed to be lower than the inflation actually experienced by the F/A-18 contractors It is concluded that, as of December 1980, the program cost growth was only 10 percent when adjustments are made for both the quantity change and for actual inflation. It is further concluded that the program managers had little control over cost growth. Continued inflation and possible failure to realize the expected cost-quantity relationships are identified as likely areas of significant future cost growth.
Author (GRA)

N82-21428# Nuclear Assurance Corp., Atlanta, Ga.
FEASIBILITY STUDY OF THE COMMERICAL PRODUCTION OF ETHANOL FROM WOOD Final Report
Jun. 1981 87 p 2 Vol.
(Contract DE-FG07-80RA-50322)
(DE82-002412; DOE/RA-50322/T1-VOL-1) Avail: NTIS
Feasibility study of the commercial production

The technical and economic feasibility (commercial viability) of constructing and operating a 25 million gallon per year ethanol plant in Georgia which uses cull timber/waste wood as feedstock is discussed. The process is based on a unique combination of existing technologies - principally dilute acid hydrolysis for glucose production from cellulose and hydrothermal decompression (steam explosion) for delignification pretreatment of wood feedstock. The conclusions are positive. The process can be successfully scaled up and a plant can be successfully constructed and operated at an attractive return on investment. A plan for meeting that objective is given. DOE

N82-21429# Nuclear Assurance Corp., Atlanta, Ga.
FEASIBILITY STUDY OF THE COMMERCIAL PRODUCTION OF ETHANOL FROM WOOD. VOLUME 2: APPENDICES 1-6 Final Report
Jun. 1981 706 p refs 2 Vol.
(Contract DE-FG07-80RA-50322)
(DE82-002410; DOE/RA-50322/T1-VOL-2) Avail: NTIS HC A99/MF A01

The development of a 25 million gallon per year ethanol plant which uses cull timber wood as feedstock is discussed. The individual reports from each subcontractor involved in the investigation are given. Included is feasibility study for fuel grade ethanol plant and reports on wood residues, biomass, and other wood fuel data. A market analysis, hydrolysis of biomass, and an alternate site evaluation and community impact assessment are included. DOE

N82-21431# Alternate Energy Associates, Inc., Tucker, Ga.
FEASIBILITY STUDY OF A 3,000,000-GALLON-PER-YEAR ETHANOL-PRODUCTION PLANT IN NORTHEAST GEORGIA Final Report
Jan. 1981 216 p Prepared for CAFPRO, Inc., Athena, Ga.
(Contract DE-FG07-80RA-50321)
(DE82-002433; DOE/RA-50321/T1) Avail: NTIS HC A10/MF A01

The project was intended to convert purchased corn into ethanol and distillers dried grains using purchased electricity and waste wood for fuel for process energy Factors including feedstock availability, alcohol markets, by-product markets, financing costs, specific plant technologies, sources of low cost process fuel and electricity, and methods for meeting environmental requirements, were studied. Analysis procedures used centered around a computerized pro forma algorithm that computes economic performance of fuel alcohol projects under different operating conditions. Sensitivity analyses were conducted for differing feedstock costs, byproducts values, alcohol values, and interest rates. Graphs of plant economic performance are included for these various conditions. It was decided that a three million gallon per year plant size was optimum. Plant sites were considered in the general area of Athens, Georgia. Another group in the Athens area (Tallassee Power Corp.) had begun to study the feasibility of a small scale hydroelectric facility. DOE

N82-22098# National Bureau of Standards, Washington, D.C. Center for Programming Science and Technology.
COSTS AND BENEFITS OF DATABASE MANAGEMENT: FEDERAL EXPERIENCE
J. M. DRAPER Nov. 1981 110 p refs
(PB82-128869; NBS-SP-500-84; LC-81-600152) Avail: NTIS HC A06/MF A01 CSCL 05B

The Federal Government has a large investment in a wide variety of database management systems (DBMS's) and in diverse applications using those systems The amount of cost/benefit analysis an agency needs before deciding to buy a DBMS increases with the complexity of the application. The experiences of the interviewed agencies, together with a structured list of cost/benefit parameters, should help Federal managers in understanding the potential value of DBMS technology and in defining their requirements for data management. Author (GRA)

N82-22305# Engins Matra, Velizy (France).
AN INTEGRATED APPROACH TO SPACECRAFT PERFORMANCE MEASUREMENTS
J. M. FOURQUET May 1980 121 p refs
(T-NT-30000-6645-MT-ISSUE-00-E) Avail. NTIS HC A06/MF A01

An integrated analysis of spacecraft performance measurement is outlined with emphasis on cost effectiveness. Spacecraft test requirements must be considered right from the very beginning of a development program. Consequently, the overall efficiency of the test operations depends on a gradual buildup from the very early definition and development phases. With this philosophy of spacecraft testing, dissimilar tasks grouped under the general category of ground testing are surveyed. Methodology and implementation examples, requiring management decisions early in the program schedule, serve to quantify possible trade offs. This leads to a more objective assessment of required system and orbital performances, predicted with a maximum of confidence. Author (ESA)

N82-22374# Wisconsin Agri-Energy Corp., Meguon.
FEASIBILITY STUDY 20-MM GAL/YR FUEL GRADE ETHANOL FACILITY
Jun. 1981 141 p refs
(Contract DE-FG07-80RA-50392)
(DE82-002606; DOE/RA-50392/T1) Avail: NTIS HC A07/MF A01

Results of a preliminary process design and economic study of 20MM US gallons per year fuel grade anhydrous ethanol plant and an associated coal fired cogeneration facility are presented. The process was based on the use of No 2 US yellow corn as the feedstock and a Wyoming low sulfur coal as the fuel. Distillers dried grains will be recovered as a by-product of the process. It is projected that approximately 80,000 tons of distillers dried grains will be recovered per year. The cogeneration portion will use 115,000 tons of coal a year to produce 115,000 pounds per hour of process steam while at the same time generating 13,300 kilowatts of electricity. The capital cost is estimated to be $87,504,000 Assessment of the environmental, health, safety, and socioeconomic impacts show that no significant adverse impacts are anticipated in conjunction with either facility construction or operation. Two air quality considerations require further study. DOE

N82-22376# Schaffer (F. C.) and Associates, Inc., Baton Rouge, La.
TECHNICAL/ECONOMICAL FEASIBILITY STUDY FOR THE APEX OIL COMPANY ALCOHOL/GASOHOL PLANT NEAR CARVILLE, LOUISIANA
Jan. 1981 305 p refs Prepared in cooperation with URS Engineers and EMPCO, Inc.
(Contract DE-FG07-80RA-50336)
(DE82-002615; DOE/RA-50336/T1) Avail: NTIS HC A14/MF A01

The feasibility of constructing and operating a 33 million gallon-per-year ethanol plant in Carville, Louisiana was studied. Under current market the plant under consideration does not appear to be attractive at this time. Five major factors contributed to this outcome. (1) the market for ethanol/gasohol is not developed to the point where there is sufficient demand to assure full plant utilization; (2) the price required to provide a reasonable rate of return is 80 cents per barrel above the current estimated market clearing price of $1 50 per gallon; (3) the capital costs to construct a plant of this size has increased; (4) there is insufficient local feedstock production to meet the minimum import requirements; and (5) lack of participation by major oil companies in the gasohol program limits both the distribution and potential retail outlets for the product. The project was placed on hold pending satisfactory resolution of these items. DOE

N82-22377# American Farmers' Marketing Cooperative, Mayfield, Ky. Ethanol Div.
FEASIBILITY STUDY FOR ALTERNATIVE FUELS PRODUCTION BIOMASS TECHNOLOGY. VOLUME 2: ADDENDUM, ECONOMIC AND FINANCIAL ANALYSIS
8 Jan. 1981 76 p 2 Vol
(Contract DE-FG07-80RA-50333)
(DE82-000026, DOE/RA-50333/T1-VOL-2) Avail: NTIS HC A05/MF A01

The economic and technical feasibility of constructing and operating a 10,500,000 gallon per year ethanol fuel plant near Mayfield, Kentucky was investigated. The capital cost and investment budget; source and use of funds; petroleum and ethanol markets; corn market; distillers dried grains market; competition; government regulations; and risk factors are discussed. DOE

N82-23820# Abt/West, Denver, Colo.
VISIBILITY BENEFITS ASSESSMENT GUIDEBOOK Final Report
R D. ROWE and L. G. CHESTNUT Aug 1981 331 p refs
(Contract EPA-68-02-3528)
(PB82-126129; EPA-450/5-81-001) Avail: NTIS HC A15/MF A01 CSCL 13B

This guidebook presents concepts and techniques that can be used to estimate monetary benefits for changes in visibility aesthetics resulting from alternative levels of air pollution control. There are several defensible methodologies that can be used to place a monetary value on visibility aesthetics. This guidebook focuses upon this one aspect of air quality analysis, which can be combined with other aspects, such as health damages of air pollution and costs of emission controls to producers, to assist in policy decision making relating to air quality management. This guidebook introduces these benefit estimation techniques in recognition of the EPA's need to provide technical support to those who must evaluate impacts related to clean air regulations and in recognition that improved benefit measurement will lead to more accurate benefit cost analysis. GRA

N82-24131# KG Associates, Dallas, Tex
LIFE CYCLE COST WORKBOOK Final Report
J. W GRIFFITH Sep. 1981 34 p refs Sponsored in part by NBS and Dept. of Health and Human Services
(PB82-120510; NBS-GCR-79-186-1) Avail: NTIS HC A03/MF A01 CSCL 05A

A methodology to compare total or relative (Life Cycle) cost of alternative plans is presented. It is designed to be useable by any person who has access to the necessary financial data and a rudimentary understanding of normal business financing and cost. The approach used is based on the completion of simple work sheets. All of the definitions and reference tables needed to execute the work sheets are included in the workbook. By use of this approach ,the health care provider, or other person responsible for making preliminary decisions among widely varying alternatives, can extend his information base beyond the traditional approach of first cost figures to consider the actual life cycle price. GRA

N82-27181# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Systems and Logistics
AN ANALYSIS OF THE COST ESTIMATING PROCESS IN AIR FORCE RESEARCH AND DEVELOPMENT LABORATORIES M.S. Thesis
H. W. F. SCHEEL Sep. 1981 197 p refs
(AD-A110965; AFIT/LSSR-82-81) Avail: NTIS HC A09/MF A01 CSCL 15E

Within Air Force laboratories estimating costs for new projects can be a difficult task for the project manager. This is due to the uncertain nature of the exploratory development projects, which predominate in Air Force laboratories, and the lack of standardized guidelines or procedures to assist in the estimating. The objectives of this thesis were to: (1) Identify the techniques which are commonly used in estimating costs for exploratory development projects, (2) Identify factors which contribute to the variance between the project manager's cost estimate and the offeror's proposed costs; and (3) Identify weaknesses or limitations in the current cost estimating procedures and develop recommendations for improvement. The results indicate laboratory project managers rely almost exclusively on historical data from past projects or recent cost proposals and/or their own experience to estimate new project costs. Four major factors were identified as contributing to the variance between estimates: (1) Project managers underestimate manpower; (2) Project managers underestimate overhead; (3) Project managers are constrained by initial estimates or the availability of funds and; (4) potential offerors misinterpret the Statement of Work. Two of the major recommendations for improvement were: (1) to establish a computerized data base of past projects; and (2) to decrease the acquisition lead time. Author (GRA)

N82-27182# Desmatics, Inc., State College, Pa
VALIDATION OF COST ALLOCATION METHODOLOGIES
D. E. SMITH and R. L. GARDNER Feb 1982 31 p Presented at the Resources Anal. and Management Working Group of the 48th Mil. Operations Res. Symp., Monterey, Calif., 1-3 Dec. 1981
(Contract F33600-80-C-0554)
(AD-A110771, TR-115-1) Avail NTIS HC A03/MF A01 CSCL 05A

This report presents a discussion of the validation of the algorithms used to allocate operating and support (O&S) costs in a military cost reporting system. It also provides some general guidelines that may prove of value in validation studies concerned with similar systems. Author (GRA)

N82-27280*# Operations Research, Inc., Silver Spring, Md.
BENEFIT COST ANALYSIS OF THE AIRCRAFT ENERGY EFFICIENCY PROGRAM Final Report
J. BAUCHSPIES, F HOPKINS, and L. KAPLAN Nov. 1980 242 p refs Revised
(Contract NASW-2961)
(NASA-CR-169116; NAS 1 26:169116) Avail: NTIS HC A11/MF A01 CSCL 01C

Analyses were reviewed in light of rapid and dramatic changes in fuel cost and availability, as well as significant changes in the economic and political climate relating to these factors. N.W

N82-28020# Naval Postgraduate School, Monterey, Calif.
DYNAMIC PLANNING AND CONTROL OF SOFTWARE MAINTENANCE: A FISCAL APPROACH M.S. Thesis
J. F. GREEN and B. F. SHELBY Dec. 1981 129 p refs
(AD-A112801) Avail: NTIS HC A07/MF A01 CSCL 14A

Until recently, much of the budget planning for software systems has been primarily targeted at costs incurred during the development phase. However, with increasing software system life span and complexity, maintenance costs have become a more prevalent concern As a result of necessary corrections for design errors and evolutionary maintenance, post-delivery investment in software systems now requires a greater proportional share of the life-cycle costs. In this research, various methodologies and system factors relating to software cost accounting are reviewed with the intent of developing a cost control model for arriving at a well-structured view for the management of the maintenance phase of the software life-cycle. The model proposed embodies a planning concept for establishing a maintenance strategy and a control concept for analyzing manloading requirements during the maintenance phase Author (GRA)

N82-28207# Old (Bruce S.) Associates, Inc., Concord, Mass.
RETURN ON INVESTMENT IN BASIC RESEARCH. EXPLORING A METHODOLOGY Final Report, 1979 - 1982
B. S. OLD Nov. 1981 76 p refs
(Contract N00014-79-C-0192; NR PROJ 274-312)
(AD-A111283) Avail: NTIS HC A05/MF A01 CSCL 05A

Basic research funding in universities and industry, first undertaken by the U.S. Government through the Office of Naval Research beginning in 1946, is shown to have provided a very large return on investment through positive influences on knowledge developed and applied, people trained and their career contributions, new companies and industries formed, and major new contributions to national defense posture. GRA

N82-28210# Clemson Univ., S C. Dept of Mathematical Sciences.
LEARNING AND COSTS IN AIRFRAME PRODUCTION, PART 1
N. K. WOMER and T. R. GULLEDGE, JR (Louisiana State Univ.) Oct. 1981 19 p refs Presented at the ORSA-TIMS Joint Natl. Meeting, Houston, Tex., 11-14 Oct. 1981
(Contract N00014-75-C-0451; F33615-81-K5116; NR PROJ. 365-049)
(AD-A112948; N131) Avail: NTIS HC A02/MF A01 CSCL 05A

In recent years, there has been much interest in exploring the impact of learning and changes in production rate on program costs. Most researchers agree that learning is an important determinant of cost, but agreement on the cost impact of production rate changes has been less certain. Still, common sense and economic theory suggest that production rate should be an important determinant of cost This importance is also suggested by the fact that cost penalties for production rate changes now occur in some department of defense contracts. This paper does not present a theoretical justification for the integration of learning curves with traditional neoclassical economic theory. The general theoretical framework for this paper is published in previous reserach. The purpose of this paper is to extend the range of applicability of the general framework by considering a previously unexplored specification. In particular, this paper explores the joint production situation, where learning and output are simultaneously produced, and a model is presented that has potential application in the airframe industry The theoretical properties of the model are explored, and a cost minimizing solution is presented Finally, a strategy is proposed for adapting the model to a particular airframe program Author (GRA)

N82-28219# National Aerospace Lab., Amsterdam (Netherlands). Scientific Services Div
FUNCTIONAL REQUIREMENTS FOR A SOFTWARE COST DATA BASE
G. J. DEKKER, M VANDERWILT, and F. J. VANDERBOSCH 4 Feb. 1981 61 p refs
(Contract NIVR-1870)
(NLR-TR-81017-U) Avail. NTIS HC A04/MF A01

Software cost estimation techniques and available cost data bases were surveyed through the literature. Cost estimation of software development and control of cost during development are difficult due to the lack of useful cost figures from previous projects and also due to the lack of an accurate cost estimation and management method. A cost estimation method to aid cost management is proposed. To support this method, 47 cost factors are defined. It is felt that the clear definition of these cost factors is of main importance for the usefulness of the method The implementation of a cost data base which contains data about these 47 cost factors is discussed This data must be gathered from current projects. The cost data base can ultimately be used to determine the constants of the proposed cost estimation method Author (ESA)

N82-28221# Jorgenson (Dale W.) Associates, Cambridge, Mass.
ENERGY-ECONOMY ANALYSIS AND APPLICATION TO R AND D PLANNING Final Report, Oct. 1980 - Sep. 1981
E. A. HUDSON and P. A. DOROSH Oct. 1981 98 p
(Contract GRI-5080-310-0329)
(PB82-141128; GRI-81/0004) Avail: NTIS HC A05/MF A01 CSCL 05C

Projections of energy and economic conditions and analysis of energy economy interactions are based on a simulation model of the structure and growth of the U.S. economy (the Hudson-Jorgenson model). A reference projection is first constructed; this provides a reasonable estimate of future energy and economic conditions as well as providing information on economic growth, inflation and other variables required in project appraisal and R and D planning Next, detailed analyses of energy economy interactions are performed; these examine the mechanisms through which energy changes affect economic structure and growth, and also provide a basis for quantitatively estimating the economic effects of specific energy changes. GRA

N82-28290# Army Aviation Research and Development Command, St. Louis, Mo.
HISTORICAL RESEARCH AND DEVELOPMENT INFLATION INDICES FOR ARMY FIXED AND ROTOR WINGED AIRCRAFT Annual Report
C W. LINES, JR and W. J. WAYMIRE Jan. 1982 37 p refs
(AD-A114368; USAAVRADCOM-TR-82-F-3) Avail NTIS HC A03/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 FY81. These indices are appropriate for updating statistical reports that formerly utilized the OSD forecasting indices; for initial use in bringing a cost in prior years to a present-year dollar value; and for evaluating inflation actually experienced A computer program is utilized to make the necessary mathematical calculations. Data sources for 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 different materials. The computer program prints the R&D historical inflation indices and subindices by fiscal year as shown in Appendices C through G of this report. GRA

N82-29058# Los Alamos Scientific Lab., N. Mex.
BICYCLE 2: A COMPUTER CODE FOR CALCULATING LEVELIZED LIFE-CYCLE COSTS
R. W. HARDIE Nov 1981 37 p refs Supersedes LA-8493-MS
(Contract W-7405-ENG-36)
(DE82-001865; LA-8909; LA-8493-MS) Avail. NTIS HC A03/MF A01

The BICYCLE computer code is described. The code was specifically designed to calculate levelized life cycle costs for plants that produce electricity, heat, gaseous fuels, or liquid fuels. Included are: (1) derivations of the equations used by BICYCLE, (2) input instructions, (3) sample case input, and (4) sample case output DOE

N82-29232# Army Troop Support Command, St. Louis, Mo. Comptroller Cost Analysis Div.
HISTORICAL INFLATION PROGRAM. A COMPUTER PROGRAM GENERATING HISTORICAL INFLATION INDICES FOR ARMY AIRCRAFT Final Report
W. H GILLE, JR Mar. 1982 82 p refs
(AD-A114053, TSARCOM-TR-82-2) Avail: NTIS HC A05/MF A01 CSCL 05C

This report extends and revises Technical Report 81-1 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 any Fiscal Year base). This report contains updated tables of inflation factors, expressed in a FY 81 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 cost 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. GRA

N82-30688 California Univ., Livermore. Lawrence Livermore Lab.
THE ROLE OF FINANCING IN THE MARKETABILITY OF CAPITAL INTENSIVE SOLAR TECHNOLOGIES FOR INDUSTRY
W C. DICKINSON *In* ASME Solar Eng , 1981 p 679-687 1981 refs
Avail: Issuing Activity

Three methods of financing large, capital-intensive, industrial solar systems are examined: conventional end-user financing; conventional lease financing; and the solar management company/limited partnership (SMC). The primary disadvantage of the first method is the large capital investment required of the end-user The availability of investment capital is limited and other investment priorities usually are dominant. In the latter two methods the end-user is not required to provide any front-end capital. The SMC structure appears particularly attractive in that the end-user pays only for solar energy delivered to the process and is not required to operate and maintain the system. Author

N82-30972# Naval Postgraduate School, Monterey, Calif.
A MACRO APPROACH TO SOFTWARE RESOURCE ESTIMATION AND LIFE CYCLE CONTROL M.S. Thesis
B. R. VORGANG *Dec 1981 145 p refs*
(AD-A114520) Avail· NTIS HC A07/MF A01 CSCL 09B

Planning and controlling the software development process has shown, in the past, to be an extremely difficult task The estimation of resource requirements, development costs, risk profiles and project feasibility has often proven to be inaccurate, this costing the government time and dollars. However, by using obtainable management parameters, and simple engineering and operations research techniques, estimating can be done easily and accurately by taking a macro approach to the estimation problem. This study will present the background and mathematical basis for a software cost estimation model. In addition, an example of an automated application of the model will be presented and discussed. Author (GRA)

N82-31388# Centre National d'Etudes Spatiales, Paris (France).
USE OF PROGRAMMED REVIEW OF INFORMATION FOR COSTING AND EVALUATION (PRICE) MODEL AT CNES
J. B. ROUX *In* CNES The Future of Launchers in Europe p 601-612 1982 In FRENCH; ENGLISH summary
Avail: NTIS HC A99/MF A01

The bases of the PRICE model, which calculates a cost-mass relation for a given project from data of thousands of other projects are outlined, and its application to the Ariane project is outlined. Ten to 20 descriptors per project define key elements, like manufacturing processes, and regression analysis calculates their coefficients and range. The model assesses physical parameters and others such as time limits. The few differences between model forecasts and actual production costs for Ariane were due to special circumstances. Author (ESA)

N82-31948# Purdue Univ., Lafayette, Ind. School of Industrial Engineering.
LIFE-CYCLE COSTING OF LIFE SUPPORT EQUIPMENT Final Report, Apr. - Sep. 1980
C. C. PETERSEN, C. L. MOODIE, J. POSEY, G. SCHULTIES, and J. CHEN Dec. 1981 78 p
(Contract F33615-78-C-0627; AF PROJ. 7930)
(AD-A116404; SAM-TR-81-25) Avail: NTIS HC A05/MF A01 CSCL 06K

A feasibility study has been accomplished on applying life-cycle costing (LCC) to aircrew life support equipment (LSE) The AFLC Logistics Support Cost (LSC) model was examined and found to be too complex for application to life support devices (LSD). A potentially useful simplification of the LSC model was developed and applied to the CRU-68 oxygen regulator and the FR139 and FR140 anti-G valves, but available logistics data were insufficient for these devices. An alternate model (LCC-LSD) was developed and applied with some success. The simpler computer program requires data much more accessible from the DO41, DO39, and

DO62 data systems and has a plotting capability to graph LCC vs. changes in reliability or maintainability. Sensitivity analyses showed maintenance costs to be the key area where the U S Air Force could achieve significant savings (perhaps $15 million)
Author (GRA)

N82-32305# Army War Coll., Carlisle Barracks, Pa.
FOREIGN (TURBINE POWERED) HELICOPTER PRODUCTION: A THREAT TO THE UNITED STATES PRODUCTION BASE
J. E. GAUZE 28 Apr. 1982 34 p refs
(AD-A116755) Avail. NTIS HC A03/MF A01 CSCL 05C

The trends in world helicopter sales, the preceptions held by potential buyers, the market growth through the end of the 1980's, are addressed The more significant disincentives which maybe placing the U.S. industry in less than a fully competitive position are discussed. GRA

N82-33285# Florida Univ., Gainesville. Database systems Research and Development Center.
A DMS COST/BENEFIT DECISION MODEL: MATHEMATICAL MODELS FOR DATA MANAGEMENT SYSTEM EVALUATION, COMPARISON AND SELECTION (PART 1) Interim Report
J. J. DUJMOVIC and R. ELNICKI Jul 1981 168 p refs
(Contract NB80-SBCA-0449)
(PB82-170150, NBS-GCR-82-374) Avail: NTIS HC A08/MF A01 CSCL 05A

A detailed description of the LSP method is presented. The main topics include· (1) development of system requirement tree; (2) detailed classification and description of elementary criteria, (3) logic aggregation of preference; (4) the analysis of elementary and compound preference aggregation functions, (5) cost analysis models for data management systems, and (6) a detailed presentation of the cost preference analysis for system comparison and selection. GRA

N82-33885# Montana Energy and MHB Research and Development Inst., Inc., Butte. Center for Innovation.
THE MONTANA ENERGY AND MHD DEVELOPMENT INSTITUTE, INC. Final Report
Oct. 1981 124 p
(Contract EDA-05-06-01815-40)
(PB82-176926; EDA-82-0020) Avail: NTIS HC A06/MF A01 CSCL 05C

The business of commercializing a new product, service, or technique is examined. In most instances, inventors are not equipped to provide, either from their own capabilities or through paying for others, the necessities. The services of legitimate organizations, such as the Center for Innovation, are very badly needed. The center's operation deals primarily with independent inventors versus those associated with large or even small corporations. GRA

N82-34291*# Stanford Univ , Calif. Program in Information Policy.
PRIVATE FINANCING AND OPERATION OF A SPACE STATION: INVESTMENT REQUIREMENTS, RISK, GOVERNMENT SUPPORT AND OTHER PRIMARY BUSINESS MANAGEMENT CONSIDERATIONS Final Report
M. SIMON Sep. 1982 31 p refs
(Contract NASW-3204)
(NASA-CR-169357; NAS 1 26.169357; REPT-43) Avail: NTIS HC A03/MF A01 CSCL 05A

Private investment in a manned space station is considered as an alternative to complete government sponsorship of such a program. The implications of maned space operations are discussed from a business perspective. The most significant problems and risks which would be faced by a private company involved in a space station enterprise are outlined and possible government roles in helping to overcome these difficulties suggested Economic factors such as inflation and the rate of interest are of primary concern, but less obvious conditions such as antitrust and appropriate regulatory laws, government appropriations for space activities, and national security are also considered J.D.

08

MANAGEMENT POLICIES

Includes planning, theories, philosophy, tradeoffs, and management by objectives.

A82-13476#
SOFTWARE DOCUMENTATION - THE LIFELINE OF COMPUTER PROGRAMS
S H KING (General Dynamics Corp., Fort Worth, TX) and B. H. POTTS (BHP Development Co , Redwood City, CA) In. Digital Avionics Systems Conference, 4th, St. Louis, MO, November 17-19, 1981, Collection of Technical Papers. New York, American Institute of Aeronautics and Astronautics, 1981, p. 181-187.
(AIAA 81-2255)

Guidelines for determining software documentation needs and methods of implementation are presented. Topics discussed include the purposes of software documentation, documentation types and scope, the use of software documentation for management control, and a recommended documentation procedure. It is emphasized that good documentation provides the means for successful software integration in present and future aircraft. V L.

A82-13916#
THE AIR FORCE FLIGHT TEST CENTER - UTAH TEST AND TRAINING RANGE IN THE 1980'S
C. E. ADOLPH (USAF, Flight Test Center, Edwards AFB, CA) AIAA, SETP, SFTE, SAE, ITEA, and IEEE, Flight Testing Conference, 1st, Las Vegas, NV, Nov 11-13, 1981, AIAA 9 p.
(AIAA PAPER 81-2487)

The Air Force Flight Test Center (AFFTC) conducts and supports manned and unmanned aircraft flight tests, development testing of parachutes, operates the Edwards Flight Test Range, the USAF Test Pilot School and the Utah Test and Training Range. This paper summarizes the evolutionary forces in the technical and management areas which gave impetus to today's methods of operation Current capabilities and procedures are then described, followed by a discussion of improvements planned to meet the demands of the mid to late 1980's (Author)

A82-14704
A SOFTWARE MANAGEMENT DOCTRINE FOR THE 80'S
H. M ZENDLE (IBM Corp., Federal Systems Div., Bethesda, MD) In: NAECON 1981, Proceedings of the National Aerospace and Electronics Conference, Dayton, OH, May 19-21, 1981 Volume 1. New York, Institute of Electrical and Electronics Engineers, Inc., 1981, p. 197-204.

Software management techniques developed by the Federal Systems Division of the International Business Machines Corporation are examined These include: (1) a software life-cycle model; (2) a model of work breakdown structure, (3) a software development plan designed to allow management to trace progress toward and attainment of project milestones; (4) the identification of several work products as baselines in order to prevent uncontrolled changes in the evolving software system; (5) design and code reviews; (6) systematic programming and design; (7) the concept of earned value by which a certain percentage of the total software budget is associated with a separate work product; and (8) independent validity and verification. Performance results for LAMPS MK III and the Digital Bomb/Nav system on the B-52D are presented S.C S.

A82-14813
SOFTWARE MANAGEMENT STANDARDS
J. V. POST (Boeing Aerospace Co., Seattle, WA) In: NAECON 1981; Proceedings of the National Aerospace and Electronics Conference, Dayton, OH, May 19-21, 1981. Volume 3. New York, Institute of Electrical and Electronics Engineers, Inc., 1981, p. 1134-1140.

Software Management Standards define the management practices used in a standardized way to develop deliverable software. Software Management Standards may be viewed as software meta-standards which define a high-order system The system, which is enforced at the management level, references low-order standards as its elements, such as design standards, coding standards, and documentation standards. A sample Software Management Standard is described, one which is based on software management policy at Boeing Aerospace Company This Software Management Standard mandates the development and maintenance of a single high-level document, the Software Development Plan (SDP). The purpose, scope, implementation, and enforcement of a Software Development Plan is discussed. A relationship is described between formal commitment to standardized management and the development of software. (Author)

A82-26600* Jet Propulsion Lab., California Inst. of Tech., Pasadena.
DEFINING TERMS IN TECHNICAL EDITING - THE LEVELS OF EDIT AS A MODEL
M. F. BUEHLER (California Institute of Technology, Jet Propulsion Laboratory, Pasadena, CA) Technical Communication, 4th Quarter, 1981, p. 10-15. NASA-supported research. refs

A82-30088#
PROBABILISTIC STATIC FAILURE OF COMPOSITE MATERIALS
B N. CASSENTI (United Technologies Research Center, East Hartford, CT) In: Structures, Structural Dynamics and Materials Conference, 23rd, New Orleans, LA, May 10-12, 1982, Collection of Technical Papers Part 1. New York, American Institute of Aeronautics and Astronautics, 1982, p. 109-119. Research sponsored by the United Technologies Corp. refs
(AIAA 82-0658)

A theory has been developed that combines the statistics of composite material failure with the orthotropic nature of composite materials. The theory can be used to predict the probability of failure for a unidirectional composite including the effects of loading history and the probabilistic location of the failure. The theory includes the general anisotropic response in addition to differences in failure that may exist in tension or compression loading. Applications of the theory illustrate the results that can be obtained and indicate that future experimental results should include a record of the failure location. The theory correlates well with the limited experimental data available. Also, the theory in its present form could be readily added to current structural analysis programs. The implementation of this theory will allow more accurate assessments of the reliability of composite material structural components. (Author)

A82-35453#
MATERIAL AND PROCESS IMPACT ON AIRCRAFT ENGINE DESIGNS OF THE 1990'S
R. A. SPRAGUE (GE Material and Process Technology Laboratories, Cincinnati, OH) American Society of Mechanical Engineers, International Gas Turbine Conference and Exhibit, 27th, London, England, Apr. 18-22, 1982, 10 p.
(ASME PAPER 82-GT-278) MEMBERS, $2.00; NONMEMBERS, $4.00

Major material and process technology areas are discussed in terms of their impact on future engine performance. Airfoil materials development will concentrate on enhancing high temperature mechanical properties. New single-crystal or eutectic alloys, and overlay and/or thermal barrier coatings will permit increases of up to 250 F in allowable metal temperature capability. Increases in turbine inlet temperature and the desire to reduce engine weight and life cycle costs will drive disk material development toward attainment of higher tensile, creep, and fatigue strengths through development of dual-property disks, which combine new alloy compositions with novel processing techniques, and by increased application of polymeric composites. Rapid solidification plasma deposition technology promises to permit fabrication of complex, multialloy structural parts with improved mechanical properties and environmental resistance. Definition of new laboratory testing procedures and analyses will lead to better management of life cycle costs through enhanced materials utilization. C D

A82-36952
METHODS - PAST APPROACHES, CURRENT TRENDS AND FUTURE REQUIREMENTS
D. A. TOPMILLER (USAF, Aerospace Medical Research Laboratory, Wright-Patterson AFB, OH) In: Manned systems design. Methods, equipment, and applications; Proceedings of the Conference, Freiburg im Breisgau, West Germany, September 22-25, 1980. New York, Plenum Press, 1981, p. 3-31. refs

The historical development, current technologies and practices and projected future directions of the discipline of human factors engineering are reviewed. The origins of the field in the United States in response to the increasing complexity of weapon systems in World War II and its initial development using the tools of experimental psychology are outlined, and limitations to the early design handbook approach and the improvements brought by the introduction of an interdisciplinary approach with influences from computer and information science are considered Current trends in reference data source, experimental design, human-machine integration performance measurement, modelling, engineering design simulation and procedural technologies are then assessed based on responses to a questionnaire survey. Future requirements for methods, technologies and data bases for man-machine interface design and overall systems design are then discussed as derived from evaluations of human factors needs and projected shortfalls in computer technology. A.L.W.

A82-37972#
STRATEGIC MATERIALS - TECHNOLOGICAL TRENDS
A. HURLICH Mechanical Engineering, vol. 104, July 1982, p. 44-53. refs

The US is becoming increasingly dependent upon other countries for sources of strategic materials - raw materials such as cobalt, aluminum, manganese and chromium needed to supply military, industrial and civilian needs during a national emergency and found domestically in insufficient quantities. Various ways of reducing the US vulnerability in these strategic materials are reviewed, emphasizing technological methods to reduce consumption. The use of recycling, scrap recovery and conversation methods is expanding, but these efforts are insufficient. Another approach is to develop materials management programs, such as devising lists of alternative materials that may be used in case the normally used materials become unavailable, and strategic planning to limit the use of critical materials that may pose serious problems if their supply is interrupted. New materials and technologies are being developed and tested to reduce as much as possible the use of strategic materials - such as reducing the amount of chromium in certain stainless steels from 12-18% to 2-6%. The use of near net shape technology also can save large amounts of materials by eliminating trimming waste. Investigation and development of possible substitutes for strategic materials are now being conducted by government agencies and private industry. Finally, stockpiling is mentioned as a way to ensure adequate supplies when no substitutes are available. N.B.

A82-41928
CONSIDERATIONS FOR TRANSFERRING TECHNOLOGIES INTERNATIONALLY
R. W. HOUSE (Vanderbilt University, Nashville, TN) Engineering Management International, vol. 1, May 1982, p. 151-161. refs

This paper presents first a broad overview of the process of technological innovation. The process is partitioned into four phases

as follows: pre-production; production, distribution; and utilization. Within each phase, elements that are important for carrying out the phase are defined and elaborated. Following the discussion of the technological innovation process, a procedure is presented for planning and managing the transfer of technology in a variety of contexts. The procedure is presented in six steps. Each of these steps is described in some detail They are associated in a direct way to the technological innovation process described in the first part. The procedure is intended to improve the probability of the transfer being accomplished successfully. Following the discussion of the six step procedure, some methods for helping to implement the six steps are presented. These include behavioral and computational considerations. (Author)

A82-42199
A NUMERICAL SIMULATION OF THE SYSTEM EFFECTIVENESS - A RENEWAL THEORY APPROACH
F. A. TILLMAN, R. F NASSAR, C. L. HWANG (Kansas State University of Agriculture and Applied Science, Manhattan, KS), and W KUO (Bell Telephone Laboratories, Inc., North Andover, MA) In: Annual Reliability and Maintainability Symposium, Los Angeles, CA, January 26-28, 1982, Proceedings. New York, Institute of Electrical and Electronics Engineers, 1982, p. 252-261. refs
(Contract N00014-76-C-0842)

A general solution to system effectiveness (taken to be the product of availability and reliability) is derived using renewal theory. The general solution is simplified to obtain an analytical one when the system cycle time and on time are gamma distributed with positive integer shape parameters. If the assumptions of gamma distributions are removed, the analytical solution would be extremely difficult to obtain, if not impossible. Therefore, a numerical solution to the general problem of the system effectiveness is proposed The numerical approach is very general and can be applied to empirical data without assuming a distribution for the data. The approach is tested by comparing the numerical results with the analytical solution when the data are generated from a gamma distributed system cycle time and on time. The results of the two approaches are quite close. B.J.

A82-43171
AN EXPLORATORY TEST OF THE MATRIX ASSUMPTION IN A HIGHLY DIFFERENTIATED RESEARCH ORGANIZATION - STRUCTURAL DESIGN VERSUS BEHAVIORAL IMPERATIVES
G. S. EVANS (Nevada, University, Reno, NV) IEEE Transactions on Engineering Management, vol. EM-29, Aug. 1982, p. 78-81. refs

The paper describes an innovative, yet practical approach to make an initial assessment as to whether a large Federal agricultural research agency possessed the necessary structural and behavioral properties for formal implementation of the matrix organizational form. An exploratory study to test the feasibility of conversion from line-staff to matrix was designed to concentrate on two dimensions: (1) structural congruity and (2) the actual behavior of the matrixed managers. Although it was concluded that the line-staff organization could be converted to the structural requirements of the matrix form, the key matrix managers in the agency did not operate in a manner consistent with the behavioral requirements of a formal matrix organization B.J.

A82-45298
MEASUREMENT TECHNIQUES ESTABLISH SHIELDING VALUES
P. GRANT (Tecknit, Cranford, NJ) MicroWaves, vol 21, Sept. 1982, p. 97-99.

Features of tests defined by MIL-STD-285 for evaluation of gasket and shielding materials for effectiveness in EM applications are discussed, along with additional tests to assay the transfer impedance (TI). The military standard produces measurements of EM properties of shielded enclosures, with effectiveness expressed as the decibel ratio of the field intensity at fixed points on both sides of the barrier. The TI method is a measurement of voltage induced on one side of a gasket by a current injected on the other side. The military method is limited to a frequency range of 10 kHz-10 GHz, and an example is provided of a typical military test set-up. TI trials are confined to frequencies below 1 GHz in order to avoid cavity resonances caused by the gasket. Documentation of test results of a material's shielding effectiveness is outlined. M.S K.

A82-48071*#
THE DEVELOPMENT OF A HANDBOOK FOR ASTROBEE F PERFORMANCE AND STABILITY ANALYSIS
R. S. WOLF (NASA, Ames Research Center, Mountain View, CA) In: Sounding Rocket Conference, 6th, Orlando, FL, October 26-28, 1982, Collection of Technical Papers. New York, American Institute of Aeronautics and Astronautics, 1982, p. 322-325.
(AIAA 82-1728)

An astrobee F performance and stability analysis is presented, for use by the NASA Sounding Rocket Division. The performance analysis provides information regarding altitude, mach number, dynamic pressure, and velocity as functions of time since launch. It is found that payload weight has the greatest effect on performance, and performance prediction accuracy was calculated to remain within 1%. In addition, to assure sufficient flight stability, a predicted rigid-body static margin of at least 8% of the total vehicle length is required. Finally, fin cant angle predictions are given in order to achieve a 2.5 cycle per second burnout roll rate, based on obtaining 75% of the steady roll rate It is noted that this method can be used by flight performance engineers to create a similar handbook for any sounding rocket series. R.K.R.

N82-10534# Midwest Research Inst., Golden, Colo. Solar Energy Research Inst
STANDARDS APPLICATION AND DEVELOPMENT PLAN FOR SOLAR THERMAL TECHNOLOGIES
H. R. W. COBB Jul. 1981 218 p refs
(Contract DE-AC02-77CH-00178, EG-77-C-01-4042)
(DE81-030310; SERI/TR-742-885) Avail: NTIS HC A10/MF A01

Functional and standards matrices, developed from input from ST users and from the industry that will be continually reviewed and updated as commercial aspects develop are presented. The matrices highlight codes, standards, test methods, functions and definitions that need to be developed They will be submitted through ANSI for development by national consensus bodies A contingency action is proposed for standards development if specific input is lacking at the committee level or if early development of a standard would hasten commercialization or gain needed jurisdictional acceptance. T.M.

N82-10945# Messerschmitt-Boelkow-Blohm G m.b.H., Ottobrunn (West Germany). Unternehmensbereich Apparate.
HOW CAD/CAM AFFECTS TASK COMPLEXITY IN MANAGEMENT PLANNING: ORGANIZATIONAL, STRUCTURAL, AND PERSONNEL IMPLICATIONS [WIE VERAENDERT CAD/CAM DEN AUFGABENBEREICH DER AV]
J WEYAND 30 Jun. 1980 17 p In GERMAN
(MBB-UA-547-80-OE) Avail: NTIS HC A02/MF A01

The impact of computer systems on management methods is assessed Through the introduction of CAD/CAM into an enterprise, a wide range of information acquisition, processing and communication procedures are fundamentally changed. Essential characteristics of this change are: (1) systems which support information acquisition are partially, or even wholly, automated; (2) total integration of systems can be achieved; and (3) data are acquired only once (preferably at the source) and used in accordance with the requirements of all associated systems.
Author (ESA)

08 MANAGEMENT POLICIES

N82-11284*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
DSN MODEL FOR USE IN STRATEGIC PLANNING
K. C. KELLY, C. Y. LIN, and M. MCKENZIE *In its* The Telecommun. and Data Acquisition Rept. p 25-31 15 Oct. 1981 refs
Avail: NTIS HC A11/MF A01 CSCL 05A

A System Dynamics Model of the DSN to support strategic planning for the Network is addressed. Applications for the model are described, as well as the foundations of system dynamics and the methodology used to develop the model. Activities to date and plans for future work are also discussed J.M.S.

N82-11320# Battelle Pacific Northwest Labs., Richland, Wash.
SAMPLING DESIGN FOR THE 1980 COMMERCIAL AND MULTIFAMILY RESIDENTIAL BUILDING SURVEY
W. M. BOWEN, A. R. OLSEN, and A. L. NIEVES Jun. 1981 98 p
(Contract DE-AC06-76RL-01830)
(DE81-028783; PNL-3883) Avail: NTIS HC A05/MF A01

The extent to which new building design practices comply with the proposed 1980 energy budget levels for commercial and multifamily residential building designs (DEB-80) can be assessed by: (1) identifying small number of building types which account for the majority of commercial buildings constructed in the U.S.A.; (2) conducting a separate survey for each building type; and (3) including only buildings designed during 1980. For each building, the design energy consumption (DEC-80) will be determined by the DOE2.1 computer program. The quantity X = (DEC-80 - DEB-80). These X quantities can then be used to compute sample statistics. Inferences about nationwide compliance with DEB-80 may then be made for each building type. Details of the population, sampling frame, stratification, sample size, and implementation of the sampling plan are provided. DOE

N82-11633 California Univ., Los Angeles.
ENVIRONMENTAL PROTECTION AS AN ONGOING COMPONENT OF LARGE FACILITIES ENGINEERING PROJECTS Ph.D. Thesis
P E. SMOKLER 1981 242 p
Avail: Univ. Microfilms Order No. 8122847

An Environmental Protection System (EPS) was developed. The purpose of the system is to ensure that environmental protection begins at the project conceptual stage, and continues through design, construction, and implementation of construction surveillance. This system, initiated in rudimentary form for the Space Shuttle (West Coast) Space Transportation System was expanded upon and refined in the application of EPS to the Missile X (MX) project. The stages of a large facilities engineering project include systems requirements definition, system design, definition of facility requirements, development of facility criteria, generation of facility designs, facility construction, and facility activation and operation. The EPS is composed to environmental parameters such as endangered species, archaeology, etc. However, the key to its implementation is in the endeavors to translate this scientific intent into the tangible engineering criteria. Dissert. Abstr.

N82-12988# Instituut TNO voor Wiskunde, Informatieverwerking en Statistiek, The Hague (Netherlands).
ASSIGNMENT TECHNIQUES FOR HEAVILY LOADED NETWORKS [TOEDELINGSTECHNIEKEN VOOR ZWAAR BELASTE NETWERKEN]
H. E. R. MEINJER Delft Netherlands Organization for Applied Scientific Research TNO Oct. 1979 38 p refs In DUTCH
(A-79-VK-45-07) Avail: NTIS HC A03/MF A01

A survey of the most important assignment methods is presented. It is based on literature reviewing, except for the equilibrium assignment method and it is limited to models for one traffic method with fixed demands, where the effects of congestion on the assignment result are taken into account. The two equilibrium methods treated use a monotonically increasing function linking current and resistance, and result in a unique solution where all the employed routes between origin and destination have the same resistance and the nonemployed routes have higher resistance.
Author (ESA)

N82-12989 Office of Technology Assessment, Washington, D.C.
COMPUTER-BASED NATIONAL INFORMATION SYSTEMS: TECHNOLOGY AND PUBLIC POLICY ISSUES
Sep. 1981 176 p refs
(OTA-CIT-146; LC-81-600144) Avail: SOD HC

Developments in computer and information management technology and their impact on society are discussed. Among the issues discussed are the following: innovation, productivity, and employment; privacy, security of computer information; government management of data processing; society's dependence on information systems; and the constitutional rights and regulatory boundaries affected by information systems.

N82-12990# *Office of Technology Assessment, Washington, D.C.*
COMPUTER-BASED NATIONAL INFORMATION SYSTEMS: TECHNOLOGY AND PUBLIC POLICY ISSUES. SUMMARY
In its Computer-based Natl. Inform. Systems p 3-25 Sep. 1981
Avail: SOD HC

The structure of information policy issues was examined Information policy, law, and regulation were studied. System issues, information issues, secondary policy impacts, and long-term societal effects are discussed. Government management of data processing and its implications are also discussed. T M.

N82-12998# *Office of Technology Assessment, Washington, D.C.*
GOVERNMENT MANAGEMENT OF DATA PROCESSING
In its Computer-based Natl. Inform. Systems p 89-94 Sep. 1981 refs
Avail: SOD HC

The problems that arise from the Federal Government falling behind the private sector in its use and management of up to date computing technology are discussed. Potentially lost opportunities to use the newest technology to improve the efficiency and effectiveness of Government programs, and increased cost and decreased reliability resulting from operating systems that are becoming obsolete from archaic management procedures are highlighted. T M.

N82-14956# University of Southern California, Los Angeles. Social Science Research Inst.
RELIABILITY VS. DIAGNOSTICITY IN HIERARCHICAL INFERENCE
G. M. GRIFFIN and W. EDWARDS Jun. 1981 32 p refs Sponsored in part by Decisions and Designs, Inc.
(Contract MDA903-80-C-0194)
(AD-A105628; SSRI-81-3) Avail: NTIS HC A03/MF A01 CSCL 05A

This study examined the performance of subjects in a cascaded inference task where two subjects worked together, one subject having diagnosticity information and the other having reliability information. This was compared to a condition in which a single subject received both types of information. Additionally, the effects of different 'experts' having the power to make the final decision in the two-person conditions was explored. Seventy-two subjects made inferences about the probability of success vs. failure of hypothetical job applicants presented in a personnel manager scenario. Subjects were paid bonuses according to their performance on the task. Contrary to hypotheses, there were no between conditions differences. Single subjects performed just as well as subjects working together. This study replicates previous work using single subjects in the general pattern of responses: subjects were somewhat radical in comparison to the normative model. GRA

N82-15731*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
MANAGEMENT, PLANNING, AND IMPLEMENTATION OF MEDICAL OPERATIONS
N. BELASCO *In its* STS-1 Med. Rept. p 99-110 Dec. 1981
Avail: NTIS HC A06/MF A01 CSCL 05A

The roles of the primary team member organization participating in and supporting STS-1 medical operations activities are summarized. The medical operations panel and supporting structure are outlined. The medical operations assignments are presented for JSC along with communications requirements for STS-1. T.M.

N82-15986*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
TECHNICAL COMMUNICATION. PERSPECTIVES FOR THE EIGHTIES, PART 2
J. C. MATHES, comp. (Michigan Univ., Ann Arbor) and T. E. PINELLI, comp. Dec. 1981 316 p refs Papers presented at the 32nd Ann. Meeting of the Conf. on Coll. Composition and Commun., Dallas, 26-28 Mar. 1981 2 Vol.
(NASA-CP-2203-PT-2; L-14899-PT-2) Avail: NTIS HC A14/MF A01 CSCL 05B

The importance of technical writing as a separate discipline is suggested. Some specific areas addressed were. technical writing skills industry needs, definitions of technical writing, the hows and whys of inhouse writing, and the nature of the composing process in technical comunication.

N82-15987*# McDonnell-Douglas Corp., St. Louis, Mo.
SOME TECHNICAL WRITING SKILLS INDUSTRY NEEDS
F. R. SMITH *In* NASA. Langley Research Center Tech Commun., Pt. 2 p 335-341 Dec. 1981
Avail: NTIS HC A14/MF A01 CSCL 05B

It is suggested that engineers and other technical students be taught three classes of skills in technical writing. First, 'Big Picture Things', which includes: the importance of clear writing, the wide scope of writing, the wide scope of writing tasks that will be faced in industry, and the principles of organization of technical materials such as; how to analyze, classify, partition, and interpret. Second, 'Writing Procedures', which encompasses: how to get words on paper efficiently and team-write. Third, 'Writing Details', in which two considerations are important: how to achieve precision in the use of language and the aspects of style. Three problems in style are cited. the problem of sentence transition, overuse of attributive adjectives, and verbosity in paragraph structure. The most important thing in technical writing is considered to be functionality, economy and clarity. M.D.K.

N82-15988*# Communication Support Services, Inc., Bedford, Tex.
TECHNICAL WRITING VERSUS TECHNICAL WRITING
J. W. DILLINGHAM *In* NASA. Langley Research Center Tech. Commun., Pt. 2 p 343-348 Dec. 1981 refs
Avail: NTIS HC A14/MF A01 CSCL 05B

Two terms, two job categories, 'technical writer' and 'technical author' are discussed in terms of industrial and business requirements and standards. A distinction between 'technical writing' and technical 'writing' is made. The term 'technical editor' is also considered Problems inherent in the design of programs to prepare and train students for these jobs are discussed. A closer alliance between industry and academia is suggested as a means of preparing students with competent technical communication skills (especially writing and editing skills) and good technical skills. M.D.K.

N82-15989*# Ethyl Corp., Detroit, Mich.
WHYS AND HOWS OF IN-HOUSE WRITING
J. C. LANE *In* NASA. Langley Research Center Tech. Commun., Pt. 2 p 349-354 Dec. 1981
Avail: NTIS HC A14/MF A01 CSCL 05B

The combining of requisite technical knowledge with requisite writing ability is addressed. Considerations in the development of in-house writing courses, in-plant training, are presented and evaluated. Specific problems in past methodology are also detailed. It is suggested that teachers of technical writing should be technical people themselves, preferably with working experience in industry or business; the training provided should be user-oriented, not theory oriented. M.D.K.

N82-15990*# Ohio State Univ., Wooster. Agricultural Technical Inst.
TECHNICAL WRITING PRACTICALLY UNIFIED THROUGH INDUSTRY
L. S. HOUSTON *In* NASA Langley Research Center Tech. Commun., Pt. 2 p 369-383 Dec. 1981 refs
Avail: NTIS HC A14/MF A01 CSCL 05B

General background details in the development of a university level technical writing program, based upon the writing tasks of the student's occupations, are summarized. Objectives and methods for unifying the courses of study with the needs of industry are discussed Four academic course divisions, Industries Technologies, in which preparation and training are offered are: Animal, Horticulture, Agriculture, and Agricultural Business. Occupational competence is cited as the main goal for these programs in which technical writing is to be practically unified through industry. Course descriptions are also provided M.D.K.

N82-16795# RAND Corp., Santa Monica, Calif.
MODELS IN THE POLICY PROCESS: PAST, PRESENT, AND FUTURE
W. E. WALKER Sep. 1981 30 p refs Presented at the Tenth IFIP Conf. on System Modeling and Optimization, New York, 31 Aug. - 4 Sep 1981
(RAND/P-6654) Avail: NTIS HC A03/MF A01

The utilization and usefulness of computer models in policy making, primarily in the public sector, is reviewed. Increasing involvement of the policy analyst in policy implementation is shown, as is the flexibility and practicality of interlocking small models as opposed to a single large model Reasons for predicting an increased use of computer modeling in government planning are presented. J.D H.

N82-16922# Illinois Univ., Urbana. Dept. of Architecture.
FORMAL TECHNIQUES FOR ANALYSIS AND DESIGN OF PURPOSIVE ORGANIZATIONS Final Report
E. L. MURPHREE, JR., R. M. DINNAT, P. CLICKENER, and R. MATTHEWS Sep. 1981 93 p refs
(Contract AF-AFOSR-0090-80; AF PROJ. 2313)
(AD-A106775; AFOSR-81-0711TR) Avail: NTIS HC A05/MF A01 CSCL 05A

A framework for a generic model of purposive human organizations is presented. The static model is based on relationships between pairs of resources, pairs of tasks, and resource-task pairs. The heart of the approach is a relational matroid which allows notations of such basic organizational patterns as authority, groupings of resources, task precedence, assignment of resources to tasks, and information flow. Author (GRA)

N82-16923# National Bureau of Standards, Washington, D.C. Experimental Technology Incentives Program.
A MANUAL FOR DESIGNING AND IMPLEMENTING A PROCESS TO MONITOR COMPLEX SYSTEM DEVELOPMENTS Final Report
S. D. GARRITY Sep. 1981 66 p refs
(PB82-104308, NBSIR-81-2328) Avail: NTIS HC A04/MF A01 CSCL 05A

A manual for designing and implementing a process to monitor key areas of a complex system development is presented. The manual is derived from an internal study of system developments in the National Bureau of Standards. The proposed monitoring proccess consists of a framework of thirty factors and a set of five functions which monitoring can serve. Author (GRA)

08 MANAGEMENT POLICIES

N82-17156# Arinc Research Corp., Santa Ana, Calif.
STANDARDIZATION STUDY FOR ADVANCED AIRCRAFT ARMAMENT SYSTEM PROGRAM
L. J. GRAHAM and W. G. SCHULZ May 1981 103 p refs
(Contract N60530-80-C-0339)
(AD-A107681; REPT-1783-01-1-2405) Avail: NTIS HC A06/MF A01 CSCL 01C

Results of a 6-month study of standardization criteria and characteristics are presented that may be effectively applied to the Advanced Aircraft Armament System (AAAS) Program. System elements feasibly for standardization are identified Standardization characteristics for those feasible elements are developed for various levels of standardization (subsystem, module, piece part) and standardization approaches (horizontal, vertical, area, functional, logistical, and cooperative). Alternative standardization characteristics are also postulated and recommendations are formulated for application to the AAAS Program Author (GRA)

N82-18057# Army Construction Engineering Research Lab., Champaign, Ill.
EXPECTED USE OF MICRO-BASED NETWORK ANALYSIS Final Report
C. E DELONG and J. H. SPOONAMORE Nov. 1981 22 p refs
(Contract DA PROJ 4A7-62731-AT-41)
(AD-A107660; CERL-TM-P-122) Avail: NTIS HC A02/MF A01 CSCL 05A

Over the next decade, engineers have an excellent opportunity to use available low-cost, micro-based hardware. Network analysis is a suitable software tool for managing small and large, simple and complex project networks even on the small machines. One may ask whether and how engineers will use micro-based network analysis given its limited use in the past. Data on the current construction projects indicate that engineers will not quickly and easily adapt these micro-based tools. The same data also suggest that established users will more and more depend on their micro computers. Author (GRA)

N82-19085# Messerschmitt-Boelkow-Blohm G m.b.H., Ottobrunn (West Germany). Unternehmensberetch Raumfahrt.
MODERN MANAGEMENT IN CONSTRUCTION INDUSTRY OFFICES [MODERNES MANAGEMENT IN KONSTRUKTIONSBUERO]
B. J. MADAUSS 1981 38 p refs In GERMAN Presented at Deut. Konstruktionsleitertage 1981 Conf., Duesseldorf, West Germany, 25-26 May 1981
(MBB-UR-493-81-O) Avail. NTIS HC A03/MF A01

Contrasting expectations from management and designers in the construction industry were examined. Ways of problem solving are discussed. It is questioned if the designer can remain a creative problem solver under the pressure of cost effectiveness and time. Transl. by E.A.K.

N82-19842# Aktiebolaget Ergonomilaboratoriet, Stockholm (Sweden).
ERGONOMIC CONSIDERATIONS IN PRODUCT DESIGN AND EVALUATION
T. IVERGAARD *In* Research Inst. of National Defence Human Factors in System Develop.: Experiences and Trends p 77-95 Jun. 1981
Avail: NTIS HC A08/MF A01

The influence of free market competition, particularly advertising and marketing constraints, on product development is assessed. The need for an ecological approach is stressed while an ergonomic design procedure is outlined. The marketing of products which are offered to consumers, including industrial users, is in some respects good and fulfills useful functions for the consumers. Still, there are many products which are potentially dangerous, unhealthy, uncomfortable, wearing or difficult to use. Ergonomics in product evaluation can help identify these problems. In many countries, the authorities feel obliged to control development in different ways. The extent and direction of these controls depends on the companies themselves investing in ergonomics as part of product development. Author (ESA)

N82-20007# Helsinki Univ. of Technology, Espoo (Finland). Lab of Information Processing Science.
AN APPROACH FOR GROSS DESIGN OF OPERATIONS MANAGEMENT SYSTEMS Ph.D. Thesis
E. ELORANTA 1981 120 p refs
(ISBN-951-752-308-4; ISSN-0356-5068) Avail: NTIS HC A06/MF A01

The control aspect of management systems is studied. Subtasks of management planning, directing and montoring are closely related to those of control, defined as recepting, effecting and informing or sensing, selecting and effecting. Management is considered the control of an organization by one of more of its parts. The redesign of management systems implies an improvement in effectiveness or in efficiency, measured of just estimated by tangible or intangible benefits. Effectiveness is to do the right thing while efficiency is to do the thing right. A change in effectiveness rather than a change in efficiency is emphasized. The very first stage of the design process start from a vague problem identification and end at a project proposal for detailed design of improvement. The gross design of operations management systems is introduced S.L.

N82-21436# American Association of Community and Junior Colleges, Washington, D.C. Energy Communications Center.
ALCOHOL FUELS PRODUCTION, MANPOWER, AND EDUCATION: WHERE DO TWO-YEAR COLLEGES FIT
1981 37 p refs
(Contract DE-FG05-79IR-10295)
(DE82-001929; DOE/IR-10295/T1) Avail: NTIS HC A03/MF A01

Representatives from 2-year colleges met with officials from national organizations to discuss the role of community colleges in the training of personnel and the development of curriculum to enhance the growing alcohol fuels industry. Major conclusions include: (1) Energy issues are too important for colleges to ignore in their program offerings, each college should determine what energy focuses and what program forms make most sense for its local area, (2) Community-size alcohol plants have the potential of leading the way toward local economic development and self sufficiency; (3) Production and manpower projections vary widely from one source to another. Even if the most optimistic production levels are reached, the evidence shows that three will be only a modest need for narrowly-trained alchol fuels technicians The most reasonable approach for colleges is to train energy generalists through curricula that focus on basic competencies in science, math, management, and communications. DOE

N82-22090# General Accounting Office, Washington, D. C. Accounting and Financial Management Div.
FEDERAL AGENCIES: MAINTENANCE OF COMPUTER PROGRAMS, EXPENSIVE AND UNDERMANAGED
26 Feb. 1981 72 p refs
(PB81-235020; AFMD-81-25) Avail: NTIS HC A04/MF A01 CSCL 05A

The impact that computer program maintenance has on Federal computer operations, and recommendations. The disruptions and expenses caused by software errors and omissions are discussed with the view of saving time and money. Lack of management policies is seen as a major problem. To improve such maintenance are discussed. GRA

N82-22102# Forecasting International Ltd., Arlington, Va.
THE POTENTIAL INFLUENCE OF SOCIAL, ECONOMIC, REGULATORY AND TECHNOLOGICAL FACTORS ON SCIENTIFIC AND TECHNICAL COMMUNICATION THROUGH 2000 A.D. VOLUME 1: THE FORECAST Final Report, 1 Sep. 1978 - 31 Aug. 1981
A. CLAYTON 1 Sep. 1981 145 p refs 2 Vol.
(Contract NSF IST-78-12102)
(PB82-129917) Avail: NTIS HC A07/MF A01 CSCL 05B

The future of scientific and technical communication and the various factors which may influence its course of evolution are addressed. The current status of this type of communication is reviewed and existing trends are highlighted based upon an analysis of historic progression. The impacts of potentially perturbing factors are traced in case studies of bibliographic retrieval services and computer conferencing The point of view taken is that of the 'user', defined as an individual who initiates or is the intended recipient of the communication of scientific and technical information. Key policy issues are identified, and the implications of the study findings for decision-makers in government and industry are examined. GRA

N82-23333# Sverdrup and Parcel, Inc., St. Louis, Mo.
FEASIBILITY STUDY FOR AN ALCOHOL PRODUCTION PLANT FOR ARIZONA GRAIN, INC., CASA GRANDE, ARIZONA
May 1981 205 p refs
(Contract DE-FG07-80RA-50300)
(DE82-000287; DOE/RA-50300/T1) Avail: NTIS HC A10/MF A01

The feasibility of establishing and profitably operating a fuel alcohol production facility was studied. Detailed technical, financial, marketing, siting, environmental, health, safety and socioeconomic analyses are described. The final study criteria differ significantly from those originally proposed, due to changes in assumptions which occurred as the study progressed. The revised criteria more truly reflect the sponsor's needs and improve the flexibility of the proposed plant. The final criteria required investigations of two site alternatives and two feedstock alternatives. Also, two production capacities, 12 million and 15 million gallons per year, were analyzed in detail. DOE

N82-23334# US Ethanol Industries, Inc., Birmingham, Mich.
FEASIBILITY STUDY FOR A 50,000,000-GALLON-PER-YEAR ETHANOL PLANT
Feb. 1981 743 p Prepared in cooperation with Ambrose (John) and Co., Inc., West Bloomfield, Mich.
(Contract DE-FG07-80RA-50345)
(DE82-002845; DOE/RA-50345/1-VOL-1) Avail: NTIS HC A99/MF A01

The technical and economic feasibility of constructing and operating a 50,000,000 a gallon per year ethanol plant in Washtenaw County, Michigan was investigated. The factors taken into consideration were: site selection, availability of resources, and marketing considerations. Design and engineering analysis as well as financial and economic analyses are also presented. S.L.

N82-24277# Orbital Transport und Raketen A.G., Munich (West Germany).
DEVELOPMENT OF LAUNCH VEHICLES AS A CHALLENGE TO PRIVATE INDUSTRY [TRAEGERRAKETENENTWICKLUNG ALS HERAUSFORDERUNG FUER DIE PRIVATINDUSTRIE]
F. K. WUKASCH 1981 16 p In GERMAN Presented at 30th Raumfahrtkongr. der Hermann-Oberth-Ges. e. V. Kurzzusammenfassung
Avail: NTIS HC A02/MF A01

The development philosophy of the Orbital Transport and Rockets Company (OTRAG), a private firm that develops cost optimized rockets for transportation of satellites and commercial payloads into space, is described. Payload capacity varies from 100 kg to 2 t. Materials and fabrication costs are reduced by using modules, standardization, extreme simplicity in every respect, and conventional materials and components. Three test flights were conducted from an area in Zaire, and a fourth one from an area in Libya. Author (ESA)

N82-25807# Little (Arthur D.), Inc., Cambridge, Mass.
THE EFFECTS OF FUTURE INFORMATION PROCESSING TECHNOLOGY ON THE FEDERAL GOVERNMENT ADP SITUATION
Sep 1981 106 p refs Prepared in cooperation with General Systems Group, Inc.
(PB82-138181; NBS-GCR-81-342) Avail: NTIS HC A06/MF A01 CSCL 09B

The effects on the Federal ADP inventory of new and expected automated data processing technology, shifts in industry structure, and proposed changes in Federal ADP regulations are qualitatively forecasted Underlying technologies, changes in the information industry and market, future products and systems, the present Federal ADP situation, and proposed policy changes are discussed. GRA

N82-26023# SRI International Corp , Menlo Park, Calif. Artificial Intelligence Center.
PARALLELISM IN PLANNING AND PROBLEM SOLVING: REASONING ABOUT RESOURCES
D. E. WILKINS 5 Jan. 1982 17 p refs
(Contract F49620-79-C-0188, AF PROJ. 2304)
(AD-A111933; TR-258; AFOSR-82-0089TR) Avail: NTIS HC A02/MF A01 CSCL 05A

The implications of allowing parallel actions in a plan or problem solution are discussed The planning system should take advantage of helpful interactions between parallel branches, must detect harmful interactions, and, if possible, remedy them This paper describes what is involved in this and presents some new techniques that are implemented in an actual planning system and are useful in seeking solutions to these problems. The most important of these techniques, reasoning about resources, is emphasized and explained Author (GRA)

N82-27184# Decision Science Consortium, Inc., Falls Church, Va.
COHERENCE THROUGH PARTIAL INFORMATION IN AN ADDITIVE MULTIATTRIBUTE UTILITY ANALYSIS
R. C. BROMAGE Nov. 1981 30 p refs
(Contract N00014-81-C-0330; NR PROJ 277-271; RR0141101)
(AD-A112192, TR-81-10) Avail: NTIS HC A03/MF A01 CSCL 12A

This report addresses the specific problem of the resolution of incoherent weight assessments in an additive multiattribute utility analysis. The approach taken is that if incoherencies occur because actual numerical assessments are too precise, then it would be useful if the ramifications of less precise, but coherent, information were made clear. Two types of information are considered. First, it is supposed that the decision maker can order the attributes on the relative importance of the weights. The implications of any given ordering are shown to be very simply analyzed. Second, it is supposed that, in addition, inequality assessments can be made between certain pairs of weights. The analysis demonstrates the implications of these, and also suggests which inequality assessments are likely to be most useful. GRA

N82-27220# RAND Corp., Santa Monica, Calif.
PREPLANNED PRODUCT IMPROVEMENT AND OTHER MODIFICATION STRATEGIES: LESSONS FROM PAST AIRCRAFT MODIFICATION PROGRAMS Interim Report
F. BIERY and M LORELL Dec. 1981 78 p refs
(Contract F49620-82-C-0018)
(AD-A113599; RAND/N-1794-AF) Avail: NTIS HC A05/MF A01 CSCL 15E

Pre-Planned Product Improvement (P31) is a weapon system acquisition strategy formulated in the late 1970s in a response to the high development costs of new systems, lengthening acquisition intervals, increasing age of current inventories, constrained budgets, and various technology trends It is founded on the assumption that quality enhancement modification of existing

inventory systems is a cheaper and quicker way to modernize than the development of entirely new systems. The P31 strategy is aimed at facilitating this process; its central element is the design of new systems from their origins to accommodate future quality upgrades. Discussion of the merits and disadvantages of P3I, however, remains abstract and theoretical. This Note reviews the circumstances that led to the formulation of P3I, clarifies the implications of the concept and offers an initial assessment of the policy as applied to aircraft systems based on a careful and extensive examination of past major aircraft modification efforts. The authors conclude that long-range pre-planning during the design stage is impractical. This note also provides lessons drawn from past experience on the conduct of modification programs in general Author (GRA)

N82-28213*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
A REVIEW AND EVALUATION OF THE LANGLEY RESEARCH CENTER'S SCIENTIFIC AND TECHNICAL INFORMATION PROGRAM: RESULTS OF PHASE 6: THE TECHNICAL REPORT. A SURVEY AND ANALYSIS Final Report
R. A. MCCULLOUGH (Graffic Traffic Studios), T. E PINELLI, D. D PILLEY (Graffic Traffic Studios), and F. F. STOHRER (Old Dominion Univ.) Apr. 1982 136 p refs
(NASA-TM-83269; NAS 1 15 83269) Avail: NTIS HC A07/MF A01 CSCL 05B

Current practice and usage using selected technical reports; literature relative to the sequential, language, and presentation components of technical reports; and NASA technical report publications standards are discussed. The effctiveness of the technical report as a product for information dissemination is considered. Author

N82-28483# Mid-American Solar Energy Complex, Minneapolis, Minn.
PASSIVE-SOLAR CONSTRUCTION HANDBOOK
Sep. 1981 347 p refs
(Contract DE-AC02-79CS-30150)
(DE82-002455; P-101-13) Avail. NTIS HC A15/MF A01

An identification and explanation of pertinent considerations in the construction of passively solar heated buildings are presented. Toward that end, the handbook discusses solar design principles, site planning and access, system components, construction details, financial considerations and other items which are essential considerations in passive solar design. The handbook was designed for a multitude of uses: as an instructional tool in workshops and seminars; as a compendium of passive solar design elements; and, as a reference guide to building trade professionals entering passive solar construction. DOE

N82-28948# National Inst. for Metallurgy, Randburg (South Africa).
THE ORGANIZING OF CONFERENCES
L. F. HAUGHTON 18 Sep. 1981 18 p refs
(PB82-142696, NIM-2130; ISBN-0-86999-556-1) Avail: NTIS HC A02/MF A01 CSCL 05A

The Liaison and Information Division of the National Institute for Metallurgy (NIM) has been concerned in the planning and organizing of conferences, local and international, large and small, for many years, and as the result of trial and error has acquired a fair amount of knowledge of the subject and developed a successful modus operandi. It is felt that the knowledge and expertise gleaned over the years should be made available generally for use by interested organizers. GRA

N82-29047# Naval Postgraduate School, Monterey, Calif
SOFTWARE MAINTENANCE: IMPROVEMENT THROUGH BETTER DEVELOPMENT STANDARDS AND DOCUMENTATION Final Report, 1 Jan. 1980 - 1 Jan. 1982
N. F SCHNEIDEWIND 22 Feb. 1982 45 p refs
(AD-A113257; NPS54-82-002) Avail: NTIS HC A03/MF A01 CSCL 09B

Software maintenance is frequently the most expensive phase of the software life cycle. It is also the phase which has received insufficient attention by management and software developers. Software standards have improved the ability of the software community to develop and design software. Unfortunately, most standards do not deal with the maintenance phase in a substantive way. Since maintainability has to be designed into the software and cannot be achieved after the software is delivered, it is necessary to have software standards which explicitly incorporate requirements for maintainability Accordingly, this report suggests design criteria for achieving maintainability and evaluates Weapons Specification WS 8506 and MIL-STD 1679 against these criteria. Using these documents as typical examples of military software standards, recommendations are made for improving the maintainability aspects of software standards. Author (GRA)

N82-29223# Sandia Labs., Albuquerque, N. Mex. Energy Research and Development Support Div.
REALISTIC APPROACH TO THE PLANNING OF HIGH TECHNOLOGY, HIGH RISK PROJECTS
M. J BECKTELL Sep 1981 14 p refs
(Contract DE-AC04-76DP-00789)
(DE82-001049, SAND-79-1483-REV) Avail: NTIS HC A02/MF A01

The historical development of project planning techniques is reviewed and realistic planning techniques identified. Network analysis methods are described. Realistic planning techniques which identify resources, priorities, interrelationships, and goals are outlined. Planning and scheduling, time estimates, updating, objectivity, and performance evaluation are considered. DOE

N82-29261# Federal Aviation Administration, Washington, D.C. Planning Analysis Div.
FAA AVIATION FORECASTS-FISCAL YEARS 1982-1993
Feb. 1982 72 p
(AD-A114696, FAA-APO-82-2) Avail: NTIS HC A04/MF A01 CSCL 01B

This report contains the Fiscal Years 1982 to 1993 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. GRA

N82-29348# Maxfield Associates Ltd., Falls Church, Va.
REPORT OF THE ANALYSIS OF THE JOINT MEDIUM RANGE AIR TO SURFACE MISSILE PROGRAM Final Technical Report
23 Jan. 1980 153 p
(Contract N00019-79-C-0526)
(AD-A114372) Avail: NTIS HC A08/MF A01 CSCL 16D

The objective of this effort completed between July, 1979 and January, 1980 was to investigate technical alternatives and make recommendations concerning management approaches to accomplish the project goals. The purpose of this report is to formalize those recommendations and to identify future courses of action alternatives. The basic concepts incorporated in a supersonic stand-off, air-to-surface missile have existed in Navy advance planning for many years. Navy action on this concept was formalized in 1967 with the decision to initiate a funded technology program to produce a system technology prototype of an advance tactical stand-off missile. Parallel development of propulsion, guidance, and other subsystem technologies conducted

by the Air Force, industry, and other countries have also contributed to the current technology base. In May 1978, the Chief of Naval Operations established a requirement for a survivable medium range air-to-surface missile with the issuance of operational requirement W-0650-TW, 'Medium Range Air-to-Surface Missile'. The requirements delineate the need for an offensive air-to-surface missile that can penetrate and survive against defenses expected to be encountered in the 80's and 90's. GRA

N82-29965# Hanford Engineering Development Lab., Richland, Wash.
STANDARDS AND GUIDELINES APPLICABLE TO SCIENTIFIC SOFTWARE LIFE CYCLE
N. P. WILBURN 1981 87 p refs Presented at the IEEE Software Standards Workshop
(Contract DE-AC06-76FF-02170)
(DE82-005914; HEDL-SA-2553-FP) Avail: NTIS HC A05/MF A01

A survey of 99 standards and guidelines is given as to their applicability in the development of scientific software. The coverage by the standard or guidelines of the four aspects (performance, documentation, verification, management) of each of the six phases of the software life cycle (requirements, design, implementation, testing, operation, maintenance) is identified. DOE

N82-30125# Harvard Univ., Cambridge, Mass. Computation Lab.
REAL TIME RESOURCE ALLOCATION IN A DISTRIBUTED SYSTEM
J H. REIF and P. SPIRAKIS Feb. 1982 28 p refs Presented at the ACM AIGACT-AIGOPS Symp. on Principles of Distributed Computing, Ottawa, Aug. 1982
(Contract N00014-80-C-0647; NSF MCS-79-21024)
(AD-A114856; TR-06-82) Avail: NTIS HC A03/MF A01 CSCL 05A

A resource allocation problem is considered which is local in the sense that the number of users competing for a particular resource at any time instant is bounded and also at any time instant the number of resources that a user is willing to get is bounded. The problem may be viewed as distributedly achieving matchings in dynamically changing hypergraphs. We show that this problem is related to the fundamental problem of handshake communication (this problem can be viewed as achieving matchings in dynamically changing graphs, via distributed algorithms) in that an efficient solution to each of them implies an efficient solution to the other We provide real-time solutions to the resource allocation problem (i.e., distributed algorithms with real time response) via probabilistic techniques. No probability assumptions about the system behavior are made, but processes are allowed the ability to make independent probabilistic choices. One of our solutions assumes the existence of an underlying efficient handshake communication system Another is based on basic synchronization primitives (flag variables). The special case of equi-speed processes is examined. Applications are drawn to dining philosophers, scheduling and two-phase locking in databases. GRA

N82-30308# Naval Postgraduate School, Monterey, Calif.
A PRELIMINARY ANALYSIS OF TF34-100/400 JET ENGINE REWORK DATA IN SUPPORT OF THE MRP SYSTEM IMPLEMENTATION AT NARF ALAMEDA M.S. Thesis
E. R. SLAYBAUGH Dec. 1981 83 p refs
(AD-A114452) Avail: NTIS HC A05/MF A01 CSCL 15E

The Naval Air Rework Facility (NARF) located at Naval Air Station (NAS) Alameda is in the process of implementing a Material Requirements Planning (MRP) system which will incorporate an inventory model to help manage those repair parts which are not always replaced during component rework. This thesis focused on analyzing TF34-100/400 jet engine rework data as one phase of that implementation. In particular, probability of replacement values were generated for the repair parts from demand data and the rework schedule during 1980, and the engine's bill of materials. In addition, a parametric analysis was conducted to study the optimal relationship between the shortage and surplus costs of the proposed inventory model for the TF34 repair parts. The analyses highlighted the importance of determining the actual shortage costs resulting from a work stoppage and suggested some potentially useful forms for the surplus cost parameter. Author (GRA)

N82-30979# Rome Air Development Center, Griffiss AFB, N.Y.
SOFTWARE DESIGN METHODOLOGIES: SOME MANAGEMENT PERSPECTIVES
W. E. RZEPKA Mar. 1982 50 p refs
(Contract AF PROJ. 5581)
(AD-A115441; RADC-TR-82-50) Avail: NTIS HC A03/MF A01 CSCL 09B

The purpose of this report is to provide general information concerning software design methodologies to technical management personnel. In particular, the report is aimed at managers who are in the planning stages of a software development and are facing the decisions of whether to use a formal design methodology and which methodology to use. To accomplish this objective a definition of design methodology is presented, explained and illustrated. Major design philosophies are discussed and the kinds of applications which they address are described. Following this introductory information, various management perspectives on software design methodologies are presented. In general, these perspectives pertain to the current state of software design methodology development and support tools, as well as relevant application experiences. GRA

N82-31148# Wisconsin Univ., Milwaukee.
TOWARD AN UNDERSTANDING OF INNOVATION ADOPTION: AN EMPIRICAL APPLICATION OF THE THEORETICAL CONTRIBUTIONS OF DOWNS AND MOHR
R. D. BINGHAM, P. K. FREEMAN, and C. L. FELBINGER 1981 115 p refs
(Contract NSF PRA-79-20149)
(PB82-164781; NSF/ISI-81003) Avail: NTIS HC A06/MF A01 CSCL 05A

The instability of findings in innovative research with regard to complex organizations is investigated. Factors identified as the possible causes of this instability and their methodological prescriptions toward the development of an integrative theory are examined The factors are: (1) variation among primary attributes, (2) interaction; (3) ecological inferences, and (4) varying operationalizations of innovation. GRA

N82-33136# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil)
ANALYSIS OF THE UNCAPACITATED DYNAMIC LOT SIZE PROBLEM
G. R. BITRAN (MIT, Cambridge), T. L. MAGNANTI (MIT, Cambridge), and H. H. YANASSE Jul. 1982 41 p refs
(Contract N00014-75-C-0556; NSF ECS-79-26625)
(INPE-2472-PRE/161; SLOAN-WP1282-82) Avail: NTIS HC A03/MF A01

Worst case error bounds for several heuristics are provided for the uncapacitated dynamic lot size problem. The authors propose two managerially oriented procedures and show that they have a relative worst case error bound equal to two, and develop similar analyses for methods known as the 'Silver and Meal' heuristics, the part priod balancing heuristics, and economic order quanitity heuristics (expressed in terms of a time supply of demand). Results on aggregation and partitioning of the planning horizon are also presented. Author

N82-33278# Wisconsin Univ., Milwaukee.
TOWARD AN UNDERSTANDING OF INNOVATION ADOPTION: AN EMPIRICAL APPLICATION OF THE THEORETICAL CONTRIBUTIONS OF DOWNS AND MOHR Executive Summary
R. D BINGHAM, P K. FREEMAN, and C. L. FELBINGER 1981 25 p refs
(Contract NSF PRA-79-20149)
(PB82-164773; NSF/ISI-81004) Avail: NTIS HC A02/MF A01 CSCL 05A

An innovation study addressing the instability of findings in innovative research with regard to complex organizations is investigated Factors identified by Downs and Mohr as the possible causes of this instability and their methodologyical prescriptions toward the development of an integrative theory are examined. The factors are (1) variation among primary attributes, (2) interaction, (3) ecological inferences, and (4) varying operationalizations of innovation. GRA

N82-33279# National Bureau of Standards, Washington, D.C
EXECUTIVE GUIDE TO ADP CONTINGENCY PLANNING
J. K. SHAW and S. W. KATZKE Jan. 1982 19 p refs
(PB82-165226; NBS-SP-500-85, LC-81-600182) Avail: NTIS HC A02/MF A01 CSCL 05A

This publication has been prepared for executives and managers who depend on ADP resources and services to accomplish the organizational objectives for which they are responsible. The goal is to help in understanding the need for Automatic Data Processing (ADP) contingency planning, to specify management's scope of involvement, to indicate in summary form the contents of ADP contingency plans and how one proceeds in developing such plans. Author

N82-34099# Computer Corp. of America, Cambridge, Mass.
AN ARCHITECTURE FOR DATABASE MANAGEMENT STANDARDS Final Report
Jan 1982 57 p refs
(Contract NB-79-SBC-0086)
(PB82-176322, NBS-SP-500-86; LC-81-600174) Avail: NTIS HC A04/MF A01 CSCL 09B

The current status of project on architectures for database management systems (DBMS) is presented. An architectural framework for developing DMBS standards is presented. It addresses requirements of both the Federal data processing community and the DBMS vendor community. The architecture groups DBMS functions into both internal and external components and for these components is proposed a family structure which supports the integration of DBMS standards for multiple data models GRA

N82-34103# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio.
WEAPON SYSTEM SOFTWARE ACQUISITION AND SUPPORT: A THEORY OF SYSTEM STRUCTURE AND BEHAVIOR M.S. Thesis
B. D. MERCER Mar. 1982 196 p refs
(AD-A115555; AFIT/GCS/MA-82M-3) Avail: NTIS HC A09/MF A01 CSCL 09B

The system for acquiring and supporting weapon system software was investigated through the methodology of system dynamics, a technique for studying the structure of socio-technical systems and how that structure determines their behavior. Conceptual and mathematical models of a generalized software production process and the influences upon that process were developed. The mathematical model was translated into a continuous simulation computer model using the DYNAMO language. These models can be examined by managers at all levels in the acquisition and support process in order to increase their understanding of the complexities and interactions of system decisional structures. Such understanding is foundational to the analysis and formulaton of policy to guide and improve the performance of that management system. GRA

09

LEGISLATION

Includes law (jurisprudence), hearings, government / industry relations, Federal and international resources, legislative effects and applications, patents, and regulations.

A82-10463#
HOW LARGE SHOULD A COMMUTER TRANSPORT BE
R. D. FITZSIMMONS, J SEIF, and S. C NELSON (Douglas Aircraft Co., Long Beach, CA) American Institute of Aeronautics and Astronautics, Aircraft Systems and Technology Conference, Dayton, OH, Aug. 11-13, 1981, 12 p. refs
(AIAA PAPER 81-1732)

Definitions of a commuter transport are examined from the viewpoint of a major airframe manufacturer. Selected milestones in commuter air service are reviewed The impact of deregulation is creating new opportunities for commuter airlines to expand services, resulting in new economic and operating problems. Problems of acquisition and operating costs are discussed Considerations for commuter transport capacity include number of passengers, frequency of service, airport facilities, and community compatibility. Capacity variations are explored in the 1980s and the 1990s. Some conceptual commuter transport candidates for the future are presented. (Author)

A82-12048
ACMA - FACT OR FANTASY
W. T. MIKOLOWSKY and W A. GARRETT (Lockheed-Georgia Co., Marietta, GA) Lockheed Horizons, Fall 1981, p 2-12.

The feasibility of the advanced civilian/military aircraft (ACMA) for use as both an advanced military airlift vehicle and a commercial airfreighter is discussed. A partnership in development between government and industry is expressed as necessary to reduce costs through larger production quantities, to increase emergency airlift capabilities in the Civil Reserve Air Fleet, and commercial maintenance of military aircraft. Design options and requirements are presented along with timetables, showing production delivery to commence in 1994. Topics such as commercial need, energy use, engine design, and financial planning are examined, with emphasis on system features that enhance the commercial attractiveness of the vehicle. A preliminary configuration shows a payload capability of 390,000 lbs with a fuel efficiency 50% better than that of the 747-200F. M.S K.

A82-13954#
THE AMPHIBIOUS ASSAULT LANDING CRAFT TEST PROGRAM - A SUCCESSFUL INDUSTRY-GOVERNMENT MERGER
F. P. HIGGINS (U.S. Naval Material Command, David W. Taylor Naval Ship Research and Development Center, Panama City, FL) AIAA, SETP, SFTE, SAE, ITEA, and IEEE, Flight Testing Conference, 1st, Las Vegas, NV, Nov. 11-13, 1981, AIAA 7 p.
(AIAA PAPER 81-2352)

The Amphibious Assault Landing Craft (AALC) Program is defined as an advanced development effort designed to prove the technology and to demonstrate the utility of an air cushion vehicle for the Navy and Marine Corps amphibious assault mission Under the program, two different all-aluminum, gas turbine powered craft - JEFF(A) and JEFF(B) - were designed, built, and tested. The unique integration and consolidation efforts of the Navy's David W. Taylor Naval Ship Research and Development Center before the test and evaluation phase are discussed, as are the fiscal and schedule constraints which prompted these actions. It is noted that both prime contractors supported the actions once their significant effect on cost and schedule was recognized. C.R.

A82-17065
ENGINEERING AND SOCIETY
New York, American Institute of Aeronautics and Astronautics, 1981 31 p
$7 50

The symposium considered the political, economic, and social factors which affect engineers and their contribution to the future. Attention was given to other external forces which influence on engineer's work, such as customers requirements, regulations, and government support. Specific mention was made of government policies, noting that regulations grow with the complexity of the technology considered Effective public group/engineer interfaces were examined, as were educational and economic supportive measures for engineering students Finally, the functions of the AIAA Society in Aerospace Technology Committee are reviewed, particularly their activities in aiding the transfer of aerospace technology to different fields of applications. M.S.K.

A82-17322#
TECHNOLOGY DEVELOPMENTS UNDER CONSIDERATION FOR FUTURE GROUND SYSTEMS
G W. J DREWES (ESA, European Space Operations Centre, Darmstadt, West Germany) In. Space tracking and data systems; *Proceedings of the Symposium, Arlington, VA, June* 16-18, 1981 New York, American Institute of Aeronautics and Astronautics, 1981, p. 187-189

A review is conducted of those areas of ground-system related technology which require for their appropriate development funding provided by ESA. ESA will, in this connection, financially support the development of a coaxial S and X band feed horn for use with its 15-m antenna for Villafranca and Carnarvon With respect to RF techology, it is found that the required RF components and subsystems will be available, and, consequently, ESA will not provide any funds for developments in this area. Other sectors examined with respect to possible developments requiring ESA funding are related to modulation/demodulation, spacecraft position, data handling, timing, and development and standardization. G.R.

A82-21362
GOVERNMENT-INDUSTRY RELATIONSHIPS IN TECHNOLOGY COMMERCIALIZATION THE CASE OF PHOTOVOLTAICS
J. D ROESSNER (Georgia Institute of Technology, Atlanta, GA) Solar Cells, vol 5, Jan 1982, p. 101-134. NSF-supported research. refs

Interfaces between the U.S. government and the emerging photovoltaics industry are examined in terms of basic research programs, market studies, and strategies to accelerate the development of the industry. The process of the development of a model industry is outlined from innovation to large-scale, specific use production, and DOE programs are noted to shift from R and D, testing, and evaluation programs to market tests, demonstrations, and workshops when a product becomes commercially ready. The growth of funding for research, technology development, and purchases to gain operational experience with solar cell arrays is traced, and it is noted that firms specializing in photovoltaics production have managed to continue with irregular government funding and normal, private financing arrangements. Government procurement is suggested to have the greatest impact on a new industry, especially when coupled with performance and reliability requirements. M S.K.

A82-21474
GATEWAY DIVERSITY AND COMPETITION IN INTERNATIONAL AIR TRANSPORTATION
W. B TYE (Putnam, Hayes and Bartlett, Inc., Cambridge, MA) Transportation, vol. 10, Dec. 1981, p. 345-356.

Because of the existence of 'limited designation' gateways, i.e., gateways for international air travel where entry by U.S. flag carriers is limited (in many cases to only one carrier), the U.S. Civil Aeronautics Board (CAB) has announced a policy of 'gateway competition'. This policy seeks to maximize inter-gateway competition as a goal of the carrier selection process. The paper reviews the rationale and history of this policy and the economic principles of gateway competition After addressing exceptions where gateway competition does not enhance competitive goals, the issue of how to enforce the credibility of the bidding process in route awards is addressed. The paper concludes by identifying circumstances where competitive objectives are not advanced through application of the principal gateway competition.
(Author)

A82-21589#
A PERSPECTIVE ON CIVIL USE OF GPS
W. C. EULER (Magnavox Advanced Products and Systems Co., Torrance, CA) In· Institute of Navigation, Annual Meeting, 36th, Monterey, CA, June 23-26, 1980, Proceedings. Washington, DC, Institute of Navigation, 1981, p. 33-39. refs

It is noted that, while the GPS development program has made remarkable progress, the case for civilian users has advanced only marginally. The absence of a concrete policy regarding access, accuracy, and user charges has resulted in conservatism on the part of the affected government agencies as well as industry It is suggested that the development of a firm national policy for the civil use of Navstar, is essential to optimize the planning and equipment evolution to be carried out by affected government agencies, civil users, and equipment manufacturers. B J

A82-23317
INTERNATIONAL PLANS FOR CIVIL AND MILITARY CO-ORDINATION
P. J. GRAY (RAF, National Air Traffic Services, London, England) In. Air Traffic Control Association, Annual Fall Conference, 25th, Arlington, VA, October 19-24, 1980, Proceedings Arlington, VA, Air Traffic Control Association, 1980, p. 105-108.

Attention is given to a review of the common aims of the civil and military controller, certain conflicts of interest inherent in the function of civil and military air traffic control, and the resolution of conflicts related to the existence of national boundaries in Western Europe. In connection with the finite nature of air space, it is found to be important that, in an allocation of the utilization of this space, the needs and characteristics of all users, civil and military, must be taken into consideration. In the UK, integrated civil and military staffs at HQ and field levels are used to ensure that no one user interest is permitted to unfairly predominate. In the wider European context civil and military coordination and cooperation prevails within Eurocontrol, and perhaps most successfully, at NATO CEAC (Committee for European Airspace Coordination). G.R

A82-24331
ANNALS OF AIR AND SPACE LAW. VOLUME 5
N. M. MATTE, (ED.) (McGill University, Montreal, Canada) Toronto, Carswell Co., Ltd.; Paris, Editions A. Pedone, 1980. 796 p. In English and French.

Consideration is given to such topics as a fundamental reexamination of the international aviation liability system, air law as an autonomous system, the negotiation of an aircraft purchase contract, recent trends in international aviation accident litigation, the air transportation of handicapped persons, and bilateral air transport agreements between Canada and the United States. Also examined are remote sensing and international law, the international regulation of satellite direct broadcasting, international satellite monitoring for disarmament and development, international legal aspects of future space cities, and the Agreement Governing the Activities of States on the Moon and Other Celestial Bodies.
B J.

A82-25534
PUNITIVE DAMAGES AND INSURANCE COVERAGE QUESTIONS - ANOTHER VIEW
J. J. KENNELLY (International Bar Association, Joint Meeting, Budapest, Hungary, Oct. 1, 1981, Paper.) Air Law, vol. 7, no. 1, 1982, p. 11-21.

Topics relevant to the awarding of punitive damages to plaintiffs filing lawsuits against companies which manufacture, maintain, or

operate aircraft are considered, specifically for conditions which warrant the punitive damages and limitations to the dollar amount. The punitive damages are held to be due the plaintiff if a demonstration of wanton and willful misconduct resulting in injury can be proven, and companies may be held liable vicariously due to actions of an employee. It is noted that liability insurance is intended for compensatory payments rather than punitive remuneration to the injured party. Specific provisions in insurance contracts to allow foreign insurance companies to cover the damages of foreign liability even though a domestic court rules against insurance collection are considered M.S.K.

A82-27827#
LEGAL IMPLICATIONS OF COMMERCIAL SPACE ACTIVITIES
K.-H. BOECKSTIEGEL (Koeln, Universitaet, Cologne, West Germany) In: Colloquium on the Law of Outer Space, 24th, Rome, Italy, September 6-12, 1981, Proceedings. New York, American Institute of Aeronautics and Astronautics, 1982, p. 1-17. refs
(IAF 81-SL-02)

The transition from exploration to commercial exploitation of space and space technology is considered in terms of legal issues defined by international and national laws, the Outer Space Treaty and the Moon Treaty, and liability and regulatory topics. The shift of emphasis of government funding for the Shuttle is regarded as encouraging early commercial use for Shuttle-launched materials processing in space. Communications and earth resources satellites have already begun showing commercial success, and resources assessment from space offers an aid to developing nations in need of mineral and energy sources. Legal issues are projected to include the delineation of the boundaries of outer space, GEO, the legal definition of space transportation systems, the access of states, institutions, and enterprises to natural resources in celestial bodies, and the transfer of space technology. (Author)

A82-27828#
LEGAL IMPLICATIONS OF ECONOMIC ACTIVITIES IN OUTER SPACE
A. A. COCCA In: Colloquium on the Law of Outer Space, 24th, Rome, Italy, September 6-12, 1981, Proceedings. New York, American Institute of Aeronautics and Astronautics, 1982, p. 19-23.
(IAF 81-SL-50)

The directions of economically-driven activities in space are projected, along with legal guidelines -present or future- which will ensure maximum freedom for space development and restraint in areas of general concern. Policy objectives in economic matters of space exploitation are defined as space resources development for integration in the world economy, open cooperation between nations, a prevention of monopolies, and pricing which is equitable. Celestial body-based resources are noted to be open to exploitation although no claim can be made on undeveloped territories. The formation of space-oriented companies such as Intelsat, Intersputnik, the Space Committee, New World, Inc, Otrag, etc. are mentioned as positive manifestations of business activities operating without legal interference. Further review is given to insurance policies, formation of a Space Bank, and maintaining the Shuttle under NASA control M.S.K

A82-27829#
REGULATION OF PRIVATE COMMERCIAL SPACE ACTIVITIES
A. M. DULA In: Colloquium on the Law of Outer Space, 24th, Rome, Italy, September 6-12, 1981, Proceedings. New York, American Institute of Aeronautics and Astronautics, 1982, p 25-45. refs
(IAF 81-SL-03)

Existing legislation concerning space transportation is reviewed for the effects which impinge on activities of privately owned aerospace services. The actual boundary of space has been accepted as the lowest altitude in which a satellite can be placed in orbit without free-falling to earth, and while air space has been defined legally, the consensus thus far is that air space does not extend into space. Rocket launching in the U.S. requires a 24-48 hr notice of certain details of the flight be given the nearest FAA office and defines the conditions under which launch may proceed. Actual private operations are determined to not be covered by the NASAct of 1958, unless the U.S. government funds part of the enterprise, or if the foreign affairs powers of the President are invoked. It is noted that treaties may bind a national government to liability penalties even if launch within the country is carried out by a nongovernmental organization. A conclusion is offered that the optimum successful development of civil space activities will be accomplished only if regulations are written only as they are needed, and not in advance. M.S.K.

A82-27832#
FUTURE LEGAL RULES IN RESPECT TO PRIVATE ENTERPRISE IN OUTER SPACE
G. C. M. REIJNEN (Utrecht, Rijksuniversiteit, Utrecht, Netherlands) In: Colloquium on the Law of Outer Space, 24th, Rome, Italy, September 6-12, 1981, Proceedings. New York, American Institute of Aeronautics and Astronautics, 1982, p. 63-71. refs
(IAF 81-SL-07)

The extent that existing international legislation regarding outer space activities is applicable to commercial enterprises in space is considered, along with potential new legislation for regulating foreseeable problems. Recommendations for an update of the Outer Space Treaty of 1967 include a precise definition of the distribution of profits from space resource exploitation to all countries, a definition of profit, and delineation of the relations between governments and private enterprises. Liability by a private company due to space activities is noted to require legal interpretation, as is the term 'common heritage' in the Moon Treaty. Compensation not based on fault in the Liability Convention is as yet undefined, as are the establishment of an organization which is suitable for mediating solutions to disputes between states due to disagreements in space. M.S.K.

A82-27842#
LEGAL IMPLICATIONS OF SPACE TRANSPORTATION SYSTEMS
M. MENTER (Counsel, Haffer and Alterman, Washington, DC) In: Colloquium on the Law of Outer Space, 24th, Rome, Italy, September 6-12, 1981, Proceedings. New York, American Institute of Aeronautics and Astronautics, 1982, p. 123-134. refs
(IAF 81-SL-17)

This paper discusses: (1) the study, by the United Nations Committee on the Peaceful Uses of Outer Space Scientific and Technical Subcommittee, of the Space Transportation System (STS) or Systems of States; (2) responsibilities of States under the 1967 Space Law Treaty and subsequent treaties as to liability and jurisdiction over space objects and personnel in space, and U.S. action to fulfill such obligations; (3) the need for extending law to cover normal transactions of persons in a space community, such as contracts and other legal instruments for regulations, or codes for their protection, health and welfare, and a mechanism for resolving disputes. Also covered are: (4) the allocation of risks, including liability of users of the U.S Space Shuttle and NASA's recent legislative authority relative to indemnity insurance against third-party liability; (5) patent rights of users of the Shuttle under NASA's policies and Shuttle contract; the status of the Shuttle; (6) the desirability of new legislation and international agreement expanding the role of national and international agencies presently concerned with aircraft flight to exercise similar responsibility as to space flight; and (7) environmental considerations in STS operations. (Author)

A82-29274
THE ROLE OF GOVERNMENTS IN AIR TARIFF ENFORCEMENT
G. REIMER Zeitschrift fuer Luft- und Weltraumrecht, vol. 31, Mar. 1982, p. 12-19. refs

It is pointed out that, during recent years, uneconomic excess capacity led to frequent violations of government approved international air transport tariffs. Many of the problems of the air

transport industry could be solved or avoided through a more adequate system of tariff enforcement by governments, this presently being almost exclusively exercised on a national basis. *Government enforcement of filed and approved tariffs on a* multilateral basis could be of a preventive and a punitive nature for the whole airline industry. Attention is given to the International Air Transport Association (IATA) member airlines' more recent attempts to stop fare discounting unauthorized commissions. The difficulties for individual governments in complying with their bilateral obligations on a national basis in the field of tariff enforcement are considered, and a summary is provided of governments' activities at the level of the ICAO. G.R.

A82-29275
THE INVESTIGATION OF AIRCRAFT ACCIDENTS AND INCIDENTS - SOME RECENT NATIONAL AND INTERNATIONAL DEVELOPMENTS
A. VAN WIJK (KLM Royal Dutch Airlines, Schiphol Airport, Netherlands) Zeitschrift fuer Luft- und Weltraumrecht, vol. 31, Mar. 1982, p. 20-55. refs

In June 1981, an International Civil Aviation Organization (ICAO) Panel of Experts on the General Work Programme of the ICAO Legal Committee recommended that the subject 'Legal Implications of Aircraft Accident and Incident Investigation' deserved consideration as a possible new item to be added to the General Programme of the Legal Committee and that a basic research study should be undertaken by the ICAO Secretariat. A report is provided on developments both at national and international levels connected with the considered subject. Major trends in recent ICAO thinking on the technical side of aircraft and incident investigation procedures are examined, and developments in the *U.S. are considered. Resolutions adopted by the European* Parliament in relation to air traffic safety issues are also discussed, and attention is given to developments in the Netherlands, Switzerland, Sweden, New Zealand, and Canada. G.R.

A82-31982#
CONSIDERATIONS FOR INTERNATIONAL JOINT VENTURE DEVELOPMENT OF VERY LARGE AIRCRAFT
W. A. GARRETT (Lockheed-Georgia Co., Marietta, GA) and H. LIESE (Dornier GmbH, Friedrichshafen, West Germany) American Institute of Aeronautics and Astronautics, International Very Large Vehicles Conference, 2nd, Washington, DC, May 17, 18, 1982, 10 p. refs
(AIAA PAPER 82-0809)

Attention is given to a joint international civilian-military venture for the development of a common aircraft that will satisfy the growing mutual defense objectives and commercial interests of both the U.S. and the respective European NATO countries The high costs involved in the development and manufacture of an advanced-technology, fuel efficient, transport aircraft for the considered applications make it imperative to find an approach in which these costs are distributed among a number of partners. A description is presented of an investigation conducted by an American and a European aerospace company, relative to the prospects for a joint U S./European NATO cooperative aircraft venture. The decision of the two companies to conduct this investigation is based on a long-standing interest in Very Large Aircraft concepts. G.R.

A82-32058
SECTION 419 OF THE AIRLINE DEREGULATION ACT - WHAT HAS BEEN THE EFFECT ON AIR SERVICE TO SMALL COMMUNITIES
J. S. MEYER Journal of Air Law and Commerce, vol 47, Fall 1981, p. 151-185. refs

Section 419 of the Airline Deregulation Act of 1978 (ADA) is assessed in terms of whether the small community program it calls for is working to satisfy the needs of the communities concerned, and whether those needs will call for future government regulation beyond the ten years stipulated in the ADA Opposing economic theories on airline deregulation are reviewed. Section 419 guarantees essential air transportation to certain smaller communities for ten years, and the CAB has rulemaking power to determine which communities qualify The standards for eligibility and what constitutes essential air transportation are discussed, *along with procedures. The reactions of communities to the* changes that deregulation has caused are described, and it is concluded that the airline industry clearly continues to need some form of regulation to insure that smaller communities receive air service necessary to foster their economic growth. C.D.

A82-32060
GOVERNMENT GUARANTIES FOR AIRCRAFT FINANCING
M. D. RICE Journal of Air Law and Commerce, vol. 46, Winter 1981, p 329-345. refs

The history of government-guaranteed loan programs for aircraft financing is related, followed by a discussion of various aspects of the present program under section 42 of the Airline Deregulation Act of 1978. Criteria for eligible carriers and aircraft, the nature of *the guaranty and the terms of the loans, and the procedure for* obtaining a loan guaranty are detailed C.D.

A82-33920#
THE U.S. AIRLINE INDUSTRY - EN ROUTE TO DEREGULATION
E. STARKMAN (Dowling College, Oakdale, NY) AIAA Student Journal, vol. 20, Spring 1982, p. 30-36. refs

The Airline Deregulation Act of 1978 and its consequences for the airline industry in the United States are discussed. The act is argued to have been a product both of public sentiment for reduced government regulation of private enterprise and the particular maturity of the airline industry, and it is noted that the actual deregulation act was preceded by a period of de facto selective *deregulation beginning in 1977. Provisions of the act included the* establishment of a fully competitive airline industry and the gradual dismantling, by January 1, 1985, of the Civil Aeronautics Board. Airlines have responded to the act by strengthening high-cost, long-haul routes at the expense of shorter routes while seeking to maintain feeder routes, in the case of the larger airlines, and explosive growth and the formation of entirely new carriers in the case of local service carriers. A.L.W.

A82-35624#
CURRENT SPACE POLICY CONTROVERSIES - AN OBSERVER'S PERSPECTIVE
J. M LOGSDON (George Washington University, Washington, DC) In: Space manufacturing 4; Proceedings of the Fifth Conference, Princeton, NJ, May 18-21, 1981. New York, American Institute of Aeronautics and Astronautics, 1981, p. 237-240

An investigation is conducted concerning possible developments regarding the national space program for the next decade, taking into account the Apollo and Space Shuttle projects as the major objectives of America's space program during the preceding decades. It is concluded that with the major possible exception of a substantial military space program, the current policy climate is not favorable to large new undertakings in space. A motivation for space activities is related to economic and social payoffs on earth. An examination of satellite communication applications suggests that there will be a twenty or thirty-fold expansion in the use-of-space for relaying various forms of communications in the next two decades. However, with respect *to other areas of space applications, prospects of a substantial* payoff in the near future do not appear to be good enough for substantial investments provided by the private sector. NASA has considered the establishment of a space operations center for supporting a variety of space activities. G.R.

A82-35625#
SPACE POLICY - THE CONTEXT OF LEGISLATION
C. M. CHAFER (Georgetown University, Washington, DC) In: Space manufacturing 4; Proceedings of the Fifth Conference, Princeton, NJ, May 18-21, 1981. New York, American Institute of Aeronautics and Astronautics, 1981, p. 241-249. refs

An analysis of the political, social, national, and economic context for policy making which will influence space manufacturing

and industrialization in the 1980s is presented. Political choices are noted to lack awareness of the capabilities of humans to effect technological progress, although funding and political backing for space programs are also subject to political expediency. The Shuttle program, although starting on the heels of a successful Apollo program, was barely approved and maintained during its developmental years. Favorable political statements are compared with current unfavorable budgetary allotments for the flight schedule of the Shuttle after the successful maiden voyage. An improvement in tax legislation is suggested to encourage private industry investment in high-risk space ventures, thus supplying funds for space development which no longer come from the government.
M S K.

A82-37827#
THE LIABILITY OF THE AIR CARGO CARRIER FOR THE LATE DELIVERY OF A PARCEL [LA RESPONSABILITE DU TRANSPORTEUR AERIEN POUR RETARD DANS LA LIVRAISON D'UN COLIS]
E. COLAS In: Annals of air and space law. Volume 6. Montreal, McGill University; Toronto, Carswell Co., Ltd.; Paris, Editions A. Pedone, 1981, p. 15-30 In French.

Conflicts between article 19 of the Varsovie Convention, which established liability for the delay of delivery of air parcels, and article 23 of the same document, which absolves the air carrier from liability for delays, are discussed It is argued that although no air carrier should be constrained to strict adherence to a schedule due to the dangers which could threaten the crew if delivery on time was mandatory, this situation should not exonerate air freight companies in advance from the responsibility of providing prompt service. Conditions which are set in advance, such as a contractual agreement of a delivery date, or a reasonable amount of time to make delivery, are considered as legally acceptable terms upon which to base liability claims. Methods of establishing the level of financial liability caused by delays in delivery are discussed. M.S.K.

A82-37835#
PRODUCTION OF THE ARIANE LAUNCH VEHICLE [LA PRODUCTION DU LANCEUR ARIANE]
M. G. BOURELY (ESA, Paris, France) In: Annals of air and space law Volume 6. Montreal, McGill University; Toronto, Carswell Co., Ltd.; Paris, Editions A. Pedone, 1981, p. 279-314. In French. refs

The successful third flight of the Ariane launch vehicle culminated an eight year program of development initiated by the nine signatory nations Operational status implies, however, a commercial/industrial sector for the continued production of the launch vehicle and its components, a function which is not the usual province of governments although the rocket owes its existence to public funding. Signed Conventions have established that liability for damages caused by space enterprises to come will be shared internationally. Problems remain in the continued production and adaptation of the vehicle to different missions, while the late delivery of an operational Shuttle in the U S. and also domestic demands for satellite services are noted to guarantee a steady market for launch services in the period 1980-1990. It is recommended that for the near future governmental funds help defray launch and production expenses in order to ensure that the Ariane remains competitive in launch costs with facilities of the U.S and the Soviet Union. M.S.K.

A82-37838#
THE SPACE SHUTTLE - SOME OF ITS FEATURES AND LEGAL IMPLICATIONS
S. GOROVE (Mississippi, University, University, MS) In. Annals of air and space law. Volume 6. Montreal, McGill University, Toronto, Carswell Co.; Ltd.; Paris, Editions A. Pedone, 1981, p. 381-398. refs

The characteristics, operational features, crew membership; payloads, and legal implications of operations of the STS are outlined. The Shuttle will carry either satellites or the Spacelab in the cargo bay in nominal operation, or may add three seats when rescue missions are necessary, when a total of 10 persons could be transported from space to ground. Users of the Shuttle will include communications and manufacturing organizations, the DoD and NOAA, NASA, students, and foreign concerns. Legal problems which are unanswered are whether the Shuttle is a spacecraft or aircraft or, if both, when one status ends and the other begins. Other questions concern the country of registry of either payloads or the Spacelab, the necessity of rerouting air traffic away from the Shuttle descent path, jurisdiction over the personnel and cargo (a responsibility nominally held by the Commander), and matters of insurance for the payloads and for damages which the Shuttle or its payloads may cause to other people, property, the crew, or parts of the payload. M.S.K

A82-37843#
THE ORGANIZATION OF FRENCH SPACE ACTIVITIES - A DYNAMIC COMBINATION OF PUBLIC AND PRIVATE SECTORS [L'ORGANISATION DES ACTIVITES SPATIALES FRANCAISES UNE COMBINAISON DYNAMIQUE DU SECTEUR PUBLIC ET DU SECTEUR PRIVE]
O. DE SAINT-LAGER (Centre National d'Etudes Spatiales, Paris, France) In Annals of air and space law. Volume 6. Montreal, McGill University, Toronto, Carswell Co., Ltd., Paris, Editions A Pedone, 1981, p 475-487. In French

The French government initiated French space-related activities in 1959 and established the National Center for Spatial Studies (CNES) in 1962. CNES projects since then have included international cooperation with ESA to develop the Ariane launch vehicle, with Sweden and Belgium to build the SPOT satellite, and with the U.S. to construct the ARGOS spacecraft. Interactions have also continued with the academic CNRS organization and industry for hardware production Three agencies coordinate private sector space business: the Group for the Development of Space Teledetection (G.D T.A.), Prospace, which deals with industrial promotion and organization of space enterprises, and Satel-Conseil, which gathers and disperses information on satellites and integrated telecommunications systems. Arianespace produces the Ariane launcher through private, industrial interaction managed by ESA. The Spot-image corporation disburses remote sensing data drom the SPOT satellite on a worldwide basis. Continuing deep interaction between governmental and private organizations is indicated M.S K.

A82-37844#
CONTROVERSIAL ISSUES UNDER ARTICLE XI OF THE MOON TREATY
K. B. WALSH In: Annals of Air and Space Law. Volume 6 Montreal, McGill University; Toronto, Carswell Co., Ltd.; Paris, Editions A. Pedone, 1981, p. 489-498. refs

The Agreement Governing the Activities of States on the Moon and Other Celestial Bodies, which is more popularly known as the Moon Treaty, has been described as 'the most far reaching international agreement ever written'. In connection with its significance, the treaty has become the subject of much dispute There are at least three interrelated areas of controversy in Article XI of the treaty. An attempt has been made to define these specific controversies and to understand their bases Article XI provides that 'the moon and its natural resouces are the common heritage of mankind'. It also calls for the establishment of 'an international regime . to govern the exploitation of natural resources'. The meaning of 'common heritage of mankind' needs to be analyzed. In general, it is found that Article XI has succeeded in erecting a barrier to free enterprise development of natural resources, and that it has taken incentive away from all potential exploiters.
G.R.

A82-37915
CATASTROPHIC ACCIDENTS - INDEMNIFICATION OF CONTRACTORS AGAINST THIRD PARTY LIABILITY
P. G. DEMBLING (Schnader, Harrison, Segal and Lewis, Washington, DC) Journal of Space Law, vol 10, Spring 1982, p. 1-12. refs

The history of federal legislation dealing with catastrophic events caused by governmental activities which result in damages which exceed the coverage which can be gained from insurance is presented. First efforts at making large-indemnity cases a federal matter were spurred by a Columbia University report in 1956-1957 which led to the passage of the Price-Anderson Act of 1957, limiting the amount of liability to which a utility is held in the event of a nuclear plant accident. Difficulties were subsequently perceived in that contractors working on projects judged essential to the national interest were found in a position of total liability for damages which might result from their participation Public Law 85-804 allowed the shift of liability from authorized federal department contractors to the U.S. government. Possible legislation to provide individuals with the opportunity

A82-38025
THE RECOGNITION OF AIR WORTHINESS OF AIRCRAFT - COMMENTS TO A REMARKABLE JUDICIAL DECISION [ZUR ANERKENNUNG DER LUFTTUECHTIGKEIT VON FLUGZEUGEN - BEMERKUNGEN ZU EINEM BEMERKENSWERTEN URTEIL]
A. RUDOLF Zeitschrift fuer Luft und Weltraumrecht, vol. 31, June 1982, p. 124-128 In German. refs

A judicial decision made by the U.S. Court of Appeals is discussed, taking into consideration the question whether a German judge might have arrived at the same decision as the American judge, and the legal consequences of such a decision. The considered decision is related to a complaint filed by foreign airlines with respect to an act of the Federal Aviation Agency (FAA). After an aircraft accident involving the loss of a U.S. DC-10 airliner on May 25, 1979, at Chicago, the FAA had prohibited for U S. airspace the operation of all DC-10 aircraft, including those registered in foreign countries. The plaintiffs maintain that this act would constitute a violation of Article 33 of the Chicago Convention, which, in its turn, would violate Paragraph 1102 FAAct. The Court agreed with the plaintiffs. G.R.

A82-40054
AIRPORT FUNDING - APPROACHES FOR SPENDING THE SURPLUS IN THE TRUST FUND
N. P. PATTERSON Journal of Air Law and Commerce, vol. 47, Spring 1982, p. 519-563 refs

The Airport and Airway Development and Revenue Act of 1970 is discussed, and the new legislative proposals to continue airport and airway funding when the old Act expires are analyzed in detail. The trust fund spending practices that led to the current split in the approaches taken for future multiyear funding methods are emphasized. The long-term implications of the new proposals on airports, air carriers, air passengers and general aviation are discussed. C.D.

A82-40055
THE ECONOMIC RECOVERY TAX ACT - SAFE HARBOR RULE FOR LEASES
S. TORKILDSON Journal of Air Law and Commerce, vol. 47, Spring 1982, p 565-604. refs

The impact of the new safe harbor leasing law on the existing body of tax law is analyzed. The various ways lease transactions can be structured is explained, and the business and tax advantages to be gained through the use of leases are discussed. The old IRS guidelines are compared to the new law, with emphasis given to the advantages and disadvantages of the two formats. The major differences concern the minimum at risk investment, transactions entered into for profit, options to purchase or sell, the usefulness of leased property at the end of the lease term, the lessee furnishing part of the purchase price, new vs. used property, who can use the safe harbor, and the useful life of the property at the end of the lease. C.D.

A82-42499
THE AMERICAN EXECUTIVE DEPARTMENTS AS SUCCESSORS TO THE CIVIL AERONAUTICS BOARD - THE POTENTIAL IMPACT ON INTERNATIONAL AIRLINE SERVICE
W. E OCONNOR Air Law, vol. 7, no. 3, 1982, p. 138-145. refs

A82-44469
IT'S TOO LOGICAL - IT'LL NEVER WORK /COMMERCIAL APPLICATIONS OF THE JVX/
J F. ZUGSCHWERT Vertiflite, vol. 28, Sept -Oct. 1982, p 24-27.

It is proposed that both military and commercial applications of V/STOL aircraft be developed by the Joint Services Advanced Vertical Lift Aircraft Fleet, the commercial models would be subject to, and suitable for wartime call-up. Such cross utilization would have the benefit of spreading the R & D and acquisition costs over a larger base, and of reducing the total operational flying hour cost by permitting a return on investment from the commercial aircraft. This proposal is also deemed appropriate for the Heavy Lift Helicopter and the Advancing Blade Concept aircraft A.B.

A82-44696#
PROSPECTS FOR INTERNATIONAL COOPERATION IN MATERIALS PROCESSING TECHNOLOGIES
R DALBELLO and S. FINER (Office of Technology Assessment, Washington, DC) International Astronautical Federation, International Astronautical Congress, 33rd, Paris, France, Sept. 27-Oct. 2, 1982, 7 p. refs
(IAF PAPER 82-225)

Specific problems expected in applications of materials processing in space (MPS) are discussed, along with opportunities for international cooperation in developing and commercializing the MPS technologies. MPS technologies were initiated originally for controlling the propellants on board the Apollo spacecraft and ensuring the ability to effect repairs. Current prospective uses of microgravity environments include the growth of larger and purer crystals for electronic devices, the fabrication of new alloys and composite materials, glass and ceramics, the implementation of chemical processes impossible on earth, such as the fabrication of latex spheres, and the processing of biologic materials. Impediments to space industrialization are outlined, and near term remedies to utilize government and industrial resources to bring the technologies to production readiness are explored M.S.K

A82-44929*# National Aeronautics and Space Administration, Washington, D. C.
PHOTOVOLTAIC OUTLOOK FROM THE NASA VIEWPOINT
L. P. RANDOLPH (NASA, Washington, DC) In Photovoltaic Specialists Conference, 15th, Kissimmee, FL, May 12-15, 1981, Conference Record. New York, Institute of Electrical and Electronics Engineers, Inc., 1981, p 10-13. refs

The NASA photovoltaic outlook for space applications focuses on the needs for increasing the specific power (W/kg), establishing radiation damage control, and reducing the specific cost ($/W). In each of these areas the technology requirements and potential impediments are presented Technology trends and forecasts are also discussed. (Author)

A82-45175
AVIATION LAW: CASES AND MATERIALS. DOCUMENTS SUPPLEMENT 1981 /2ND EDITION/
A. F. LOWENFELD (New York University, New York, NY) New York, Matthew Bender and Co , 1981. 1456 p.; Documents supplement 1981, 1277 p.
PRICE OF TWO VOLUMES, $330

A textbook on legal matters specifically dealing with aspects of aviation legislation, both domestic and international, is presented, along with a supplementary volume of pertinent documentation A point of view of aviation law as a complement to administrative law is taken. Attention is given to the drafting and interpretation of international agreements, the settlement of international disputes, the functioning of international agencies, and the conduct of states. The problem of aircraft noise is considered, as are

compensation in the case of transport injuries costs and the role and effects of treaties. Finally, airplane hijacking is dealt with in terms of international law, jurisdiction, extradition, and conflict due to political asylum and personal privacy and the public safety, i.e., airline passengers M.S.K.

A82-45388
NATIONAL SPACE POLICY IN EVOLUTION
M. A. BERTA (USAF, National Security Council, Washington, DC) and S. G. ROSEN (USAF, Office of Special Projects, Los Angeles, CA) In: Leadership in space for benefits on earth; Proceedings of the Twenty-eighth Annual Conference, San Diego, CA, October 26-29, 1981. San Diego, CA, Univelt, Inc., 1982, p. 17-27.
(AAS 81-301)

The nature of national commitments to space has evolved over the last twenty-five years. It is in this context that space laws, agreements, and policy statements are reviewed. Future directions will be guided by Administration objectives to effect economic recovery and strengthen national security (Author)

A82-45393
THE EVOLVING ROLE OF THE FEDERAL GOVERNMENT IN SPACE COMMUNICATIONS RESEARCH AND DEVELOPMENT
D. R. BRANSCOME (U.S. House of Representatives, Washington, DC) In: Leadership in space for benefits on earth; Proceedings of the Twenty-Eighth Annual Conference, San Diego, CA, October 26-29, 1981. San Diego, CA, Univelt, Inc., 1982, p. 81-94.
(AAS 81-328)

The role of the Federal Government in the evolvement of satellite communications systems is discussed The evolution of commercial satellite systems and their relation to NASA experimental satellites are presented Several studies assessing the impact of NASA's withdrawal from satellite communications research and development are summarized. Also included is a discussion of foreign industry and the role foreign governments are playing. Conclusions and observations from Congressional hearings on the role of government in communications research and development are presented. This paper also includes a look at what the future may hold (Author)

A82-46492#
ANALYSIS OF GOVERNMENT'S ROLE IN COMMERCIALIZATION OF SPACE TECHNOLOGY
M SIMON (General Dynamics Corp., Convair Div, San Diego, CA) AIAA, DGLR, AAS, and BIS, Space Systems Conference: The Space Transportation System: A Review of Its Present Capability and Probable Evolution, Washington, DC, Oct. 18-20, 1982, AIAA 8 p refs
(AIAA PAPER 82-1821)

Establishment of joint government-industry programs is analyzed as a means of encouraging private investment in space technology and applications. The major barriers to investment in space resources - and the government's role in reducing these barriers - are explored, with emphasis upon investment requirements and risk. A recommended approach is presented for developing institutional arrangements for cooperation between government and private industry, based upon cost-benefit and effectiveness considerations. (Author)

A82-47262
EUROPEAN USE OF THE SPACE SHUTTLE
D. J. SHAPLAND (ESA, Paris, France), D GENTHE (Deutsche Forschungs- und Versuchsanstalt fur Luft- und Raumfahrt, Porz-Wahn, West Germany), and C BUONGIORNO (Roma, Universita, Rome, Italy) In: Making space work for mankind; Proceedings of the Nineteenth Space Congress, Cocoa Beach, FL, April 28-30, 1982. Cape Canaveral, FL, Canaveral Council of Technical Societies, 1982, p. 3-18 to 3-39.

Potential uses of the Space Shuttle by Europeans are summarized. The uses discussed include the Spacelab, the first Spacelab payload, the German D-1 mission, Spacelab facilities such as the Space Sled, the Biorack, the Material Science Double Rack, the metric camera, the microwave remote sensor, the fluid physics module, the cryostat, the German Infrared Laboratory, and the Tethered Satellite System. The payload integration, ESA flight crew, microgravity program, coronal helium abundance experiment, and soft X-ray imaging telescope are also covered. Finally, the use of the Space Shuttle as a launch vehicle and as a first stage launch vehicle is addressed. The discussed uses are illustrated, and the relationship of ESA member states to the agency's activities is graphically depicted. C.D.

A82-47269
NASA/INDUSTRY JOINT VENTURE ON A COMMERCIAL MATERIALS PROCESSING IN SPACE IDEA
R. L. RANDOLPH (Microgravity Research Associates, Inc., Miami, FL) In: Making space work for mankind; Proceedings of the Nineteenth Space Congress, Cocoa Beach, FL, April 28-30, 1982. Cape Canaveral, FL, Canaveral Council of Technical Societies, 1982, p. 5-28 to 5-31.

A joint endeavor between Microgravity Research Associates, Inc. (MRA) and NASA is discussed. The concept involves the development and demonstration of the capability to produce high quality electronic materials in space by use of the electro-epitaxial process. The negotiations that arrived at the contract are described, and the three phases of the endeavor are summarized. MRA's projected activities after completion of the project are stated. Finally, the pricing of the product and the risks involved in the project are assessed, and the outlook is evaluated. C.D.

A82-47274* National Aeronautics and Space Administration, Washington, D. C.
FUTURE DIRECTIONS FOR THE SPACE PROGRAM WITH SPECIAL REFERENCE TO THE COMMERCIAL AND INDUSTRIAL OPPORTUNITIES
R. J. PHILIPS (NASA, Washington, DC) In: Making space work for mankind; Proceedings of the Nineteenth Space Congress, Cocoa Beach, FL, April 28-30, 1982. Cape Canaveral, FL, Canaveral Council of Technical Societies, 1982, p. 6-19 to 6-21.

A82-47275
PROGRESS IN RENEWABLES
R. L. SAN MARTIN (U.S Department of Energy, Washington, DC) In. Making space work for mankind; Proceedings of the Nineteenth Space Congress, Cocoa Beach, FL, April 28-30, 1982. Cape Canaveral, FL, Canaveral Council of Technical Societies, 1982, p. 7-24 to 7-28

This is a status report on progress made in the conduct of eleven Federally-supported renewable energy programs. Considerable progress has been made in the establishment and development of an infrastructure to support sustained growth Unique technical problems led to the research and development of materials and designs which have achieved energy conversion efficiencies of up to 25% for electricity and 92% for heat in solar thermal systems. Overall, enough real progress has been made to provide a sound technology base upon which renewable energy systems industries can reasonably continue development.
(Author)

N82-10953# VDI-Technologiezentrum, Berlin (West Germany).
DOCUMENTATION AND INFORMATION ON PROTECTIVE RIGHTS RELATING TO GOVERNMENT SUPPORT ON TECHNOLOGICAL RESEARCH AND DEVELOPMENT Final Report
I. GRETSCHER Bonn Bundesministerium fuer Forschung und Technologie Dec. 1980 245 p In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-80-177; ISSN-0340-7608) Avail: NTIS HC A11/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 41

Patent applications filed in 1978 in government-sponsored research are listed. Applications of microelectronics, electronics, metallurgy and materials technology, non-nuclear energy and communication are included. Protective rights, inventor, license holder and descriptions of the invention with diagrams are given.
Author (ESA)

N82-10959# Committee on Science and Technology (U. S. House).
NASA AUTHORIZATION, 1982: INDEX
Washington GPO 1981 316 p Hearings on H.R. 1257 before the Comm. on Sci. and Technol., 97th Congr., 1st Sess., No. 2, 1981
(GPO-84-713) Avail Committee on Science and Technology

A subject and name index is presented to the testimony delivered, statements received, and questions raised in relation to NASA's budget requests, for program management, construction of facilities, and research and development. A.R.H.

N82-11473# Kanner (Leo) Associates, Redwood City, Calif.
MAGNETIC BEARINGS
I. YASUDA 1981 10 p Transl. into ENGLISH of Japanese Patent No 125544-1978 (1 Nov, 1978, Patent Appl No. 40294-1977) Prepared for LASL, N. Mex.
(Contract W-7405-ENG-36)
(DE81-024201, LA-TR-81-19) Avail: NTIS HC A02/MF A01

The design and operation of a magnetic bearing are described. Noncontacting bearings with concentric cylindrical parts formed on rotating bodies and stationary bodies are discussed. The enhancement of the dampening effect for suppressing vibrations is emphasized. DOE

N82-11666# Performance Development Inst., Washington, D C
INCENTIVES FOR TECHNOLOGICAL INNOVATION IN AIR POLLUTION REDUCTION: AN ETIP POLICY RESEARCH SERIES. VOLUME 8: CONTROLLED TRADING AND SITE-SPECIFIC SIP REVISIONS: COMPETING FOR ATTENTION IN A CROWDED ADMINISTRATIVE ROUTE Interim Report
J EVANS Dec. 1980 108 p refs
(Contract NBS-78-3603)
(PB81-218273; NBS-GCR-ETIP-81-95) Avail: NTIS HC A06/MF A01 CSCL 13B

Factors regarding the impacts on innovation of regulatory incentives were studied The report presents case studies and analysis showing how the success of these reforms is endangered by the slowness of the administrative route for approval in a state implementation plan (SIP). T.M.

N82-11979# General Accounting Office, Washington, D. C Federal Personnel and Compensation Div.
CIVIL SERVANTS AND CONTRACT EMPLOYEES: WHO SHOULD DO WHAT FOR THE FEDERAL GOVERNMENT
19 Jun 1981 50 p refs
(PB81-219966; FPCD-81-43) Avail: NTIS HC A03/MF A01 CSCL 05I

The various contract reform bills introduced in the 96th Congress are analyzed in relation to those areas identified as needing improvement. The status of executive branch implementation of management controls of reform agency contract practices is determined and changes in the size of the Federal indirect contract work force are compared with the direct work force. Prior reports involving contractors used to do work that should have been done by Government employees and the extent to which Government employees perform commercial services are also addressed DOE

N82-11981* National Aeronautics and Space Administration, Washington, D. C.
NASA PATENT ABSTRACTS BIBLIOGRAPHY: A CONTINUING BIBLIOGRAPHY, SECTION 1, ABSTRACTS. SUPPLEMENT 19
Jul 1981 53 p
(NASA-SP-7039(19)-SEC-1) Avail: NTIS HC A04/MF A01 CSCL 05B

Abstracts are cited for 130 patents and patent applications introduced into the NASA scientific and technical information system during the period of January 1981 through July 1981. Each entry consists of a citation, an abstract, and in most cases, a key illustration selected from the patent or application for patent. A R.H.

N82-11982* National Aeronautics and Space Administration, Washington, D. C.
NASA PATENT ABSTRACTS BIBLIOGRAPHY: A CONTINUING BIBLIOGRAPHY, SECTION 2, INDEXES. SUPPLEMENT 19
Jul. 1981 684 p
(NASA-SP-7039(19)-SEC-2) Avail: NTIS HC A99/MF A01 CSCL 05B

Citations of approximately 4,000 patents and patent applications for the period May 1969 through July 1981 are indexed according to subject, invention, source, number, and accession number. A.R.H.

N82-11990# Air Force Academy, Colo. Dept. of Astronautics and Computer Science
MILITARY SPACE DOCTRINE: THE GREAT FRONTIER Final Report
P. VIOTTI, ed., P. A. SWAN, ed, and C. D. FRIEDENSTEIN, ed. 3 Apr. 1981 168 p Proceedings of the Conf. at the USAFA Mil Space Doctrine Symp., 1-3 Apr. 1981
(AD-A104574) Avail: NTIS HC A08/MF A01 CSCL 15C

The report presents the consensus of 246 leaders of the Air Force space program to questions posed to them in three areas: United States space operations doctrine, United States space organization doctrine, and International/USSR space operations and organization doctrine Within each of these areas, discussion is divided between the past, the present (1975-1985) and the future (post 1985). Author (GRA)

N82-12991# Office of Technology Assessment, Washington, D.C.
BACKGROUND AND PURPOSE OF THE STUDY
In its Computer-based Natl. Inform. Systems p 29-34 Sep. 1981
Avail: SOD HC

As computer-based national information systems become more important to American society, particularly for Government administration, they create corresponding public policy problems. These problems are discussed and include the design, procurement, and operation of Government data systems; the potential for Government agencies to abuse the large record systems they operate that contain personal data; the effects of computer technology on the structure and operations of the banking industry; the role of the Postal Service in providing electronic message service; problems concerned with the protection of privacy and constitutional rights presented by the use of large automated data systems; and the impact of information technologies on copyright laws. T M

N82-14644# American Bar Association, Washington, D.C. Special Committee on Energy Law.
NEED FOR POWER AND THE CHOICE OF TECHNOLOGIES: STATE DECISIONS ON ELECTRIC POWER FACILITIES
Jun 1981 221 p refs
(Contract DE-AC01-79RG-10004)
(DE81-025960; DOE/EP-10004/1) Avail: NTIS HC A10/MF A01

The decision-making processes at the state level regarding the licensing of electric generating facilities were assessed The basic issues addressed are the need for power and choice of technology: state decisions which directly influence and affect the nation's energy supply, and the tradeoffs involved in meeting energy demand. The areas of special emphasis included the legal mechanisms and regulatory procedures used to determine and resolve these issues. The effectiveness of state decision-making was assessed, focusing on legal and administrative histories and accommodation of interests of concerned parties. Recent innovations to enhance the decision-making process were also assessed where applicable. No particular substantive results are advocated in the findings The recommendations presented are broad in scope. DOE

N82-14981# Strasbourg Univ. (France). Bureau d'Economie Theorique et Appliquee.
ECONOMIC EFFECTS INDUCED BY ESA CONTRACTS, PHASE 2. VOLUME 1: SUMMARY [LES EFFETS ECONOMIQUES INDUITS DES CONTRATS DE L'ESA. PHASE 2. VOLUME 1: RESUME]
P. BRENDLE, P. COHENDET, J. A. HERAUD, R. LARUEDETOURNEMINE, H. SCHMIED, D. VITRY, and E. ZUSCOVITCH Paris ESA Jun 1980 22 p In FRENCH 3 Vol.
(Contract ESA-3702/78/F-DKR(SC))
(ESA-CR(P)-1462-VOL-1) Avail: NTIS HC A02/MF A01

Different effects are classified by. technological advantages; commercial gains; organization and methodological advances; and impact on employment. Exports and limiting, or substitution for, imports are considered. Advantages other than space research were estimated for each sector of the economy and by country. Project Meteosat is shown to be of particular value. Results show that innovations due to ESA funding center on two essential activities: processing, storage and dissemination of information; and conditioning, storage and distribution of energy.
Author (ESA)

N82-14982# Strasbourg Univ. (France). Bureau d'Economie Theorique et Appliquee.
ECONOMIC EFFECTS INDUCED BY ESA CONTRACTS, PHASE 2. VOLUME 2: MAIN REPORT [LES EFFETS ECONOMIQUES INDUITS DES CONTRATS DE L'ESA. PHASE 2. VOLUME 2: RAPPORT PRINCIPAL]
P. BRENDLE, P. COHENDET, J. A. HERAUD, R. LARUEDETOURNEMINE, H SCHMEID, D. VITRY, and E. ZUSCOVITCH Paris ESA Jun. 1980 148 p refs In FRENCH 3 Vol
(Contract ESA-3702/78/F-DKR(SC))
(ESA-CR(P)-1462-VOL-2) Avail: NTIS HC A07/MF A01

Technological advantages, commercial gains, organizational and methodological advances, and impact on employment are discussed. Quantitative results are given by sector of the economy, country and by contracting industry. The exceptional utility of project Meteosat is revealed. Innovations achieved in the distribution of productivity and technological independence won through ESA efforts are considered.
Author (ESA)

N82-14983# Strasbourg Univ. (France). Bureau d'Economie Theorique et Appliquee.
ECONOMIC EFFECTS INDUCED BY ESA CONTRACTS. PHASE 2. VOLUME 3: THEORY AND METHOD [LES EFFETS ECONOMIQUES INDUITS DES CONTRATS DE L'ESA. VOLUME 3: RAPPORTS THEORIQUE ET METHODOLOGIQUE]
P. BRENDLE, P. COHENDET, J. A. HERAUD, R. LARUEDETOURNEMINE, H. SCHMIED, D. VITRY, and E. ZUSCOVITCH Paris ESA Jun. 1980 57 p refs In FRENCH 3 Vol.
(Contract ESA-3702/78/F-DKR(SC))
(ESA-CR(P)-1462-VOL-3) Avail: NTIS HC A04/MF A01

The economic utility of ESA contracts to the European community was determined. The economic impact of R and D was cost/benefit analyzed, macroeconomically and microeconomically. Results are given as: technological effects; commercial gains; organizational and methodological advances, and influences of ESA contracts on contractor personel. Project Meteosat is taken as an example. Data acquisition is discussed. The statistical significance of the sample is shown.
Author (ESA)

N82-14985*# New York Univ., New York. Center for Science and Technology Policy
THE CHANGING TIDE: FEDERAL SUPPORT OF CIVILIAN-SECTOR R AND D
H. I. FUSFELD, R. N LANGLOIS, and R. R. NELSON 1 Nov. 1981 151 p refs
(Contract NSG-7636)
(NASA-CR-165048) Avail: NTIS HC A08/MF A01 CSCL 05A

The involvement of the Federal government in civilian sector research and development is discussed. Relevant policies are put in an historical perspective. The roles played by industrial research and public funding are reviewed. Government support of basic an generic research, clientele-oriented applied research, and research with commercial ends is studied. Procurement, anti-trust, and patent policies, all of which affect the climate for private research and development, are examined.
R.J.F.

N82-14986*# New York Univ., New York. Center for Science and Technology Policy
TECHNICAL CHANGE IN US INDUSTRY: A CROSS-INDUSTRY ANALYSIS
R. R. NELSON, ed. 1 Nov. 1981 482 p refs
(Contract NSG-7636)
(NASA-CR-165047) Avail: NTIS HC A21/MF A01 CSCL 05A

The nature of the public policies which have influenced the pace and pattern of technical progress in a number of American industries is studied with the view of assessing the broad effects of these policies The industries studied are agriculture, pharmaceuticals, semiconductors, computers, civil aircraft, automobiles and residential construction The policies considered include research and development funding as well as government procurement, education, information dissemination, patent protection, licensing, regulations, and anti-trust policies.
R.J.F.

N82-15985* National Aeronautics and Space Administration, Washington, D. C.
INDEX TO NASA NEWS RELEASES AND SPEECHES, 1980
1981 131 p
Avail. NTIS HC A07/MF A01 CSCL 05B

A listing is provided of 201 news releases distributed by the Office of Public Affairs, NASA Headquarters and 10 selected speeches presented by Headquarters staff in 1980. Subject and name indexes are arranged alphabetically. Indexes to titles, news release numbers and accession numbers are arranged numerically.
A.R H.

N82-15998*# Rice Univ., Houston, Tex.
TRENDS IN LIABILITY AFFECTING TECHNICAL WRITERS
L. P. DRISKILL *In* NASA. Langley Research Center Tech. Commun., Pt. 2 p 597-608 Dec. 1981 refs
Avail: NTIS HC A14/MF A01 CSCL 05B

Liability of technical writers for defective products is explored. Documents generated during a product's life cycle (including design memos, design tests, clinical trials, trial use reports, letters, and proposals) become relevant because they are likely to become the only available means of showing that the product was not defectively designed. These documents become the evidence that the product underwent balanced and well considered planning, development, testing, quality control, and field testing. The predicted increased involvement of technical writers in the prevention and defense of product liability claims is cited in view of a greater number of cases turning on 'failure to warn'.
N.W.

N82-16523# Argonne National Lab., Ill. Energy and Environment Systems Div.
ANALYSIS OF STATE-ENERGY-PROGRAM CAPABILITIES
J. TATAR, D. CLIFFORD, F GUNNISON (Science Applications, Inc.), and B. HUMPHREY May 1981 62 p refs
(Contract W-31-109-ENG-38)
(DE82-001963, ANL/CNSV-TM-82) Avail: NTIS HC A04/MF A01

The potential effects on state energy programs of a reduction in the financial assistance available through the state and local

assistance programs and the distribution of those effects, are assessed. The assessment is based on a survey of nine state energy offices (SEOs), which were selected on the basis of state support of energy programs weighted by state energy consumption The nine SEOs surveyed were the Arizona Energy Office, Arkansas Department of Energy, California Energy Commission, Florida Governor's Energy Office, Illinois Institute of Natural Resources, Minnesota Energy Agency, New Jersey Department of Energy, South Carolina Governor's Division of Energy Resources, and Washington State Energy Office. T.M.

N82-16925# American Univ., Washington, D. C.
APPROPRIATION REIMBURSEMENTS Final Report
R. E. DOROSZ 1981 88 p refs Sponsored in part by Dept of Defense
(PB81-245409; REPT-102-79-7) Avail: NTIS HC A05/MF A01 CSCL 05A

Appropriation reimbursements have been part of the Department of Defense's accounting, budgeting and reporting systems since the enactment of Sect. 601 of the 1932 Legislative Appropriations Act. An historical background on appropriation reimbursements is presented, current issues and problems, are discussed, and recommendations to improve the reimbursement process are introduced. GRA

N82-16936# Committee on Science and Technology (U. S. House).
LONG-TERM PLANNING FOR NATIONAL SCIENCE POLICY
Wasington GPO 1981 320 p refs Hearings before the Subcomm. on Sci., Res. and Technol. of the Comm. on Sci and Technol., 96th Congr., 2nd Sess., No 182, 28-31 Jul. 1980
(GPO-68-603) Avail: *Subcommittee on Science, Research and* Technology

The question of how to better identify science policy goals and planning processes for both Congressional and public understanding was addressed. The need to examine short-term national actions on budget policies and their integration into long term policy planning for the future was discussed. The main objective of the study is to identify ways to modify and improve current planning done by the Federal Government M D.K.

N82-17655# Committee on Commerce, Science, and Transportation (U S. Senate).
NOISE IMPACT ON COMMUNITIES FROM AIRCRAFT
Washington GPO 1981 40 p Hearing before the Comm on Com., Sci., and Transportation, 97th Congr , 1st Sess., 10 Feb. 1981
(GPO-80-617) Avail· Committee on Commerce, Science, and Transportation

The environmental and noise pollution problems of Cannon International Airport in Reno, Nevada are discussed. Restrictions imposed by the Federal government and the airport management on flight into and out of the airport were reviewed. Near-by urban development projects are described and the impact of airport traffic on them was evaluated Discussion focused on the balance of economic development brought about by the airport and the rights of residents to enjoy a comfortable environment T.M

N82-18069*# Denver Univ., Colo. Transfer Research and Impact *Studies Project.*
NASA TECHNOLOGY UTILIZATION PROGRAM: THE SMALL BUSINESS MARKET Final Report
J. K. VANNOY, F. GARCIA-OTERO, F D JOHNSON, and E STASKIN 1 Jul. 1980 115 p refs
(Contract NASW-3021)
(NASA-CR-168447) Avail: NTIS HC A06/MF A01 CSCL 05A

Technology transfer programs were studied to determine how they might be more useful to the small business community. The status, needs, and technology use patterns of small firms are reported. Small business problems and failures are considered. Innovation, capitalization, R and D, and market share problems are discussed. Pocket, captive, and new markets are summarized. Small manufacturers and technology acquisition are discussed, covering external and internal sources, and NASA technology. Small business and the technology utilization program are discussed, covering publications and industrial applications centers. Observations and recommendations include small business market development and contracting, and NASA management technology. N.W.

N82-18450# Committee on Science and Technology (U. S. House).
NASA SPACE COMMUNICATIONS PROGRAM
Washington GPO 1982 25 p Presented by the Subcomm. on Space Sci. and Appl. of the Comm. on Sci and Technol., 97th Congr., 2nd Sess., Feb. 1982
(GPO-85-553) Avail: Subcommittee on Space Science and Applications

A summary of NASA's space communications research and development program is provided NASA's role in space communications, particularly in the 30/20 Gigahertz research and development program is discussed How NASA should plan for space communications beyond 1990, and how NASA can best distribute public information concerning space communications is also discussed. R.J.F.

N82-19083*# National Aeronautics and Space Administration, Washington, D. C.
SELLING TO NASA
Oct. 1981 50 p
(NASA-TM-84136; NHB-5100.1D) Avail: NTIS HC A03/MF A01 *CSCL 05A*

The prospective NASA contractor is provided with information that describes the agency and its procurement practices. Products include ideas, manufacturing capabilities, fabricated components, construction, basic materials, and specialized services. NASA assistance in marketing these and other products is emphasized. Small and minority business enterprises are discussed. The agency's scientific and technical information activities are also discussed N.W.

N82-19084*# National Aeronautics and Space Administration, Washington, D. C.
NASA POCKET STATISTICS
Jan. 1982 70 p
(NASA-TM-84134) Avail: NTIS HC A04/MF A01 CSCL 05A

NASA program goals and objectives, major mission performance, USSR space flights, comparisons of the USA and USSR space records, and selected technical, financial, and manpower data are summarized. N.W.

N82-19090# National Science Foundation, Washington, D.C. Div. of Science Resources Studies.
FEDERAL FUNDS FOR RESEARCH AND DEVELOPMENT, VOLUME 29, FISCAL YEARS 1979, 1980 AND 1981 Final Report
Jan. 1981 59 p refs
(PB82-118902, NSF-81-306) Avail: NTIS HC A04/MF A01 CSCL 05A

The report covers Federal agency R&D funding, as shown in the 1981 revised budget. The analysis covers R&D program levels for 1979-81, focusing on relative changes from 1980 to 1981, after the budget revision, with indications of subsequent congressional appropriation actions, where known. It includes data on basic research, applied research, and development; on performers of R&D work (intramural, industrial, university-and-college, etc.); on research by fields of science, and R&D data for 1979 by geographic (State) distribution. The publication includes a section on R&D funding by budget function (national defense, space, health, energy, etc.) in the 1981 budget and in prior years and another section on Federal R&D support to performers since 1955 with special emphasis on university-and-college support. GRA

N82-19100# Air Force Systems Command, Andrews AFB, Md. Office of the Staff Judge Advocate.
PATENT ABSTRACT DIGEST, VOLUME 1 Interim Report
F. A. LUKASIK 30 Apr. 1979 95 p 3 Vol
(AD-A108672; AFSC-TR-81-65) Avail: NTIS HC A05/MF A01 CSCL 05B

One page summaries of new technology generated under Air Force programs and protected by issued U.S. patents are presented. Each of the 92 entries consists of a citation, an abstract, and in most cases, a key illustration selected from the patent. GRA

N82-19101# Air Force Systems Command, Andrews AFB, Md. Office of the Staff Judge Advocate.
PATENT ABSTRACT DIGEST, VOLUME 2 Interim Report
F. A. LUKASIK Mar. 1981 111 p 3 Vol.
(AD-A108673; AFSC-TR-81-66) Avail: NTIS HC A06/MF A01 CSCL 05B

One page summaries of new technology generated under Air Force programs and protected by issued U.S. patents are presented. Each of the 108 entries consists of a citation, an abstract, and in most cases, a key illustration selected from the patent. GRA

N82-19102# Air Force Systems Command, Andrews AFB, Md. Office of the Staff Judge Advocate.
PATENT ABSTRACT DIGEST, VOLUME 3 Interim Report
F. A. LUKASIK Sep. 1981 114 p 3 Vol.
(AD-A108674; AFSC-TR-81-67) Avail: NTIS HC A06/MF A01 CSCL 05B

One page summaries of new technology generated under Air Force programs and protected by issue U.S. patents are presented. Each of the 111 entries consists of a citation, an abstract, and in most cases, a key illustration selected from the patent. GRA

N82-19234# Committee on Science and Technology (U. S. House).
FUTURE SPACE PROGRAMS, 1981
Washington GPO 1981 335 p refs Hearing before the Subcomm. on Space Sci. and Appl. of the Comm. on Sci. and Technol., 97th Congr., 1st Sess., No. 50, 21-23 Sep. 1981
(GPO-86-913) Avail: Subcommittee on Space Science and Applications

Future space programs and the nature of the future in general are discussed. Predictions are made in the areas of science, technology, and demography. Space industrialization and space exploration are discussed. R.J.F.

N82-19244# European Space Agency, Paris (France). Directorate of Administration.
SPACE ACTIVITIES IN THE 80'S: THE PROGRAMS AND THE INDUSTRY. PART 3: DETAILED PRESENTATION OF THE EUROPEAN SPACE INDUSTRY (1981)
G. DONDI Nov. 1981 535 p 3 Vol.
(ESA-SP-1012-VOL-2; ISSN-0379-6566) Avail: NTIS HC A23/MF A01; ESA, Paris FF 160 (for volume 2) FF 300 (for complete set)

The specializations, activities and potential of the space industry of ESA member countries are listed. The space firms of each country are indicated and their space activities are summarized. Contracts awarded by ESA to the firms of each country are detailed. Market guides for a number of key space/space related fields of activity, e.g., propulsion or remote sensing, are provided. Author (ESA)

N82-19246# European Space Agency, Paris (France). Science Advisory Committee.
RECOMMENDATIONS ON THE DEVELOPMENT OF SPACE SCIENCE IN THE 1980'S
Dec. 1981 74 p refs
(ESA-SP-1015; ESA-SPC(79)2; SAC(78)17) Avail: NTIS HC A04/MF A01

The role and effectiveness of ESA in science is reviewed and recommendations for development in the 1980's are made. These include: increasing the launch rate to one satellite per year; allocating Spacelab facilities to microgravity experiments as well as to atmospheric, plasma physics and astronomical investigations; and studying a fourth stage for Ariane or the use of alternative propulsion techniques. Author (ESA)

N82-20006*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
LOCAL AND NATIONAL IMPACT OF AEROSPACE RESEARCH AND TECHNOLOGY
J. F. MCCARTHY, JR. Dec. 1981 10 p refs Presented at Cleveland City Club, Ohio, 4 Dec. 1981
(NASA-TM-82775, E-1106) Avail: NTIS HC A02/MF A01 CSCL 05A

An overview of work at the NASA Lewis Research Center in the areas of aeronautics space, and energy is presented. Local and national impact of the work is discussed. Some aspects of the U.S. research and technology base, the aerospace industry, and foreign competition are discussed. In conclusion, U.S. research and technology programs are cited as vital to U.S. economic health. Author

N82-20168# Committee on Science and Technology (U. S. House).
FAA AIR TRAFFIC CONTROL COMPUTER MODERNIZATION
Washington GPO 1981 101 p Hearings before the Subcomm. on Transportation, Aviation and Materials of the Comm. on Sci. and Technol., 97th Congr., 1st Sess., No. 13, 16-18 Jun. 1981
(GPO-82-375) Avail: Subcomm. on Transportation, Aviation and Materials

The issues of air traffic safety, the separation of air traffic, and the movement of traffic from one part of the country to another, are discussed. The proposed computer system was examined. Questions concerning whether the current system can be safely operated while a new system is being implemented and whether the overall cost effectiveness of the new system is adequate, are considered. The FAA's plans were reviewed along with its management of the current system. T.M.

N82-20327# Committee on Science and Technology (U. S. House).
SYNTHETIC FUELS DEVELOPMENT
Washington GPO 1981 118 p Hearing before the Subcom. on Energy Development and Applications and the Subcomm. on Investigations and Oversight of the Comm. on Sci. and Technol., 97th Congr. 1st Sess., No. 33, 27 Jul 1981
(GPO-85-050) Avail: Subcomm. on Energy Development and Applications

Recent developments in synthetic fuels technology are discussed, particularly in the areas of coal gasification, coal liquefaction, shale oil extraction, and alcohol fuel development. Government-industry cooperation is discussed. The problems of synfuel development are evaluated in the context of the U.S. dependence on imported oils. Synfuel production costs are examined. R.J.F.

N82-20329# Committee on Science and Technology (U. S. House).
THE NATURAL GAS OPTION: NEW RESOURCES AND NEW TECHNOLOGIES
Washington GPO 1981 176 p Hearing before the Subcomm. on Energy Development and Applications of the Comm. on Sci. and Technol., 97th Congr., 1st Sess., No 28, 22 Jul. 1981
(GPO-85-052) Avail: Subcomm. on Energy Development and Applications

The ability of the gas industry to develop new technology for gas production and efficient gas use is examined. Synfuel/production coal gasification, coal liquefaction, and other alternative fuel technologies are discussed. The gas energy supply outlook for 1980 to 2000 is discussed R.J.F.

N82-20865# Committee on Science and Technology (U. S. House).
NATIONAL TOXICOLOGY PROGRAM
Washington GPO 1981 189 p Hearing before the Subcomm. on Investigations and Oversight of the Comm. on Sci. and Technol., 97th Congr., 1st Sess., No 32, 15 Jul. 1981
(GPO-85-397) Avail: Subcomm. on Investigations and Oversight

The activities, plans, and priorities of the national toxicology program are discussed. The aim of the program is to develop through research the scientific information needed to protect the public health from damage by exposure to hazardous toxic substances. The effectiveness of the program was discussed. Carcinogens, particularly asbestos, are discussed. Bioassays and other forms of analysis are evaluated. R.J F.

N82-21092# Committee on Science and Technology (U. S. House).
NASA PROGRAM MANAGEMENT AND PROCUREMENT PROCEDURES AND PRACTICES
Washington GPO 1981 162 p Hearings before the Subcomm. on Space Sci. and Applications of the Comm. on Sci. and Technol., 97th Congr., 1st Sess., No. 16, 24-25 Jun. 1981
(GPO-82-309) Avail: Subcomm. on Space Sci. and Applications

The National Aeronautics and Space Administration's program management and procurement policies and practices as they relate to research and development programs are reviewed. Project cost growth and schedule slippage are examined and numerous recommendations are given R.J.F.

N82-21096# Committee on Science and Technology (U. S. House).
THE INFORMATION SCIENCE AND TECHNOLOGY ACT
Wasington GPO 1981 374 p refs Hearings on H.R. 3137 before the Subcomm. on Sci., Res. and Technol. of the Comm. on Sci and Technol., 97th Congr., 1st Sess., No. 25, 27-28 May and 9 Jun. 1981
(GPO-83-486) Avail: Subcomm. on Sci., Res. and Technol.

Testimony concerning the Information Science and Technology Act, HR 3137, is presented. Various government agencies, private corporations, and professional organizations were represented. N.W.

N82-21098# Federal Emergency Management Agency, Washington, D.C.
BIBLIOGRAPHY OF PUBLICATIONS Final Report
Apr. 1981 44 p Revised
(PB82-121641; TM-121-REV-9) Avail: NTIS HC A03/MF A01 CSCL 05B

The purpose of this manual is to provide the user community with an up-to-date list of documents produced by the Office of Information Resources Management, Federal Emergency Management Agency (FEMA), and its predecessors. GRA

N82-21440# Applied Concepts Corp., Reston, Va.
A STUDY OF METRIC CONVERSION OF DISTILLED SPIRITS CONTAINERS: A POLICY AND PLANNING EVALUATION Phase Report, Aug. 1981
J. A. SIMPSON Aug. 1981 184 p
(Contract AA-80-SAC-X8602)
(AD-A110223) Avail: NTIS HC A09/MF A01 CSCL 13D

The report establishes the historical baseline regarding events that occurred, the reasons for the events, their impacts, and the lessons learned from the conversion. The report consists of eight chapters and an appendix: (1) an overview of the distilled spirits industry, (2) an analysis of the motivation phase of the conversion, (3) an analysis of the planning phase, (4) a description and analysis of the events of the implementation phase, (5) an analysis of the costs and savings resulting from the conversion, (6) an analysis of the impact of the conversion on prices of distilled spirits, (7) an analysis of the impacts on consumption, profitability, industry structure, and size, product and brand preferences, (8) a summary of the findings and conclusions from the assessment of the process, and (9) (the appendix) a detailed chronology of events.
Author (GRA)

N82-22082# Committee on Science and Technology (U S. House).
RISK: ASSESSMENT, ACCEPTABILITY AND MANAGEMENT
Washington GPO 1981 122 p Rept. presented to the Subcomm. on Sci., Res. and Technol. Transmitted to the Comm on Sci. and Technol., 97th Congr., 1st Sess., Nov. 1981 Prepared by Congressional Research Service, Library of Congress
(GPO-87-593) Avail: Subcomm. on Sci., Res. and Technol

Risk assessment, particularly of risks to the public health resulting from government and industry decisions, is discussed Cost/benefit analysis as applied to such situations as human deaths and the contracting of cancer by humans is discussed. The role of government regulations and standards is discussed. R.J.F

N82-22547*# National Aeronautics and Space Administration Ames Research Center, Moffett Field, Calif.
OVERVIEW: WESTERN REGIONAL APPLICATIONS PROGRAM (WRAP) STATUS
S. M. NORMAN *In its* Western Reg. Remote Sensing Conf Proc., 1981 p 2-7 Sep. 1981 ERTS
Avail: NTIS HC A12/MF A01 CSCL 05B

Interactions with all 14 of the states in the Western Region over the past three years are reviewed from NASA's perspective. Outreach and training programs using the M mobile analysis and training extension van, the University Program, classes at the Ames Center, demonstration tests with state agencies, and surveying the needs of local governments are highlighted. Planned activities, the continuance of ASVT's, and the impact of the budget cuts on NASA'S technology program are also considered. A.R.H.

N82-22548*# National Aeronautics and Space Administration, Washington, D. C.
TECHNOLOGY TRANSFER PROGRAM: PERSPECTIVE
A. J. TOYSHOV *In* NASA. Ames Research Center Western Reg. Remote Sensing Conf. Proc. 1981 p 8-12 Sep. 1981 ERTS
Avail: NTIS HC A12/MF A01 CSCL 05A

Most of NASA's technology transfer activities are in the area of land use (development, suitability, and planning); forestry (including wildlife and range and vegetation inventories) agriculture related activities; and water resources. The technology dissemination function is exercised through three regional applications centers which are involved in 91 applications projects within 22 states. In addition there are approximately eight application system verification transfer (ASVT) projects, 21 university applications branches, institutionalized liason activities with public interest groups, and user requirements activities. As the result of budget cuts, the ASVT and user requirements and awareness programs are to be phased out at the end of FY81. The university applications programs are to be phased down and terminated by 1985. NASA will continue to work with the user

more in an R & D and an applications development capacity, and not in a national scale or administrative way. A.R.H.

N82-23043# Comptroller General of the United States, Washington, D.C.
STREAMLINING AND ENSURING MINERAL DEVELOPMENT MUST BEGIN AT LOCAL LAND MANAGEMENT LEVELS Report to the Chairman, Committee on Energy and Commerce, House of Representatives
4 Dec. 1981 24 p refs
(EMD-82-10; B-205344) Avail: SOD

A study of the use of Federal lands, particularly military lands, concluded that success in streamling and accelerating mineral development on Federal lands depends on the Bureau of Land Management state offices ultimately responsible for the implementation of Department of Interior minerals policies It was found the eastern States Office of the Bureau of Land Management did not effectively deal with potential Federal mineral trespass in the East, and was unable to issue mineral leases and permits on a timely basis Moreover, it was unable to effectively deal with new areas of mineral interest because of Department actions. Recommendations to improve the mineral trespass program help relieve lease and permit backlogs, maintain dedicated staff, and improve headquarters communications with State offices were made. R.J.F.

N82-23067# Committee on Appropriations (U. S. Senate).
DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT AND INDEPENDENT AGENCIES APPROPRIATIONS FOR FISCAL YEAR 1982. NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
Hearing on H.R. 4034 before the Comm. on Appropriations, 97th Congr., 1st Sess., 12 May 1981 Washington GPO 1982
Avail: SOD HC

Budget-related testimony by NASA officials is presented. Related documentation is included. The space shuttle is evaluated. Commercial opportunities are discussed Research programs are discussed. Management procedures are reviewed Personnel management is addressed. Funding for the numerous agency programs is reviewed. N.W.

N82-23111*# Houston Univ., Clear Lake, Tex.
INTERNATIONAL AEROSPACE ENGINEERING: NASA SHUTTLE AND EUROPEAN SPACELAB
R. E. BILSTEIN *In* Houston Univ. The 1981 NASA ASEE Summer Fac Fellowship Program, Vol. 1 26 p 20 Aug. 1981 refs
Avail: NTIS HC A14/MF A01 CSCL 22B

NASA negotiations and contractual arrangements involving European space research organizations' participation in manned space operations and efforts in building Spacelab for the U.S. Reusable Space Shuttle are discussed. Some of the diplomatic and technical collaboration involved in the international effort is reviewed. M.D.K.

N82-24027# General Accounting Office, Washington, D. C.
GOVERNMENT-WIDE GUIDELINES AND MANAGEMENT ASSISTANCE CENTER NEEDED TO IMPROVE ADP SYSTEMS DEVELOPMENT
20 Feb. 1981 25 p
(AFMD-81-20; B-201441) Avail: NTIS HC A02/MF A01; also available from General Accounting Office, Document Handling and Information Services Facility

A structured management approach to Federal ADP systems development is recommended. The development of guidelines and a center to assist Federal agency management in planning, designing, acquiring, and evalating large, complex ADP systems development projects are advised N W.

N82-24132* National Aeronautics and Space Administration, Washington, D. C.
NASA PATENT ABSTRACTS BIBLIOGRAPHY. A CONTINUING BIBLIOGRAPHY, SECTION 1: ABSTRACTS
Jan. 1982 60 p 2 Vol.
(NASA-SP-7039(20)-SECT-1; NAS 1.21:7039(20)-SECT-1) Avail: NTIS HC <en1>$8 50 CSCL 05B

Abstracts are cited for 165 patents and patent applications introduced into the NASA scientific and technical information system during the period July 1981 through December 1981. Each entry consists of a citation, an abstract, and in most cases, a key illustration selected from the patent or patent application. A.R H.

N82-24133* National Aeronautics and Space Administration, Washington, D. C.
NASA PATENT ABSTRACTS BIBLIOGRAPHY, A CONTINUING BIBLIOGRAPHY. SECTION 2: INDEXES
Jan. 1982 700 p 2 Vol.
(NASA-SP-7039(20)-SECT-2, NAS 1.21·7039(20)-SECT-2) Avail: NTIS HC <en1>$12 50 CSCL 05B

Entries for approximately 4000 citations for the penod May 1969 through December 1981 are listed. Subject, invention, source, number, and accession number indexes are included. A.R.H.

N82-24135*# California Univ., Santa Barbara. Geography Remote Sensing Unit
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION FUNDAMENTAL RESEARCH PROGRAM. INFORMATION UTILIZATION AND EVALUATION Final Report
J. E. ESTES and L EISGRUBER 1 Jun. 1981 33 p refs
Prepared in cooperation with Oregon State Univ., Corvallis
(Contract NAS9-16077)
(NASA-CR-167592; NAS 1.26:167592) Avail: NTIS HC A03/MF A01 CSCL 05B

In the second half of the 1980's NASA can expect to face difficult choices among alternative fundamental and applied research, and development projects that could potentially lead to improvements in the information systems used to manage renewable resources. The working group on information utilization and evaluation believes that effective choices cannot be made without a better understanding of the current and prospective problems and opportunities involved in the application of remote sensing to improve renewable research information systems. A renewable resources information system is defined in a broad context to include a flow of data/information from: acquisition through processing, storage, integration with other data, analysis, graphic presentation, decision making, and assessment of the affects of those decisions. A.R.H.

N82-24136# Committee on Science and Technology (U. S. House)
AUTHORIZING APPROPRIATIONS TO THE NATIONAL AERONAUTICS AND SPACE ADMINISTRATION FOR FISCAL YEAR 1983
FUQUA Washington GPO 1982 224 p Rept. to accompany H.R. 5890 presented by the Comm. on Sci. and Technol. at the 97th Congr., 2d Sess., 5 May 1982
(GPO-89-006; H-REPT-97-502) Avail: US Capitol, House Document Room

Federal budget appropriations to the National Aeronautics and Space Administration for research and development, construction of facilities, research and program management, and other purposes are explained. A brief description of project activities is included L.F.M.

N82-25016*# National Aeronautics and Space Administration, Washington, D C. Education Services Branch.
AEROSPACE TECHNICIANS: WE'RE TOMORROW-MINDED PEOPLE
M. H LEWIS 1981 23 p refs Original contains color illustrations
(NASA-EP-187; NAS 1.19:187) Avail NTIS HC A02/MF A01 CSCL 05A

Brief job-related autobiographical sketches of technicians working on NASA aerospace projects are presented. Career and educational guidance is offered to students thinking about entering the field of aerospace technology R.J.F.

N82-25025# Committee on Science and Technology (U S. House)
UNIFORM FEDERAL RESEARCH AND DEVELOPMENT UTILIZATION ACT OF 1981, PART 1
FUQUA Washington GPO 1982 65 p refs Rept. to accompany H.R 4564 presented by the Comm on Sci and Technol at the 97th Congr., 1st Sess., 23 Sep. 1981
(H-REPT-97-379-PT-1; GPO-87-268-PT-1) Avail. US Capitol, House Document Room

Ownership rights to patents conceived under Federal contracts are discussed. Commercialization of inventions is considered, and retention of title to inventions by contractors recommended. Uniformity in patent policy among government agencies is also considered. N.W

N82-25271# Committee on Science and Technology (U S. House)
THE FIRST A IN NASA
Washington GPO 1982 194 p Hearings before the Subcomm. on Transportation, Aviation and Mater. of the Comm. on Sci. and Technol , 97th Congr., 1st Sess., No. 61, 8 Dec. 1981
(GPO-89-476) Avail: Subcommittee on Transportation, Aviation and Materials

The contributions of NACA/NASA to both civil and military aviation are reviewed and the current relations of NASA with the aircraft industry and academia are examined in the light of proposed cuts in the aeronautics technology research portion of the agency's budget. The impact of the closing of the Lewis Research Center on the development of military aircraft is considered. A.R.H.

N82-26370# Comptroller General of the United States, Washington, D.C.
NASA MUST RECONSIDER OPERATIONS PRICING POLICY TO COMPENSATE FOR COST GROWTH ON THE SPACE TRANSPORTATION SYSTEM
23 Feb 1982 69 p refs
(MASAD-82-15) Avail. NTIS HC A04/MF A01

Reassessment of the Space Transportation System pricing policy to establish a more equitable price to all users is recommended Author

N82-26505# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
METHOD OF FABRICATING CYLINDRICAL GRATINGS
V I. YEREMIN, S. I. DENISOV, V. T ARSENTYEV, and V. M KORELSKIY 21 Jan. 1982 6 p refs Transl. into ENGLISH from Russian Patent no. 253575, 30 Nov. 1969
(AD-A110667, FTD-ID(RS)T-1520-81) Avail. NTIS HC A02/MF A01 CSCL 13H

A method to improve dimension accuracy of grating elements in the fabrication of metallic cylinders is described. The fabrication method produces cylindrical gratings with rectangular closed holes. The accuracy improves the dimensions of the grating element and their purity. The method provides a more compact abutement of the alloy to the surface and holder Prior to filling the gap the grating is heated to the melting point of the alloy. E A K.

N82-26506# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
A STAND FOR THE GRINDING AND POLISHING OF ASPHERICAL SURFACES
N. P. ZAKAZNOV, V. V. GORELIK, and L. V. IVANOV 29 Jan. 1982 6 p refs Transl. into ENGLISH from Russian Patent no. 218688, 22 Dec. 1969 p 1-2
(AD-A110935, FTD-ID(RS)T-1530-81) Avail: NTIS HC A02/MF A01 CSCL 13H

A stand for grinding and polishing aspherical surfaces of optical components is described. The stand contains a tool with a variable curvature of the working surface, connected by an articulation to a copying mechanism, making possible an increase in the processing accuracy, and enabling the production of aspherical surfaces of different radii. A schematic drawing of the stand in vertical cross section is presented. J D.

N82-26568* National Aeronautics and Space Administration *Lewis Research Center, Cleveland, Ohio*
COUPLED CAVITY TRAVELING WAVE TUBE WITH VELOCITY TAPERING Patent
D. J. CONNOLLY, inventor (to NASA) 9 Feb. 1982 7 p Filed 20 Feb. 1980
(NASA-CASE-LEW-12296-1; US-PATENT-4,315,194, US-PATENT-APPL-SN-122966, US-PATENT-CLASS-315-3.6; US-PATENT-CLASS-315-3 5, US-PATENT-CLASS-330-43) Avail. US Patent and Trademark Office CSCL 09A

A coupled cavity traveling wave tube with a velocity taper, which affords beam wave resynchronization and thereby enhances is described. The wave velocity reduction is achieved by reducing the resonant frequencies of the individual resonant cavities as a function of the distance from the electron gun, through changes in internal cavity dimensions The required changes in cavity dimensions can be accomplished by gradually increasing the cavity radius decreasing the gap length from cavity to cavity The velocity reduction is carried out without an increase in circuit resistive losses and the upper and lower cut off frequencies are reduced in approximately the same manner E A.K.

N82-26682# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
LATHE FOR THE FABRICATION OF OPTICAL SURFACES
V V GORELIK, N. P. ZAKAZNOV, and B. D. GORELIK 22 Jan. 1982 6 p Transl. into ENGLISH from Russian Patent no 333017, 21 Mar 1972 p 1-2
(AD-A110600; FTD-ID(RS)T-1525-81) Avail: NTIS HC A02/MF A01 CSCL 13I

A lathe having a mechanism for the rectilinear back and forth shifting of the carrier is described. An additional annular face plate is secured above the face plate in the housing, ensuring linear contact with the tool The headstock is rotatable relative to the shaft, and coinciding with the shaft of the spindle, making it possible to obtain different surfaces. The operation of the lathe is described. J D.

N82-27124# Air Force Systems Command, Wright-Patterson AFB, *Ohio. Foreign Technology Div*
A METHOD OF PREPARING ASPHERICAL SURFACES OF OPTICAL COMPONENTS
V. V. GORELIK, B S. KOLCHEV, and V. S. PLOTNIKOV 22 Jan. 1982 5 p refs Transl. into ENGLISH from Russian Patent no. 300538, 7 Jun. 1971 p 1
(AD-A110598; FTD-ID(RS)T-1526-81) Avail: NTIS HC A02/MF A01 CSCL 20F

A method for obtaining aspherical optical surfaces by spraying a layer of material on prepolished surfaces in a vacuum chamber is described. In order to control shape forming of the sprayed material, the thickness of the applied layer is continuously measured by a photoelectric, shadow, interference, or autocollimation method. The surface being processed is shielded from the vapor by an oscillating screen which is moved rectilinearly between the vaporizing device and the work piece. J.D.

N82-27127# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
A METHOD FOR MANUFACTURING CYLINDRICAL GRATINGS
V. I. YEREMIN, S. I. DENISOV, V. T. ARSENTYEV, and V. M. KORELSKIY 3 Mar. 1982 6 p Transl. into ENGLISH of Russian Patent no. 253575 (30 Sep 1969) p 1-2
(AD-A112078; FTD-ID(RS)T-0133-82) Avail: NTIS HC A02/MF A01 CSCL 20F

An invention to improve the precision of the dimensions of metallic grating elements, their surface finish, and to reduce the amount of work is described. Author

N82-27180*# National Aeronautics and Space Administration. John F. Kennedy Space Center, Cocoa Beach, Fla.
CHRONOLOGY OF KSC AND KSC RELATED EVENTS FOR 1980
K. NAIL, JR. (New World Services, Inc.) 25 May 1980 323 p
(NASA-TM-84752; NAS 1.15.84752; KHR-5) Avail: NTIS HC A14/MF A01 CSCL 05A

A chronological listing of the activities of Kennedy Space Center and related events during 1980 is presented. International launch activities are included to a lesser extent. J.D

N82-27190# Committee on Commerce, Science, and Transportation (U. S. Senate)
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION AUTHORIZATION ACT
Washington GPO 1982 53 p Rept. to accompany S. 2604 presented by the Comm. on Com., Sci., and Transportation, 97th Congr., 2nd Sess., 28 May 1982
(GPO-89-010) Avail: US Capitol, Senate Document Room

The U.S Senate Committee on Commerce, Science, and Transportation considered an original bill (S.2604) to authorize appropriations to the National Aeronautics and Space Administration for research and development, construction of facilities, and research and program management, and for other purposes, and reported favorably and recommended that the bill pass. Discussions concerning the bill are given. R.J.F.

N82-28222# Committee on Commerce, Science, and Transportation (U. S. Senate)
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION (NASA) AUTHORIZATION ACT
1982 10 p An act referred to the Comm. on Com., Sci. and Transportation, 97th Congr., 2d Sess., 17 May 1982
Avail: US Capitol, House Document Room

In addition to the appropriation to NASA of $647,300,000 for research and development, construction of facilities, and research and program management, this act provides $14,955,000 to the Department of Commerce for the planning, management, and operation of a civil land remote sensing space satellite system as well as for the establishment of user fees and the ownership of such systems by the private sector when in the national interest. A.R.H

N82-28223# Committee on Science and Technology (U. S. House).
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION AUTHORIZATION ACT
1982 11 p A bill referred to the Comm. on Sci. and Technol., 97th Congr., 2d Sess., 18 Mar. 1982 and to the Comm. of the Whole House on the State of Union, 97th Congr., 2d Sess., 5 May 1982
(H-REPT-97-502) Avail: US Capitol, House Document Room

Under title 1 of this bill, NASA is authorized to spend $5,378,400,000 for research and development, $100,000,000 for construction of facilities, and $1,168,900,000 for research and program management. Title 2 provides that the Secretary of Commerce plan and provide for the management and operation of a civil land remote sensing space satellite system, including LANDSAT D and LANDSAT D' and associated ground system equipment transferred from NASA. For this purpose $14,955,000 is authorized for the fiscal year 1983. A.R.H.

N82-29233# Committee on Commerce, Science, and Transportation (U. S. Senate).
NASA AUTHORIZATION FOR FISCAL YEAR 1983
Washington GPO 1982 615 p refs Hearings before the Subcomm on Sci., Technol., and Space of the Comm. on Com., Sci. and Transportation, 97th Congr., 2d Sess., 23, 25 Feb., 16, 18, 30 Mar., 1 Apr. 1982
(GPO-91-557) Avail: Subcommitee on Science, Technology and Space

Emphasis is given to programs of the Space Transportation System toward an operational status and the balance between basic science, space applications, aeronautics, and space technology. The civilian and defense sectors are also examined. N.W.

N82-29734# Department of Energy, Washington, D. C.
FEDERAL ENERGY R AND D PRIORITIES. REPORT OF THE RESEARCH AND DEVELOPMENT PANEL, ENERGY RESEARCH ADVISORY BOARD
Nov 1981 82 p
(DE82-007065; DOE/TIC-2007065) Avail: NTIS HC A05/MF A01

An assessment of the US Department of Energy's major program areas is presented. This assessment features an evaluation technique in which each member evaluated 49 program areas covering all DOE energy R and D programs in terms of seven criteria for energy supply and conservation programs and five criteria for science and technology base programs. Each member evaluated the relative importance of these criteria and judged whether more, less, or the same amounts of money relative to the President's request for FY 1982 should be allocated to the various programs The judgements of the members were combined numerically to arrive at figures of merit for each program on the relative priorities of energy echnologies and whether financial allocations to each program should be increased, held the same or decreased relative to the President's request for FY 1982. The resulting figure of merit was used to rank the programs in order of importance. Criteria used in evaluating the priority of each technology were selected and the definitions for each criterion agreed upon were technology potential, urgency, economic potential, benefit/cost, energy/national security, health/safety/environment, and Federal RD and D role The criteria for the science and technology base programs were scientific potential, risk/benefit, mission impact, urgency and federal role. A detailed definition of these criteria is given. DOE

N82-30122# Committee on Science and Technology (U. S House).
RISK ANALYSIS RESEARCH AND DEMONSTRATION ACT OF 1982
Washington GPO 1982 11 p Rept. to accompany H.R. 6159 presented by the Comm. on Sci. and Technol., 97th Congr., 2nd Sess., 24 Jun.1982
(H-REPT-97-625, GPO-89-006) Avail: US Capitol, House Document Room

Legislation to improve the use of risk analysis by those Federal agencies concerned with regulatory decisions related to the protection of human life, health, and the environment is reviewed The purpose of the bill, implementation, program participants, demonstration projects, reports, research on risk analysis, committee views, analysis of the bill, and its impact on inflation are discussed N.W.

N82-30130* National Aeronautics and Space Administration, Washington, D. C.
A GUIDE TO RESEARCH IN NASA HISTORY
A. ROLAND Aug. 1982 54 p refs
(NASA-TM-84823; NAS 1.15:84823) Avail: NASA Scientific and Technical Information Facility, P.O. Box 8757, Baltimore/Washington International Airport, Md. 21240 CSCL 05B

The NASA history program is reviewed. Headquarters and NASA Centers resources are discussed Research in contemporary

published records of the Federal government is also discussed Resources at the Johnson and Kennedy Space Center are summarized. N.W

N82-30141*# National Aeronautics and Space Administration, Washington, D C.
SPINOFF 1982
J. J. HAGGERTY Apr. 1982 134 p Original contains color illustrations
(NASA-TM-84826; NAS 1 15:84826) Avail. NTIS MF A01, SOD HC $7.50 CSCL 05A

NASA aerospace activities are reviewed Adaptation of aerospace technology by private firms and public sector organizations is emphasized Areas include transportation, consumer and recreational products, computer technology, health and medicine. Industrial productity, environment and public safety, commercial remote sensing, and technology demonstrations. N W.

N82-30586# Committee on Science and Technology (U S House)
NATIONAL MATERIALS AND MINERALS POLICY, RESEARCH AND DEVELOPMENT ACT OF 1980
Washington GPO 1981 91 p Hearing before the Comm. on Sci. and Technol , 97th Congr , 1st Sess , no. 44, 28 Jul 1981
(GPO-84-714) Avail· Committee on Science and Technology

The problems associated with national materials and minerals are discussed. The major materials concerns are on the user side of the process. That is as consumers, either industrial or as individuals, the user does not need simply a mineral or raw material in hand; it requires a finished product with a given set of properties. *Thus the concern is with substitution, conservation, and processing,* as well as supply. A strong comprehensive program in a materials research and development is recommended. S.L.

N82-31147*# National Aeronautics and Space Administration, Washington, D. C.
PRESENT CHALLENGES OF RESEARCH AND TECHNOLOGY POLITICS
A. V. BULOW May 1982 12 p Transl into ENGLISH from DFVLR-Nachr (West Germany), no. 35, Mar 1982 p 3-5 Transl by Scientific Translation Service, Santa Barbara, Calif
(Contract NASW-3542)
(NASA-TM-76720; NAS 1 15:76720) Avail: NTIS HC A02/MF A01 CSCL 05A

Research and technology in Germany are discussed. The rapid transfer of scientific knowledge and techniques from the laboratory to the manufacturing and industrial communities is indentified as a priority. It is recommended that the government give maximum support to the aviation and space flight industries R.J F.

N82-32550# Applied Concepts Corp , Reston, Va.
A STUDY OF METRIC CONVERSION OF DISTILLED SPIRITS CONTAINERS: A POLICY AND PLANNING EVALUATION ON FINDINGS AND LESSONS LEARNED Final Report
J. A. SIMPSON and S L BARSBY 28 Oct. 1981 45 p
(Contract AA-80-SAC-X8602)
(AD-A115644) Avail. NTIS HC A03/MF A01 CSCL 05C

This report is the Task 4 report and final product for 'A Study *of Metric Conversion of Distilled Spirits Containers A Policy and* Planning Evaluation,' performed by Applied Concepts Corporation for the United States Metric Board (USMB) This report summarizes the results for the entire project, which entailed: conducting a detailed case study of the distilled spirits conversion, developing and analyzing a set of hypothetical scenarios regarding the circumstances of the conversion and USMB's possible role in it, assessing the completeness and clarity of USMB's planning guidelines; conducting a survey of consumer awareness of and attitudes toward the conversion, and analyzing the implications of the findings from all the above for USMB policy. The report presents a brief overview of the major findings from the case study, regarding the actual events, issues, and impacts of the distilled spirits conversion. It traces the impacts of possible USMB intervention strategies under several alternative scenarios, in the context of the distilled spirits conversion. The study assesses the planning guidelines and analyzes the implications for USMB policy and *presents a concise summary of findings and 'lessons learned'* over the course of this project. Consumer survey results are attached in an Appendix. GRA

N82-33418# Committee on Science and Technology (U S House) '
THE NEED FOR A FIFTH SPACE SHUTTLE ORBITER
Washington GPO 1982 155 p refs Hearing before the Subcomm. on Space Sci. and Appl of the Comm. on Sci. and Technol , 97th Congr., 2d Sess., No. 105, 15 Jun. 1982
(GPO-96-894) Avail. Subcommittee on Space Science and Applications

The requirements for increasing the size of the Space Shuttle orbiter fleet are considered. Private sector acquisition of the fifth orbiter vehicle is also considered. N W

N82-34308# Committee of Conference (U. S. Congress).
MAKING APPROPRIATIONS FOR THE NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
Washington GPO 1982 13 p Rept. to accompany H.R 5890 presented by the Comm of Conf , 97th Congr., 2nd Sess., 29 Sep. 1982
(H-REPT-97-897; GPO-89-006) Avail. US Capitol, House Document Room

The appropriations to the National Aeronautics and Space Administration for resarch and development, construction of facilities, and research and program management, etc. are presented. The amounts of money requested, and the final appropriations are discussed. S.L.

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TECNOLOGY ASSESSMENT

Includes overviews, conferences, and final reports on current technology.

A82-10076
COMPUTERS IN AEROSPACE CONFERENCE, 3RD, SAN DIEGO, CA, OCTOBER 26-28, 1981, COLLECTION OF TECHNICAL PAPERS
Conference sponsored by the American Institute of Aeronautics and Astronautics. New York, American Institute of Aeronautics and Astronautics, 1981 551 p.
MEMBERS, $65.; NONMEMBERS, $75

Software design methodologies are considered along with computer systems evolution in NASA program management, planning for independent software verification and validation, a quantitative method for evaluating alternatives, and synchronous fault-tolerant flight control systems. Attention is given to a software error detection system, a highly reliable spaceborne memory subsystem, an approach to built-in testing on very large-scale *integrated/very high-speed integrated circuitry devices, core* resource management for large real-time computer program development, and spacecraft computer resource margin management. A description is presented of structured programming with job enrichment, the management of the Galileo attitude and articulation control flight software development, managing software in the weapon system environment, turnkey interactive graphics in an integrated CAD/CAM system, English-like programming languages for CAD/CAM, and the cost effectiveness of CAD/CAM. Other subjects investigated are related to the massively parallel processor innovation in high speed processors, the design and development process used for a new spacecraft computer, the machine control data verification problem, and a general purpose emulation system for software verification. G.R.

A82-12400
ENERGY FROM BIOMASS AND WASTES V; PROCEEDINGS OF THE FIFTH SYMPOSIUM, LAKE BUENA VISTA, FL, JANUARY 26-30, 1981
Symposium sponsored by the Institute of Gas Technology. Chicago, Institute of Gas Technology, 1981. 1100 p
$75

Papers are presented in the areas of biomass production and procurement, biomass and waste combustion, gasification processes, liquefaction processes, environmental effects and government programs. Specific topics include a water hyacinth wastewater treatment system with biomass production, the procurement of wood as an industrial fuel, the cofiring of densified refuse-derived fuel and coal, the net energy production in anaerobic digestion, photosynthetic hydrogen production, the steam gasification of manure in a fluidized bed, and biomass hydroconversion to synthetic fuels. Attention is also given to the economics of deriving alcohol for power applications from grain, ethanol fermentation in a yeast-immobilized column fermenter, a solar-fired biomass flash pyrolysis reactor, particulate emissions from controlled-air modular incinerators, and the DOE program for energy recovery from urban wastes. A L.W.

A82-12547
ENERGY FUTURE: PROPHETS, PROFITS AND POLICIES; PROCEEDINGS OF THE SEVENTH ANNUAL UMR-DNR CONFERENCE ON ENERGY, UNIVERSITY OF MISSOURI-ROLLA, ROLLA, MO, OCTOBER 14-16, 1980. VOLUME 7
J D. MORGAN, (ED) (Missouri-Rolla, University, Rolla, MO) Conference sponsored by the Missouri Department of Natural Resources and University of Missouri-Rolla Rolla, MO, University of Missouri-Rolla, 1981 344 p
$30

Topics covered include industrial energy systems, biomass use, and energy management. Papers were presented on photovoltaic and wind electric systems, energy considerations in building design and standards, political and social aspects of energy systems, energy research technology, and environmental impacts of various hydrocarbon based fuel systems. M.S K

A82-13451
DIGITAL AVIONICS SYSTEMS CONFERENCE, 4TH, ST. LOUIS, MO, NOVEMBER 17-19, 1981, COLLECTION OF TECHNICAL PAPERS
Conference sponsored by the American Institute of Aeronautics and Astronautics and Institute of Electrical and Electronics Engineers. New York, American Institute of Aeronautics and Astronautics, 1981. 645 p.
MEMBERS, $65.; NONMEMBERS, $75

Digital avionics are discussed in terms of a system integration concept, fault isolation methodology, system effectiveness, advanced designs, sneak software analysis, and the pilot's role in an automated flight deck. Specific applications for the L-1011 flight control system, for hardware/software integration on the Shuttle, for one man operation of the F/A-18 Hornet, with voice command control, and for advanced weapons systems were considered. Papers were also presented on individual components of digital avionics systems such as the MIL-STD-1750 chip set, standardization and semiconductors, fiber optics, connectors for data buses, large screen CRT touch panels, an electronic terrain map, and flat panels for future military aircraft. D H K.

A82-13967* National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
USER INPUT AND PROGRAM ASSESSMENT - AN EVALUATION OF THE NASA LANGLEY SCIENTIFIC AND TECHNICAL INFORMATION PROGRAM
T E. PINELLI (NASA, Langley Research Center, Hampton, VA), E M. CROSS, P A. HINNEBUSCH, and M. GLASSMAN (Old Dominion University, Norfolk, VA) In. The information community: An alliance for progress; Proceedings of the Forty-fourth Annual Meeting, Washington, DC, October 25-30, 1981. Volume 18. Meeting sponsored by the American Society for Information Science. White Plains, NY, Knowledge Publications, Inc., 1981, p 224-227

An evaluation of the scientific and technical information (STI) program of the Langley Research Center has been conducted, including surveys of both internal and external patrons. Questions included the perceived prestige of the Center's publications, the adequacy of Langley technical reports, and the use of selected NASA STI products and services The internal and external profiles proved to be very similar, and the results indicated that the Langley STI program is meeting the information needs of both populations. A number of areas for increasing user satisfaction were identified. S C.S

A82-13974*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
PROGRESS IN AERONAUTICAL RESEARCH AND TECHNOLOGY APPLICABLE TO CIVIL AIR TRANSPORTS
R. E. BOWER (NASA, Langley Research Center, Hampton, VA) International Meeting on Transportation Research: State of the Art Perspectives and International Cooperation, Amalfy, Italy, Nov. 11-14, 1981, Paper. 51 p.

Recent progress in the aeronautical research and technology program being conducted by the United States National Aeronautics and Space Administration is discussed Emphasis is on computational capability, new testing facilities, drag reduction, turbofan and turboprop propulsion, noise, composite materials, active controls, integrated avionics, cockpit displays, flight management, and operating problems. It is shown that this technology is significantly impacting the efficiency of the new civil air transports. The excitement of emerging research promises even greater benefits to future aircraft developments (Author)

A82-14676
NAECON 1981; PROCEEDINGS OF THE NATIONAL AEROSPACE AND ELECTRONICS CONFERENCE, DAYTON, OH, MAY 19-21, 1981. VOLUMES 1, 2 & 3
Conference sponsored by the Institute of Electrical and Electronics Engineers. New York, Institute of Electrical and Electronics Engineers, Inc., 1981. Vol. 1, 460 p., vol. 2, 495 p.; vol. 3, 502 p
PRICE OF THREE VOLUMES, MEMBERS, $45.; NONMEMBERS, $60

Topics of aerospace electronics such as the ADA programming language, inertial systems, microcomputer applications, survivability, and the all-electric aircraft were discussed. Papers were presented on laser gyros and advanced navigation systems, as well as advanced architecture, communications, and radar equipment, software, and avionics and armament planning. Failures in high voltage tubes were considered, and attention was given to signal processing techniques, integrated aircraft controls, fire control, software support tools, cost estimates for software, and medical technology. Emphases were placed on Kalman filter, an electronic terrain map, EM compatibility, aerospace power systems, air traffic control, environmental stress measurements, fault isolation, and multivariable flight control design. M.S.K.

A82-14925
ENERGY TECHNOLOGY VIII: NEW FUELS ERA; PROCEEDINGS OF THE EIGHTH CONFERENCE, WASHINGTON, DC, MARCH 9-11, 1981
R. F. HILL, (ED.) (Bridgeport, University, Bridgeport, CT) Rockville, MD, Government Institutes, Inc., 1981. 1472 p
$48

Papers were presented on energy analysis, planning, and regulation, noting lead times necessary for energy systems development, the socioeconomic and environmental effects of energy systems, and utility planning procedures. Effective energy use was considered in terms of utility load management, cogeneration, conservation, heat pumps, and heat recovery methods. Technologies for exploitation of fossil, geothermal, and nuclear resources were discussed, with attention given to synthetic fuels, fuel cells, and fusion prospects. Finally renewable energy resources were examined regarding solar building heat systems, economics, solar pond performance, biomass, alcohol, small-scale hydro, wind turbine performance, and photovoltaic systems.
M.S.K.

A82-16135#
AEROSPACE HIGHLIGHTS 1981
Astronautics and Aeronautics, vol 19, Dec 1981, p. 24-34, 36-40, 42-108

Topics such as air transportation systems, aeroacoustics, aerospace power systems, aircraft design, interactive computer graphics, and flight simulation are considered. Attention is also given to flight mechanics, extendible exit cones, general aviation systems, LTA vehicles, and testing programs Plasma dynamics and lasers are discussed, as are solid rockets, propellants, software systems, sensors, marine technologies, and CAD/CAM. Finally, papers are presented on terrestrial energy systems, structural dynamics, space sciences, space structures, thermophysics, V/STOL aircraft, aerospace maintenance, communications, economics, and electric propulsion, as well as materials, management, and guidance and control. M.S.K.

A82-16728
BETWEEN SPUTNIK AND THE SHUTTLE - NEW PERSPECTIVES ON AMERICAN ASTRONAUTICS
F C. DURANT, III, (ED) (National Air and Space Museum, Washington, DC) San Diego, CA, Univelt, Inc. , 1981 342 p
$30

The history, status, and future directions of the U S space program are explored The involvements and decisions promulgated by six presidents from 1957-1978 which affected the directions of space activities are outlined, and Congressional actions with regard to space are scrutinized Attention is also given to the political economy of American astronautics and the evolution and problems of space law Space transportation systems are examined, and the use of liquid hydrogen as a rocket fuel is detailed Finally, lessons concerning the operations of large projects like the Apollo program are described, and an exposition of samples of space art are provided. M.S.K

A82-17276
SAFE AND EFFICIENT MANAGEMENT OF ENERGY; PROCEEDINGS OF THE THIRTY-THIRD ANNUAL INTERNATIONAL AIR SAFETY SEMINAR, CHRISTCHURCH, NEW ZEALAND, SEPTEMBER 15-18, 1980
L. J. SCOTT, (ED.) Seminar sponsored by the Flight Safety Foundation, Boeing Commercial Airplane Co., Ministry of Transport of New Zealand, et al.Arlington, VA, Flight Safety Foundation, Inc., 1980. 336 p
$30

Topics discussed include accident prevention and safety, air traffic management for fuel economy, and quality control of fuel from the refinery to the engine. Particular attention is given to air traffic control problems, flight crew management and cockpit performance systems, and gas path analysis for engine condition monitoring. Consideration is also given to energy conservation through airport design and management, and computer flight planning for fuel efficiency. J.F.

A82-17302*
SPACE TRACKING AND DATA SYSTEMS; PROCEEDINGS OF THE SYMPOSIUM, ARLINGTON, VA, JUNE 16-18, 1981
J GREY, (ED) and L. A. HAMDAN (American Institute of Aeronautics and Astronautics, New York, NY) Symposium sponsored by the American Institute of Aeronautics and Astronautics and NASA. New York, American Institute of Aeronautics and Astronautics , 1981. 242 p.
MEMBERS, $22 ; NONMEMBERS, $27

The AIAA/NASA Symposium on Space Tracking and Data Systems, held in Pentagon City, Virginia, on June 16-18, 1981, had the purpose of reviewing international activities in space tracking and data systems for civil use in the 1980-2000 time frame Participants included 225 representatives from industrial and government organizations in eight nations. The nations represented include the United States, France, Germany, India, Japan, Norway, Spain, and Sweden. The major functions of the systems described at the Symposium are related to the initial downlink of telemetry and spacecraft status data, attendant tracking activities, and uplink of spacecraft commands, communication between the associated acquisition sites and central processing and control stations; formulation and implementation of commands that control the spacecraft and its payload; and processing of spacecraft data needed to make command decisions. Attention is given to an overview of current activities and plans, and supporting developments, taking into account the time from 1980 to 1990 New developments are also considered. G R.

A82-19226
SUMMER COMPUTER SIMULATION CONFERENCE, WASHINGTON, DC, JULY 15-17, 1981, PROCEEDINGS
Conference sponsored by AGU, AIAA, AIChE, BMES, IAMCS, IEEE, ISA, SCS, and S.H A R.E. Arlington, VA, AFIPS Press, 1981 754 p.

Aspects of simulation technology are discussed, taking into account microcomputers in simulation, heuristic/adaptive systems, differential equations approaches, available simulation packages, selected operations research applications, and mathematical and statistical tools Hybrid systems are discussed along with topics of chemical sciences. Subjects related to physical and engineering sciences are explored, giving attention to aeronautics and astronautics, physical processes, nuclear/electrical power technology, advanced computational methods and systems, avionics systems, dynamic systems analysis and control, and industrial systems. Environmental sciences are considered along with biomedical systems, managerial and social sciences, questions of simulation credibility and validation, and energy systems A description is provided of simulation facilities, and topics related to system engineering and transportation are investigated. G.R.

A82-20540
HELICOPTER TRANSMISSIONS; PROCEEDINGS OF THE SYMPOSIUM, LONDON, ENGLAND, FEBRUARY 6, 1980
Symposium sponsored by the Royal Aeronautical Society. London, Royal Aeronautical Society, 1980. 99 p.

Topics discussed include the airworthiness of helicopter transmissions, the application of condition monitoring, and the minimum-cost performance monitoring of turboshaft engines. Consideration is also given to single-shot diagnostics, helicopter transmission philosophy, and on-site vibration measurement, dynamic tracking and balancing. J.F.

A82-20751
FLIGHT TESTING IN THE EIGHTIES; PROCEEDINGS OF THE ELEVENTH ANNUAL SYMPOSIUM, ATLANTA, GA, AUGUST 27-29, 1980
Symposium sponsored by the Society of Flight Test Engineers. Lancaster, CA, Society of Flight Test Engineers, 1980. 451 p.

Flight testing procedures were discussed in terms of F-18 carrier suitability testing, the suitability of using JP-8 fuel for U.S. combat

aircraft assigned to NATO forces, and icing test programs for the F-16 and for helicopters. Methods of instrumenting a test airplane were examined, as well as the development of a self-contained flight test data acquisition system. Attention was given to fuel conservation data bases for general aviation aircraft, to flight testing the airborne cruise missile, and testing the Jetwing STOL research aircraft. Tests of the Tornado advanced avionics system were described, as were tests of a jet-powered sailplane, flight tests of effect, and flyover noise level tests. Finally, size reduction of flight test instrumentation and simulator data test instrumentation were considered, and data processing for flight tests and real-time telemetry were reviewed. M S.K.

A82-21272
BUSINESS USE OF SATELLITE COMMUNICATIONS
B. I. EDELSON (COMSAT General Corp., Washington, DC) and R. S. COOPER (U.S. Defense Advanced Research Projects Agency, Arlington, VA) Science, vol. 215, Feb. 12, 1982, p. 837-842. refs

The development, systems technology, and future applications of digital transmission systems for business use of satellite systems are explored. Intelsat currently has 22 satellites in space, applied mostly to data, telephone, and television transmission. An all digital communications network called the Integrated Services Digital Network is replacing the former, analog, systems with wideband digital transmission for voice, data, video, and industrial control information, with domestic satellites serving as the central node of transmissions in a service area. The digital systems are faster than the analog systems, and the U.S. Postal Service is developing an electronic mail system with six other countries. Various magazines are now teleprinted in various locations from broadcasts from a central source, and chain stores are employing data transmission for centralized management, inventory, and procurement. M.S.K.

A82-22976*
LIFE IN THE UNIVERSE; PROCEEDINGS OF THE CONFERENCE, MOFFETT FIELD, CA, JUNE 19, 20, 1979
J. BILLINGHAM, (ED.) (NASA, Ames Research Center, Extraterrestrial Research Div., Moffett Field, CA) Cambridge, MA, MIT Press, 1981. 478 p
$20

Papers are presented concerning the nature and distribution of life in the universe, particularly in the areas of the origins of life, life-supporting environments, the evolution of life in the Galaxy, and the detectability of technological civilizations. Specific topics include a preliminary discussion of the role of life in the universe, followed by examination of the role of water in thin films and cold environments in the origin of life, the relation between atmospheric composition and evolution, the possibility of planetary orbits in multiple star systems, and the prospects for detecting extrasolar planetary systems. Attention is also given to the origin of protein synthesis, the evolution of intelligence in multicellular organisms, the manifestations of advanced civilizations, and plans and principles for SETI. A.L.W.

A82-23309
AIR TRAFFIC CONTROL ASSOCIATION, ANNUAL FALL CONFERENCE, 25TH, ARLINGTON, VA, OCTOBER 19-24, 1980, PROCEEDINGS
Arlington, VA, Air Traffic Control Association, 1980. 204 p.

Developments towards higher levels of ATC automation are considered along with the requirements for reduced IFR separations on final approach, an analysis of system problems using aviation safety reporting system data, and specification issues and problems in connection with air traffic control computer replacement. Attention is given to maintenance concepts for the 1980's, approaches for reducing reflections on the front surface of air traffic control displays, the price of safety, general aviation in the future ATC system, the utilization of the helicopter's versatility to improve the ATC system, the human element, international plans concerning ATC-related developments, and challenges and issues for the future. Technological developments are discussed, taking into account distributed data processing modeling for future ATC systems, lightweight ATC systems, the Discrete Address Beacon System, voice communications, and a Microwave Landing System simulation. G R.

A82-24101
PHOTOVOLTAIC SOLAR ENERGY CONFERENCE; PROCEEDINGS OF THE THIRD INTERNATIONAL CONFERENCE, CANNES, FRANCE, OCTOBER 27-31, 1980
W. PALZ, (ED.) (Commission of the European Communities, Brussels, Belgium) Conference sponsored by the Commission of the European Communities Dordrecht, D. Reidel Publishing Co., 1981. 1178 p. In English and French
$81 50

The materials, design, fabrication, testing, applications, and instrumentation of solar cells and solar cell systems were discussed. Goals, markets, and obstacles in the near and medium term were examined, as were applications in developing countries, methods of cost reductions, and the development of Si and cell module production systems. Alternate materials were investigated for the cells, along with concentrator devices and systems, and current installations were reviewed. Attention was given to advanced systems and future applications, to cell processing, ion implantation, and testing and standards, and the implementation of CdS, amorphous Si, and MIS solar cells was explored. Fundamental work on solar cells was outlined, in conjunction with specific cells in concentrator conditions. M.S.K.

A82-24104
U.S. PHOTOVOLTAIC APPLICATION EXPERIMENTS AND MARKET DEVELOPMENT
H. L MACOMBER (MONEGON, Ltd., Gaithersburg, MD) In: Photovoltaic Solar Energy Conference; Proceedings of the Third International Conference, Cannes, France, October 27-31, 1980. Dordrecht, D. Reidel Publishing Co., 1981, p. 71-78.

A82-24301
CONFERENCE ON AEROSPACE TRANSPARENCIES, LONDON, ENGLAND, SEPTEMBER 8-10, 1980, PROCEEDINGS
Conference sponsored by the Society of British Aerospace Companies London, Society of British Aerospace Companies, Ltd., 1981. 713 p
$59.50

Among the aircraft transparency design, testing and analysis topics covered are: (1) transparency development needs for military aircraft in the 1980s, (2) an aircraft transparency design guide, (3) deficiencies and constraints affecting the design of cockpit transparencies and enclosures, (4) bird strikes, (5) windshield system structural enhancement, (6) aircraft transparency bird impact analysis using the MAGNA computer program, (7) stretched acrylic transparency materials, (8) transport aircraft transparencies, and (9) impact resistance test methods. Also considered are (10) abrasion-resistant coatings for aircraft, (11) the role of finite element analysis in the design of birdstrike-resistant transparencies, and (12) the effects of bird orientation on load profile and damage level. O.C

A82-24406
RESTORATION OF PERFORMANCE, MODELS 727, 737, AND 747
J. C. BAER and W. M. STAAB (Boeing Commercial Airplane Co., Seattle, WA) Society of Automotive Engineers, Aerospace Congress and Exposition, Anaheim, CA, Oct. 5-8, 1981, 12 p (SAE PAPER 811072)

A new generation of advanced technology, fuel-efficient jet transports, including the Models 757 and 767 will enter commercial airline service in 1982. Existing fleets of second-generation jet transports still in production, such as the 727, 737, and 747, have useful economic lives which will extend into the 1990s. Because of this longevity and the continual escalation of fuel prices, the economics of these transports will be improved. A description is presented of some of the performance improvement programs. Attention is given to aspects of operational efficiency, the in-flight

fuel economy, a maintenance program to preserve low drag characteristics for the aircraft, the elimination of surface roughness, Model 727 drag improvement items, Model 747 improvement items, recently developed items, aerodynamic improvements under study, and propulsion system and flight management system improvements. G.R.

A82-24696
FROM STEAM TO KILOWATTS - PLANNING, SITING AND REGULATORY CONSIDERATIONS IN GEOTHERMAL RESOURCE DEVELOPMENT
J. F. MCKENZIE (Pacific Gas and Electric Co., San Francisco, CA) In: The 1980's - A forest of energy decision trees; Proceedings of the Region Six Conference, San Diego, CA, February 20-22, 1980. New York, Institute of Electrical and Electronics Engineers, Inc., 1980, p. 166-173.

A82-25551
CONFERENCE ON DECISION AND CONTROL, 19TH, AND SYMPOSIUM ON ADAPTIVE PROCESSES, ALBUQUERQUE, NM, DECEMBER 10-12, 1980, PROCEEDINGS. VOLUMES 1 & 2
Conference and Symposium sponsored by the Institute of Electrical and Electronics Engineers New York, Institute of Electrical and Electronics Engineers, Inc., 1980 Vol. 1, 818 p.; vol. 2, 492 p.
PRICE OF TWO VOLUMES, MEMBERS, $50.25; NONMEMBERS, $67

Topics discussed include command and control concepts; optimization and numerical algorithms; estimation and mathematical physics of control theory; robots, manipulators, and prosthesis; anomaly detection and performance control in nuclear power plants; and control of Markovian and stochastic systems. Attention is also given to linear model reduction and decomposition; C3 fundamentals, optimization methods for decision and control; algebraic structures in (generalized linear) control theory; and adaptive control of energy systems. C.R.

A82-27126
FIBROUS COMPOSITES IN STRUCTURAL DESIGN
E. M. LENOE, (ED.), D. W. OPLINGER, and J. J. BURKE (U.S. Army, Army Materials and Mechanics Research Center, Watertown, MA) New York, Plenum Press, 1980. 883 p
$85

Developments related to aircraft structures are discussed, taking into account composite aircraft structures, composite wing substructure technology on the AV-8B advanced aircraft, a preliminary design development AV-8B forward fuselage composite structure, a wing fuselage critical component development program, and the development of a preloaded hybrid advanced composite wing pivot fairing. Other topics considered are related to missile and space applications, crashworthiness, impact damage, postbuckling, dynamics response, and special design considerations. Attention is also given to laminate plate theories, edge effects, flaw growth, helicopter applications, composite joints, a reliability/durability analysis, environmental effects, the development of an advanced composite hydrofoil control flap, and advancements in composite material flywheels. G.R.

A82-27707
ASILOMAR CONFERENCE ON CIRCUITS, SYSTEMS AND COMPUTERS, 14TH, PACIFIC GROVE, CA, NOVEMBER 17-19, 1980, CONFERENCE RECORD
D. E. KIRK, (ED.) (U.S. Naval Postgraduate School, Monterey, CA) Conference sponsored by the U.S. Naval Postgraduate School, University of Santa Clara, and Institute of Electrical and Electronics Engineers. New York, Institute of Electrical and Electronics Engineers, Inc., 1981. 528 p.
MEMBERS $30.; NONMEMBERS, $40

Papers presented in this volume cover a variety of subjects including switched capacitor filters, applied graph theory and topological applications, software engineering, digital systems education, and military applications of signal and information processing. Other topics discussed include two-dimensional and image processing, nontraditional applications of modern control, digital systems development techniques, digital filter structures and algorithms, and multivariable and large-scale systems. V.L.

A82-27826
COLLOQUIUM ON THE LAW OF OUTER SPACE, 24TH, ROME, ITALY, SEPTEMBER 6-12, 1981, PROCEEDINGS
Colloquium sponsored by the International Astronautical Federation. New York, American Institute of Aeronautics and Astronautics, 1982. 284 p
$24

Legal issues which impinge on space activities are discussed, particularly taking into consideration new avenues of space activities opened by advances in technology. The effects of current legalized conventions on economic activities in space are examined, particularly topics of liability, jurisdiction, private enterprise in space, and legal definitions of treaty terminology. The legal status of space objects is considered as regards the rights of states and objects launched from those states, the feasibility of including the Shuttle under existing space laws, and the implications of WARC'79 for the orbit/spectrum resource. Institutional arrangements which interface with space activities are investigated in terms of military activities in space, of international organizations suitable for enhancing space development and cooperation between nations, and for the legal status of artificial and natural space objects. M.S.K.

A82-27876
AUTOTESTCON '80; INTERNATIONAL AUTOMATIC TESTING CONFERENCE, WASHINGTON, DC, NOVEMBER 2-5, 1980, PROCEEDINGS
Conference sponsored by the Institute of Electrical and Electronics Engineers. New York, Institute of Electrical and Electronics Engineers, Inc., 1980. 343 p.
MEMBERS, $22.50; NONMEMBERS, $30

Topics considered include TPS management, ATE hardware systems, testing of the next generation commercial airline avionics, testability and built-in test, digital ATG, management information systems for ATE, and propulsion ATE. Attention is also given to system architecture, modular ATE, analog ATE, supporting shipboard electronics, and new and unusual ATE applications. B.J.

A82-30076
STRUCTURES, STRUCTURAL DYNAMICS AND MATERIALS CONFERENCE, 23RD, NEW ORLEANS, LA, MAY 10-12, 1982, COLLECTION OF TECHNICAL PAPERS. PART 1 - STRUCTURES AND MATERIALS. PART 2 - STRUCTURAL DYNAMICS AND DESIGN ENGINEERING
Conference sponsored by AIAA, ASME, ASCE, and AHS. New York, American Institute of Aeronautics and Astronautics, 1982. Pt. 1, 532 p.; pt. 2, 645 p.
PRICE OF TWO PARTS, MEMBERS, $100.; NONMEMBERS, $125

An integration scheme to determine the dynamic response of a launch vehicle with several payloads is considered along with aeroelastic characteristics of the Space Shuttle external tank cable trays, the structural design of integral tankage for advanced space transportation systems, and optimum damping locations for structural vibration control. Attention is given to a damage induced aeroelastic failure mode involving combination and parametric resonant instabilities of lifting surfaces, passive damping mechanisms in large space structures, an automated technique for improving modal test/analysis correlation, pressure measurements on twin vertical tails in buffeting flow, and a wind-tunnel study of the aerodynamic characteristics of a slotted versus smooth-skin supercritical wing. Other topics explored are related to the active control of aeroelastic divergence, stress constraints in optimality criteria design, and damage tolerant design using collapse techniques. G.R.

A82-32372
EFFICIENCIES OF HEAT ENGINES AND FUEL CELLS - THE METHANOL FUEL CELL AS A COMPETITOR TO OTTO AND DIESEL ENGINES
R. W. GLAZEBROOK (*Shell Research, Ltd, Thornton Research* Centre, Chester, England) Journal of Power Sources, vol. 7, Mar. 1982, p 215-256. refs

As the real cost of fuel rises the efficiency of energy conversion devices will become of increasing importance. Efficiency is a variable factor depending inter alia on load factor Whereas heat engines commonly yield optimum efficiencies at near to maximum power, fuel cells yield optimum efficiencies at zero power. *Projections based on realistic developments suggest that fuel cells* will operate overall with higher efficiencies than heat engines when load factors are below approximately 45%. Road transportation generally operates at load factors much lower than this and *represents a suitable market for fuel cells.* (Author)

A82-33703#
WIND SYSTEM VALUE ANALYSIS FOR ELECTRIC UTILITIES - A COMPARISON OF FOUR METHODS
J. HARPER, D. PERCIVAL, T FLAIM (Solar Energy Research Institute, Golden, CO), and R. L. SULLIVAN (Florida, University, Gainesville, FL) (Biennial Wind Energy Conference and Workshop, 5th, Washington, DC, Oct. 5-7, 1981) ASME, Transactions, Journal of Solar Energy Engineering, vol 104, May 1982, p. 70-76. (Contract EG-77-C-01-4042)

A comparison and suggestions for improvements in the SERI-H, SERI Weibull, AERO, and JBF value models for estimation of the economic worth of wind energy conversion systems (WECS) to utilities are made The simulations comprise projections for *operations with and without WECS, fuel, operation, and* maintenance costs, base load and generating capacity, reliability, estimated WECS performance, wind resource, fuel escalation rates, and scenarios with pumped hydro storage. The Weibull curve was found to be good in the SERI-H model only for considering winds above cut-in. Reasonable agreement was found at the 5% peak load penetration level for all models. Installing 635 MW of WECS was determined to replace from 126-177.9 MW of conventional utility generator capacity. The breakeven value for Mod 2 installation was determined at $1620/kW for use in southern California and $1850-2470/kW in Michigan M.S.K.

A82-35601
SPACE MANUFACTURING 4; PROCEEDINGS OF THE FIFTH CONFERENCE, PRINCETON UNIVERSITY, PRINCETON, NJ, MAY 18-21, 1981
J. GREY, (ED.) (American Institute of Aeronautics and Astronautics, New York, NY) and L. A. HAMDAN Conference sponsored by Princeton University and American Institute of Aeronautics and Astronautics New York, American Institute of Aeronautics and Astronautics, 1981. 464 p.
MEMBERS, $30.; NONMEMBERS, $37.50

Space manufacturing is discussed in regard to international and legal considerations, social sciences, novel concepts, materials resources and processing, and space stations and habitats. Particular topics discussed include the military implications of a satellite power system; a self-replicating, growing lunar factory; *the supply of lunar oxygen to low earth orbit; a small-scale lunar* launcher for early lunar material utilization; a decision-analytic evaluation of the SPS program; powder metallurgy in space manufacturing; and United States and Soviet life sciences factors in long-duration space flight. B.J

A82-36951
MANNED SYSTEMS DESIGN: METHODS, EQUIPMENT, AND APPLICATIONS; PROCEEDINGS OF THE CONFERENCE, FREIBURG IM BREISGAU, WEST GERMANY, SEPTEMBER 22-25, 1980
J MORAAL, (ED.) (Centrale Organisatie voor Toegepast-Natuurwetenschappelijk Onderzoek, Instituut voor Zintuigfysiologie, TNO, Soesterberg, Netherlands) and K.-F KRAISS (Forschungsgesellschaft fuer angewandte Naturwissenschaften, Forschungsinstitut fuer Anthropotechnik, Wachtberg-Werthhoven, West Germany) Conference sponsored by NATO. New York, Plenum Press (NATO Conference Series III. *Human Factors. Volume 17*), 1981 496 p.
$35

Papers are presented in the areas of conceptual and analytical approaches, performance measurement and simulator design and *evaluation in the design of manned systems. Specific topics include* the proper incorporation of human factors in the design process, simulation languages used in manned systems design, eye movement measurements used in the evaluation of visual *performance, techniques for electophysiological measurements,* human movement analysis in workplace design, and the design of a programmable multiple flight simulator facility A.L.W

A82-36970
VIDEO DISC TECHNOLOGY - A NEW APPROACH TO THE DESIGN OF TRAINING DEVICES
S LEVIN and J. D. FLETCHER (U.S. Army Research Institute for *the Behavioral and Social Sciences, Alexandria, VA) In. Manned* systems design· Methods, equipment, and applications, Proceedings of the Conference, Freiburg im Breisgau, West Germany, September 22-25, 1980. New York, Plenum Press, 1981, p. 465-478. refs

It appears that the productivity limits of current training technology have been reached, and that revolutionary new techniques are needed to break through existing constraints It is *pointed out that video disk technology is one of the most promising* sources of these new techniques At the heart of this technology is the capability to access tens of thousands of color images, including stereo sound, in very short time. Attention is given to four new ideas for training applications which use video disk technology Optical video disk antecedents are considered along with aspects of optical video disk technology, interactive movies, surrogate travel, electronic libraries, and simulation. A number of issues concerning the use of video disks by the training community are also investigated. G.R

A82-37295
INTERNATIONAL CONFERENCE ON DIGITAL SATELLITE COMMUNICATIONS, 5TH, GENOA, ITALY, MARCH 23-26, 1981, PROCEEDINGS
Conference sponsored by INTELSAT, Telespazio S p.A, Istituto *Internazionale delle Communicazioni, Associazione Elettrotecnica* ed Elettronica Italiana, and IEEE. New York, Institute of Electrical and Electronics Engineers, 1981. 506 p.
MEMBERS, $51.; NONMEMBERS, $68

Topics discussed include packet switching and demand assignment, modulation and transmission analysis, field trials, and new services and domestic applications. Also considered are integration with terrestrial networks, signal processing and coding, *modem design, TDMA systems, satellite-switched TDMA, and* onboard regeneration. B.J.

A82-37826
ANNALS OF AIR AND SPACE LAW. VOLUME 6
N. M. MATTE, (ED) (McGill University, Montreal, Canada) Montreal, McGill University; Toronto, Carswell Co, Ltd.; Paris, Editions A. Pedone, 1981. 760 p. In English and French.

Legal concerns regarding international aerospace and outer space activities are examined. Attention is given to liability in the case of late cargo delivery, the delivery of hazardous cargo, and the extent national decisions can affect the operations of foreign airlines operating within the country. The development of air

transport services in Africa is described, along with deficiencies in the Canadian Constitution which impede the construction of airports Space law topics considered include the delineation of governmental and private industry participation in the production of the Ariane launch vehicle. Proposals for the establishment of an agency to operate surveillance satellites for monitoring arms control agreements are discussed and mention is made of Conventions governing the direct broadcast of satellite television internationally. Finally, legal questions raised by the operation of the Shuttle are investigated. M.S.K.

A82-39851
COMPOSITE MATERIALS: MECHANICS, MECHANICAL PROPERTIES AND FABRICATION; PROCEEDINGS OF THE JAPAN-U.S. CONFERENCE, TOKYO, JAPAN, JANUARY 12-14, 1981
K. KAWATA, (ED.) (Tokyo, University, Tokyo, Japan) and T. AKASAKA (Chuo University, Hachioji, Tokyo, Japan) Conference sponsored by the Japan Society for Composite Materials and Nihon Itagarasu Zairyokogaku Joseikai. Barking, Essex, England, Applied Science Publishers, 1982. 575 p
$68

This conference on composite materials opens with consideration of such topics in dynamic behavior and wave propagation as the impact resistance and dynamic analysis of composites, wave propagation in a composite cylinder, and transient wave propagation in a viscoelastic laminate. It then proceeds to stress analysis and mechanical properties, including the equivalent inclusion method, elastic constants and internal friction in composites, finite element method and photoelasticity analyses, fiber orientation, and damping properties. Also covered are composite fatigue and fracture properties, viscoelasticity, elastoplastic fracture toughness, metal matrix composites, ceramic and rubber composites, thermal and environmental problems, the strength of composite structural elements, composite structure design methods and prospective composite applications in aircraft structures, and educational methods for composite materials engineering. O C.

A82-39882
ON THE STATE OF TECHNOLOGY AND TRENDS IN COMPOSITE MATERIALS IN THE UNITED STATES
J. R VINSON (Delaware, University, Newark, DE) In· Composite materials: Mechanics, mechanical properties and fabrication; Proceedings of the Japan-U.S Conference, Tokyo, Japan, January 12-14, 1981. Barking, Essex, England, Applied Science Publishers, 1982, p. 353-361. refs

In connection with the ongoing NASA Aircraft Energy Efficiency Composite Primary Aircraft Program a number of composite material structural components have been installed on commercial aircraft and are in service today. The composite components involved include rudder, vertical fin, ailerons, elevators, and horizontal tail Attention is given to the use of graphite composites in commercial and military aircraft, F100 afterburner nozzle flaps made of carbon-polyimide composite, the graphite-epoxy airframe of the Learfan 2100, the use of Kevlar in helicopters, the employment of Kevlar composites in sailplanes, the fabrication of the fifty foot long booms of the Space Shuttle from graphite epoxy, and the use of Kevlar-epoxy in the design of many rocket motor cases. Unfortunately, cost and confidence are still major obstacles toward more use of composites in the auto industry. G.R.

A82-40876
INTERNATIONAL COUNCIL OF THE AERONAUTICAL SCIENCES, CONGRESS, 13TH AND AIAA AIRCRAFT SYSTEMS AND TECHNOLOGY CONFERENCE, SEATTLE, WA, AUGUST 22-27, 1982, PROCEEDINGS. VOLUMES 1 & 2
B. LASCHKA, (ED.) and R. STAUFENBIEL New York, American Institute of Aeronautics and Astronautics, 1982. Vol. 1, 821 p.; vol. 2, 721 p. In English and French.
MEMBERS, $75.; NONMEMBERS, $90

Topics in aeronautical and aerodynamics research, development, implementation, and future directions are considered. The development and applications of Space Transportation Systems are described, and attention is also given to development programs for transport aircraft and military combat aircraft. Theoretical studies in flowfields, crew station design, and power plant materials and design are presented, along with investigations of aerodynamics, computational aerodynamics, control systems, and materials fatigue and tolerance. The uses of simulators for Orbiter pilot training, swept wings for efficient flight, and computer-controlled flight management systems are described, and examinations of vortex flows, structural dynamics, applications of composite structures, and canards are reported. M.S K.

A82-40896*# National Aeronautics and Space Administration Langley Research Center, Hampton, Va.
NASA RESEARCH ON VISCOUS DRAG REDUCTION
R. H PETERSEN and D. V. MADDALON (NASA, Langley Research Center, Hampton, VA) In. International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 1. New York, American Institute of Aeronautics and Astronautics, 1982, p. 203-213. refs

Current NASA research points toward exciting opportunities for large reductions in viscous drag. Research is underway on natural laminar flow, laminar flow control by suction, and turbulent drag reduction. Preliminary results suggest that a significant amount of natural laminar flow can be achieved on small, straight-wing airplanes. On larger, swept-wing aircraft, laminar flow control by distributed suction is expected to result in significant fuel savings The area over which laminar flow control is applied depends on tradeoffs involving structural complexity, maintenance, and cost Several methods of reducing turbulent skin friction by altering the turbulence structure itself have shown promise in exploratory testing This paper reviews the status of these technologies and indicates the benefits of applying them to future aircraft.
(Author)

A82-40903#
THE PROMISE OF LAMINATED METALS IN AIRCRAFT DESIGN
D. H PETERSEN, L. E. SLOTER, II, W A. POINDEXTER, J. L. MARIS, and G. E. KUHN (Vought Corp , Dallas, TX) In· International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 1. New York, American Institute of Aeronautics and Astronautics, 1982, p. 262-269. refs

The relative merits of monolithic metals, adhesively bonded sheet metal and a new family of metallurgically bonded laminated alloys are presented and discussed in light of the U.S. Air Force's laminated metal technology demonstration Advanced Technology Wing program. A wing section was designed and constructed whose lower skin consisted of adhesively bonded aluminum layers having no fastener penetrations The elimination of lower wing skin fasteners precludes both corrosion intrusion sites and locations for structural cracking, and in addition reduces manufacturing and assembly costs. The wing suffered no damage during two lifetimes of spectrum fatigue testing, as well as an additional 1 8 lifetimes of damage tolerance testing which included exposure to sump water and JP-4 fuel. O.C.

A82-40932*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
ASSESSMENT OF ADVANCED TECHNOLOGIES FOR HIGH PERFORMANCE SINGLE-ENGINE BUSINESS AIRPLANES
D. L. KOHLMAN (Kohlman Aviation Corp., Lawrence, KS) and B. J HOLMES (NASA, Langley Research Center, Hampton, VA) In: International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 1. New York, American Institute of Aeronautics and Astronautics, 1982, p. 512-563 refs

The prospects for significantly increasing the fuel efficiency and mission capability of single engine business aircraft through

the incorporation of advanced propulsion, aerodynamics and materials technologies are explored. It is found that turbine engines cannot match the fuel economy of the heavier rotary, diesel and advanced spark reciprocating engines. The rotary engine yields the lightest and smallest aircraft for a given mission requirement, and also offers greater simplicity and a multifuel capability. Great promise is also seen in the use of composite material primary structures in conjunction with laminar flow wing surfaces, a pusher propeller and conventional wing-tail configuration This study was conducted with the General Aviation Synthesis Program, which can furnish the most accurate mission performance calculations yet obtained. O C.

A82-40965#
TURBOPROP DESIGN - NOW AND THE FUTURE
B. S. GATZEN (United Technologies Corp., Hamilton Standard Div., Windsor Locks, CT) In: International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings Volume 2. New York, American Institute of Aeronautics and Astronautics, 1982, p 879-903 refs

After an account of the development history of turboprop rotor technology during the 1960s for V/STOL applications, the development status and design and performance characteristics of commuter aircraft turboprop and high speed propeller fan rotor technologies are considered. The commuter aircraft propeller family incorporates composite shell and aluminum spar blades with a double-acting pitch change system and a pitch-lock feature, resulting in weight reduction, greater safety, improved durability, and a near-ideal aerodynamic performance in the Mach 0.4-0.65 range that assures low cabin noise levels and meets far field noise certification requirements. The propeller fan incorporates 8-10 blades with swept blade tips for the Mach 0.65-0.8 range cruise speeds of 80-160 passenger transports and military cargo and ASW aircraft The propeller fan will result in fuel consumption reductions of 20% and 40% for commercial and military aircraft, respectively. O.C

A82-40993#
TECHNICAL AND ECONOMIC COMPARISON OF CARBON FIBER TAPE AND WOVEN FABRIC APPLICATIONS
G. HILAIRE and G. BRIENS (Societe Nationale Industrielle Aerospatiale, Laboratoire Central, Suresnes, Hauts-de-Seine, France) In. International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 2. New York, American Institute of Aeronautics and Astronautics, 1982, p. 1164-1172.

A comparative study is made of the structural performance characteristics of various types of carbon fiber fabrics and unidirectional filament prepreg tapes, in view of the relative equality of the importance, in recent applications of carbon fiber composites, of weight reduction, strength maximization, and reductions in manufacturing costs. The comparisons are between a 3000-filament (3 K) tow, T 300 carbon fiber, 5 H satin weave cloth weighing 285 g/sq m when dry, and a 3 K T 300 tape. Both are impregnated with 5208 resin and in that state represent 60 percent fiber volume composites. The performance charactersitics considered are interlaminar shear, notched and unnotched tensile strength, and compressive strength. The consequences of each alternative for manufacturing are assessed for the cases of manual and automated lay-up, machining and cut trimming. O.C.

A82-40994#
APPLICATION OF COMPOSITE MATERIALS AND NEW DESIGN CONCEPTS FOR FUTURE TRANSPORT AIRCRAFT
R. H. LANGE and J. W MOORE (Lockheed-Georgia Co., Marietta, GA) In: International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 2. New York, American Institute of Aeronautics and Astronautics, 1982, p. 1173-1181. refs

The application of advanced technologies and the use of innovative aircraft design concepts show the potential for significant improvement in the fuel efficiency of future transport aircraft envisioned for operation in the mid to late-1990s. This paper reviews recent preliminary design system studies of transport aircraft featuring cost/benefit analyses of advanced technology and new vehicle design concepts. Emphasis is directed toward the use of graphite epoxy composite materials in the primary and secondary structures of transport aircraft. The data on aircraft design concepts include preliminary design studies of Advanced Civil/Military Aircraft (ACMA) aircraft and innovative configurations. The aircraft design parameters include cruise Mach numbers of 0.75 to 0.80, design payloads from 330,000 to 772,000 lbs, and range from 3,500 to 4,000 nautical miles. (Author)

A82-41819
INTERNATIONAL INSTRUMENTATION SYMPOSIUM, 28TH, LAS VEGAS, NV, MAY 3-6, 1982, PROCEEDINGS. PARTS 1 & 2
Symposium sponsored by the Instrument Society of America. Research Triangle Park, NC, Instrument Society of America (Instrumentation in the Aerospace Industry. Volume 28; Advances in Test Measurement Volume 19), 1982, Pt. 1, 524 p ; pt. 2, 528 p.

Topics investigated are related to shock and vibration, microcomputer applications in instrumentation and control, energy source instrumentation instrumentation in the transportation industry, pressure and flow, acoustic emission, machinery instrumentation, wind tunnel instrumentation and control, nondestructive testing and strain, force, and torque. Other subjects explored are in the areas of electrooptical instrumentation, space transportation systems experiment instruction, data acquisition and analysis, flight test instrumentation, two-phase flow measurements, advanced system concepts, and reentry vehicle testing. Attention is given to a new temperature threshold detector and its application to missile monitoring, full scale torch tests on a spent fuel cask shipping system, pyrotechnic plate analysis and test results, the selection of a dynamic pressure sensor for use inside a steam turbine, microprocessor-based control of large constant-speed centrifugal compressors, and a modular data system for Spacelab experiments. G.R.

A82-41829
A DISTRIBUTED MICROCOMPUTER CONTROL SYSTEM FOR ENERGY MANAGEMENT
K. S. VANGURI and B. HERSHENOV (RCA Laboratories, Princeton, NJ) In: International Instrumentation Symposium, 28th, Las Vegas, NV, May 3-6, 1982, Proceedings. Part 1 Research Triangle Park, NC, Instrument Society of America, 1982, p. 115-123.

It is pointed out that energy shortages and ever increasing energy demands and costs have made the efficient use and conservation of energy a practical necessity. A description is presented of the design and development of a computer-based energy-management system for large commercial multibuilding office complexes. The system was designed as a general purpose distributed computer-control system with potential applications in a number of general areas of factory automation and process control. The system was developed for a specific installation, and developments regarding the use of the system in this installation are examined G.R.

A82-41832
A NEW INSTRUMENT FOR DIRECT MEASUREMENT OF WALL SHEAR STRESS
A VAKILI and J. M. WU (Tennessee, University, Tullahoma, TN) In. International Instrumentation Symposium, 28th, Las Vegas, NV, May 3-6, 1982, Proceedings. Part 1. Research Triangle Park, NC, Instrument Society of America, 1982, p. 147-152. refs

The importance of viscous effects in aerodynamics has motivated many investigations in the field of boundary layer flows, taking into account, in particular, the frictional forces introduced by these effects on the surface of moving bodies. Correct skin friction measurement can provide vital information which can be used to check the accuracy of theoretical modeling. However, a number of problems arise in connection with the direct measurement of skin friction. Attention is given to a new instrument which was designed to minimize these problems In particular, the new skin friction gage was developed as an alternative to ease the troubles encountered previously with a floating element balance The skin friction gauge consists of a flexible belt wrapped continuously and tightly over two cylinders separated by a small distance It is pointed out that the belt-skin-friction gauge has the potential to become a standard measuring device G.R.

A82-41833
A NEW INSTRUMENT FOR WHOLE FIELD STRESS ANALYSIS
C. P. BURGER and A S VOLOSHIN (Iowa State University, of Science and Technology, Ames, IA) In International Instrumentation Symposium, 28th, Las Vegas, NV, May 3-6, 1982, Proceedings. Part 1. Research Triangle Park, NC, Instrument Society of America, 1982, p 153-165. refs
(Contract NSF CME-80-14066)

Some of the traditional roles of photoelasticity are now performed by numerical techniques. However, the potential of photoelasticity for future use is great because no alternate experimental system has been able to replace the full field capability and the sensitivity of photoelasticity A description is given of a new method which will make a fuller exploitation of this potential possible by providing an approach for overcoming the main disadvantages of contemporary photoelasticity, including the need for special model materials with high birefringence and the necessity to apply large loads with their consequent large deformations. The described technique is based on the ability of commercially available image analysis systems to acquire rapidly information on light intensity over a whole field and to transfer this information into a digital storage device. Later this information can be processed to yield stress fields. The system is called 'Half-Fringe-Photoelasticity' (HFP) because it operates effectively with less than one half wavelength of relative retardation. G.R.

A82-42550
SOLAR ENERGY DEVELOPMENT AND APPLICATION IN JAPAN - AN OUTSIDERS ASSESSMENT
E KNOPP (Technoservice AB, Malmo, Sweden) International Journal of Ambient Energy, vol 3, Apr. 1982, p. 101-107. Research supported by the Swedish Board for Building Research.

The Sunshine Project was initiated in Japan in 1974 in order to develop energy resources to meet future needs. The solar program consists of three categories; solar home construction, the construction and operation of a 1000 kWe capacity solar thermal power generation plant, and the development of a photovoltaic system with a cost per watt reduced to 1/100 of the present cost. Low interest loans to promote the use of solar systems have resulted in the installation of one million solar collectors. Solar water heaters produced have a 2 sq m collection area and a 200 liters water storage capacity, and an evacuated tube collector with an efficiency of 64% has been developed. Work is being devoted to the production of a 50 times concentrating tracking circular Fresnel-type photovoltaic device, and a solar driven cooling system with a 5.35 kW capacity, which operates with a highly efficient freon vapor expander, has been developed. The problem of collected heat storage is being tested and assessed. R.K.R.

A82-42572
THE SPORTY GAME
J. NEWHOUSE Research supported by the Marshall Fund. New York, Alfred A. Knopf, 1982. 250 p refs
$15

An episodic history of the airliner business in the era of widebody airplanes is presented. Competition in the development and marketing of big airplanes is focused on, with each of the major companies being discussed in detail, and the development of international competition emphasized. The relationship of governments to the individual companies is explored, and aspects such as comfort, safety, and aircraft size are evaluated as factors in the competition. Future prospects of the American airplane industry are assessed. C.D.

A82-43778
ICC '81; INTERNATIONAL CONFERENCE ON COMMUNICATIONS, DENVER, CO, JUNE 14-18, 1981, CONFERENCE RECORD. VOLUMES 1, 2, 3 & 4
Conference sponsored by the Institute of Electrical and Electronics Engineers. New York, Institute of Electrical and Electronics Engineers, Inc., 1981. Vol. 1, 599 p.; vol. 2, 620 p ; vol. 3, 627 p , vol. 4, 325 p.
MEMBERS, $57.; NONMEMBERS, $76

Topics discussed include progress in digital switching, spectral efficient modems for radio systems, satellite switching technology, VLSI implementation of transmultiplexers, adaptive antennas for satellite and earth stations, channel distortion and fading channels, optical processing in communications satellites, and the simulation and modeling of communications systems. Also considered are digital source encoding and compression, earth terminals for domestic systems, new advances in information theory, communication requirements for weather prediction, progress in military communication systems, onboard regenerative satellite systems, and the evolution of public and private switched networks. Signal design for nonlinear satellite channels, advanced communications satellite systems, bandwidth efficient digital communications, advances in mobile user satellite communications, intersatellite links, and spread spectrum techniques are also examined. B.J.

A82-43802
TECHNOLOGY ASSESSMENT FOR IMPLEMENTATION OF OPTICAL INTERSATELLITE LINK
Y. S. LEE (COMSAT Laboratories, Clarksburg, MD) In: ICC '81; International Conference on Communications, Denver, CO, June 14-18, 1981, Conference Record. Volume 1 New York, Institute of Electrical and Electronics Engineers, Inc., 1981, p. 15.4.1-15.4 4. Research sponsored by the Communications Satellite Corp. and International Telecommunications Satellite Organization. refs

It is pointed out that an optical intersatellite link (ISL) will offer (1) reduced weight using high-directivity small antennas, (2) extremely wide bandwidth (multigigabit) capacity, and (3) no electromagnetic interference with the existing microwave systems, as well as compatibility with densely occupied satellite configurations. It is shown that optical ISLs between regional/national satellites can provide dynamic flexibility, that is, interconnectivity and onboard processing, in the future (1990-2000) international network. Implementation of multigigabit capacity optical ISL systems is possible using diode-pumped YAG laser technology. The semiconductor (GaAlAs) diode laser-pumped version of the Nd:YAG laser is able to meet the space qualification level reliability when a standby redundancy scheme is introduced in the system design C.R.

A82-44229#
DECOMPOSITION AND CONTROL OF COMPLEX SYSTEMS - APPLICATION TO THE ANALYSIS AND CONTROL OF INDUSTRIAL AND ECONOMIC SYSTEMS /ENERGY PRODUCTION/ WITH LIMITED SUPPLIES [DECOMPOSITION ET COMMANDE DE SYSTEMES COMPLEXES - APPLICATION A L'ANALYSE ET LA COMMANDE DE SYSTEMES INDUSTRIELS ET ECONOMIQUES /PRODUCTION D'ENERGIE/, AVEC STOCKS BORNES]
M DE COLIGNY Toulouse III, Universite, Docteur d'Etat Thesis, 1981. 205 p. refs

Optimized control strategies are developed for industrial installations where many variables of energy supply and storage are involved, with a particular focus on characteristics of a solar central tower power plant It is shown that optimal regulation resides in controlling all disturbances which occur in a limited domain of the entire system, using robust control schemes. Choosing a command is then dependent on defining precise operational limits as constraints on the machines' performances. Attention is given to the development of variational principles used for the elements of the command logic. Particular consideration is given to a limited supply in storage in spatial and temporal terms Commands for alterations in functions are then available on-line, and discontinuities are not a feature of the control system. The strategy is applied to the case of a field of heliostats and a central tower thermal receiver showing that management is possible on the basis of a sliding horizon. M.S K.

A82-44301
SOLAR ENGINEERING - 1981; PROCEEDINGS OF THE THIRD ANNUAL CONFERENCE ON SYSTEMS SIMULATION, ECONOMIC ANALYSIS/SOLAR HEATING AND COOLING OPERATIONAL RESULTS, RENO, NV, APRIL 27-MAY 1, 1981
R. L. REID, (ED.) (Tennessee, University, Knoxville, TN), L. M. MURPHY (Solar Energy Research Institute, Golden, CO), and D. S. WARD (Colorado State University, Fort Collins, CO) Conference sponsored by the American Society of Mechanical Engineers and U.S. Department of Energy. New York, American Society of Mechanical Engineers, 1981. 777 p
$40

Progress made toward the commercialization of solar energy technologies as of 1981 is assessed, and attention is given to the future uses and impacts of solar energy. Attention is given to the results of several years of monitoring and modifying solar heating and cooling on residential and commercial structures. Solar system simulation and analysis methods are reviewed, covering the performance and operations of passive and active systems, thermosyphon systems, heat pumps and phase change systems. Simulations of system components are discussed, as are means to validate existing computer simulation codes, particularly the TRNSYS program. Control systems and logic for collector systems are explored, including analyses of building loads and climates, and numerical models of the economics of solar heating systems are presented. Performance simulations and economic analyses are also outlined for wind and photovoltaic systems, and for industrial solar heating systems. Finally, fundamental studies of corrosion, steam flow, wind loading, and scaling in solar systems are described M.S.K.

A82-44928
PHOTOVOLTAIC SPECIALISTS CONFERENCE, 15TH, KISSIMMEE, FL, MAY 12-15, 1981, CONFERENCE RECORD
Conference sponsored by the Institute of Electrical and Electronics Engineers. New York, Institute of Electrical and Electronics Engineers, Inc., 1981. 1523 p.
MEMBERS, $75.; NONMEMBERS, $100

GaAs cells for space applications are considered, taking into account AlGaAs/GaAs high efficiency cascade solar cells, and a thermochemical model of radiation damage and continuous annealing applied to GaAs solar cells. Other topics discussed are related to silicon solar cells for space applications, photovoltaic concentrator receivers and application experiments, photovoltaic concentrator cells, economics and feasibility analysis, space solar cell calibration, low cost technology for space applications, thin film solar cells, low cost processes, and low cost cell and array processes A description is also presented of subjects in the areas of low cost Si and sheet technology, amorphous silicon solar cells, flat-plate array subsystem and system technology, cadmium sulfide and copper sulfide solar cells, flat-plate array subsystem design and test methods, module failure/degradation mechanism and reliability, measurement techniques for photovoltaic cells and materials, and flat-plate residential and intermediate system applications. G.R.

A82-44931
PHOTOVOLTAIC OUTLOOK FROM EUROPEAN COMMUNITY'S VIEWPOINT
W. PALZ (Commission of the European Communities, Directorate General for Research Science and Education, Brussels, Belgium) In: Photovoltaic Specialists Conference, 15th, Kissimmee, FL, May 12-15, 1981, Conference Record. New York, Institute of Electrical and Electronics Engineers, Inc., 1981, p. 17-20.

An overview of photovoltaic developments is presented, and the three primary future program specifications are to provide scientific and technological guidelines, provide for the economic feasibility of such a program, and establish implementation guidelines. It is concluded that both hard and soft technology approaches should be developed, and a 5 MW panel production in 1982 is predicted. Silicon is the leading material being used, and research and development programs are investigating the use of alternative materials such as CdSe and amorphous silicon A 1.3 MW pilot is established in Europe, and 18 projects are mentioned, including a program which will soon be established in Sicily. R.K.R.

A82-44976* Jet Propulsion Lab., California Inst. of Tech., Pasadena.
A PHOTOVOLTAIC INDUSTRY OVERVIEW - THE RESULTS OF A SURVEY ON PHOTOVOLTAIC TECHNOLOGY INDUSTRIALIZATION
R. R. FERBER, E. N. COSTOGUE, J. W THORNHILL, and K. SHIMADA (California Institute of Technology, Jet Propulsion Laboratory, Pasadena, CA) In: Photovoltaic Specialists Conference, 15th, Kissimmee, FL, May 12-15, 1981, Conference Record. New York, Institute of Electrical and Electronics Engineers, Inc., 1981, p. 261-266. Research supported by the U.S. Department of Energy.

The National Photovoltaics Program of the United States Department of Energy has the objective of bringing photovoltaic power systems to a point where they can supply a significant portion of the United States energy requirements by the year 2000. This is planned to be accomplished through substantial research and technology development activities aimed at achieving major cost reductions and market penetration. This paper presents information derived from a limited survey performed to obtain photovoltaic industry attitudes concerning industrialization, and to determine current industry plans to meet the DOE program goals. Silicon material production, a key photovoltaic manufacturing industry, is highlighted with regards to implementation of technology improvement and silicon material supply outlook. (Author)

A82-45028
RECENT PROGRESS IN THE DEVELOPMENT OF ADVANCED SOLAR CELLS
D. L. FEUCHT (Solar Energy Research Institute, Golden, CO) In: Photovoltaic Specialists Conference, 15th, Kissimmee, FL, May 12-15, 1981, Conference Record. New York, Institute of Electrical and Electronics Engineers, Inc., 1981, p. 648-653. refs
(Contract EG-77-C-01-4042)

A large number of advanced photovoltaic materials and concepts are being explored which have potential for efficient low-cost electric conversion. The progress in many of these technologies, which has been considerable over the past few years, will be discussed in the paper. In order to demonstrate technical feasibility by 1986 for achieving the cost goals of $0.15 to $0.50/W(pk) for advanced modules by 1990 there are several

problem areas which must be addressed. These are also discussed briefly. (Author)

A82-45100* Jet Propulsion Lab., California Inst. of Tech., Pasadena.
PHOTOVOLTAIC SYSTEMS OVERVIEW
J. L. HESSE (California Institute of Technology, Jet Propulsion Laboratory, Pasadena, CA) In. Photovoltaic Specialists Conference, 15th, Kissimmee, FL, May 12-15, 1981, Conference Record New York, Institute of Electrical and Electronics Engineers, Inc., 1981, p. 1139-1145.

Selected photovoltaic systems currently under user-environment field test by the U.S. Department of Energy Photovoltaics Program are discussed, and operational results are summarized. There are many systems in the stand-alone sector that are cost effective now. As proven products become available, distributed residential, commercial, institutional and industrial on-site systems should be able to displace significant amounts of centrally-generated electricity throughout most of the United States. Finally, utilities should ultimately be able to augment their generating capacity with larger-scale systems. Field experience and industry interface has led to excellent overall product performance. (Author)

A82-45386
LEADERSHIP IN SPACE FOR BENEFITS ON EARTH; PROCEEDINGS OF THE TWENTY-EIGHTH ANNUAL CONFERENCE, SAN DIEGO, CA, OCTOBER 26-29, 1981
W. F. RECTOR, III, (ED.) (General Dynamics Corp., St. Louis, MO) Conference sponsored by the American Astronautical Society and American Institute of Aeronautics and Astronautics San Diego, CA, Univelt, Inc. , 1982. 308 p
$45

Among the topics discussed in the present conference on the transfer of space technology to civilian markets are the management of military space communications, the uses of the Navstar global positioning system, the defense of spacecraft from attack, new approaches in narrow-beam communications for the improvement of orbit spectrum utilization, the use of the Space Shuttle as a launch vehicle for future communications satellites, planetary exploration through the year 2000, and cost reductions effected by means of technology development. Also considered are cost-effective data systems for spacecraft, navigation and position location from space in order to increase air and sea lane safety, and Navstar user equipment and applications. O.C

A82-45394
THE SPACE TRANSPORTATION SYSTEM AND FUTURE COMMUNICATIONS SATELLITES
H. E. EMIGH, JR. and G. S. CANETTI (Rockwell International Corp., Downey, CA) In· Leadership in space for benefits on earth; Proceedings of the Twenty-eighth Annual Conference, San Diego, CA, October 26-29, 1981. San Diego, CA, Univelt, Inc , 1982, p 95-112.
(AAS 81-329)

An historical account is given of the development of communications satellites, with a view to the establishment of growth trends on which the further growth capability expected with the Space Shuttle's operation as a satellite launcher can be projected. While during the 1970s expendable launch vehicles could lift payloads of only about 2000 lbs, at a launch cost of $25,000/lb, the Space Shuttle will handle satellites weighing up to 12,000 lbs at approximately $12,000/lb. Attention is given to the design features and projected capabilities of the Orbital Transfer Vehicle (OTV), by which large payloads can be lifted to high orbits, and to the manned Space Operations Center (SOC,), which will be employed for the assembly of the satellite to be deployed as well as of the OTV, and the production and storage of its propellants. The SOC is expected to further reduce launch costs to about $5,000. O C.

A82-45395* National Aeronautics and Space Administration, Washington, D C.
PLANETARY EXPLORATION PROGRAM THROUGH THE YEAR 2000 - A PROGRESS REPORT
G. A. BRIGGS (NASA, Office of the Space Science and Applications, Washington, DC) In: Leadership in space for benefits on earth; Proceedings of the Twenty-eighth Annual Conference, San Diego, CA, October 26-29, 1981. San Diego, CA, Univelt, Inc., 1982, p. 133-144.
(AAS 81-337)

This paper covers the solar system exploration committee including their recommendations and plan options, and study approach. Also included are: planetary and solar system exploration program; thrusts, methodology, goals, recent history, approach to reduce costs/increase efficiency, spacecraft, recent problems, and plans for FY 1982. All of the different program ingredients are emphasized. (Author)

A82-45396
AFFORDABLE ACCESS TO SPACE
G. F. FRASER (Rockwell International Corp , Space Transportation and Systems Group, Downey, CA) In. Leadership in space for benefits on earth; Proceedings of the Twenty-eighth Annual Conference, San Diego, CA, October 26-29, 1981 San Diego, CA, Univelt, Inc., 1982, p. 165-179
(AAS 81-369)

An historical account is given of the development of launch vehicle technology, from the viewpoint of progressive payload launch cost reductions, with attention to comparisons between expendable launch vehicle costs and those of the Space Shuttle. After considering launch cost improvement trends over the course of Atlas Centaur, Saturn, Titan III C and D and Delta 2914 and 3914 use, and the more recent Space Shuttle, it is noted that 17 NASA-sponsored studies conducted over the last seven years have identified 25-45% cost savings through the Space Shuttle's recovery, ground refurbishment, and relaunch of space systems. Cost savings reaching levels of 35-65% have been projected through the implementation of Space Shuttle orbital repairs and servicing Detailed total cost per mission comparisons are made for expendable and Space Shuttle launches in the cases of polar and conventional low earth orbits. O.C.

A82-45499#
WHY GE MADE A MOTEUR D'AVIATION
B. H. ROWE (General Electric Co., Aircraft Engine Group, Cincinnati, OH) Astronautics and Aeronautics, vol. 20, Oct. 1982, p. 40-43.

A brief history and the current state of the aircraft engine industry are presented, in terms of market growth in the U.S. and overseas The primary systems contributing to current market growth are the 150 passenger medium range airliner, a minimum of four types of commuter or regional type aircraft with 30-40 passenger capacities, and a possible 60-70 passenger transport and new combat aircraft. Several limits imposed on the international market are governmental protectionism, the need for import/export balance considering oil prices, financial risk, and technical risk. An example joint effort is the construction of the core engine (compressor, combustor, and turbine) by GE and SNECMA (constructed the fan and the power turbine), and other programs have ensued such as the DC-8 Series 70 re-engining program.
R.K.R.

A82-46251*
SYMPOSIUM ON AVIATION PSYCHOLOGY, 1ST, OHIO STATE UNIVERSITY, COLUMBUS, OH, APRIL 21, 22, 1981, PROCEEDINGS
Symposium sponsored by NASA, Association of Aviation Psychologists, and Battelle Memorial Institute. Columbus, OH, Ohio State University, 1981 416 p
$10.00

The impact of modern technology on the role, responsibility, authority, and performance of human operators in modern aircraft and ATC systems was examined in terms of principles defined by

Paul Fitts. Research into human factors in aircraft operations and the use of human factors engineering for aircraft safety improvements were discussed, and features of the man-machine interface in computerized cockpit warning systems are examined. The design and operational features of computerized avionics displays and HUDs are described, along with results of investigations into pilot decision-making behavior, aircrew procedural compliance, and aircrew judgment training programs. Experiments in vision and visual perception are detailed, as are behavioral studies of crew workload, coordination, and complement. The effectiveness of pilot selection, screening, and training techniques are assessed, as are methods for evaluating pilot performance. M.S.K.

A82-47251
MAKING SPACE WORK FOR MANKIND; PROCEEDINGS OF THE NINETEENTH SPACE CONGRESS, COCOA BEACH, FL, APRIL 28-30, 1982
Congress sponsored by the Canaveral Council of Technical Societies. Cape Canaveral, FL, Canaveral Council of Technical Societies, 1982 360 p.

Topics in the practical applications of space are discussed. General subjects considered include: space power systems; future Shuttle cargo programs; international Shuttle users; expendable vehicle payloads; space manufacturing operations; commercial space applications; energy choices of the future, special interest topics; space communications. Specific topics addressed include; the EUropean REtrievable CArrier; future military spacecraft power systems; Space Platform solar array; European use of the Space Shuttle; Japanese satellites; the expendable launch vehicle and satellite development; space manufacturing; space manufacturing and the Space Operations Center; the Long Duration Exposure Facility; commerce and remote sensing; robots, progress in renewables; artificial intelligence in space missions; life support system considerations for space station. C.D.

A82-47257* National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
CAPABILITIES AND LIMITATIONS OF THE SHUTTLE FOR FUTURE CARGO PROGRAMS
L. G. WILLIAMS and R. E. MATTHEWS (NASA, Johnson Space Center, STS Operations Program Office, Houston, TX) In: Making space work for mankind; Proceedings of the Nineteenth Space Congress, Cocoa Beach, FL, April 28-30, 1982 Cape Canaveral, FL, Canaveral Council of Technical Societies, 1982, p. 2-1 to 2-7.

This paper presents a view of future Shuttle cargo operations. Planned and potential performance improvements are addressed On-orbit operations, performance and experience are discussed with a view of anticipated changes. Current and future cargo integration activities are also addressed. The future Shuttle user is provided a projection to assist in planning and payload development. (Author)

A82-47258
FUTURE COMMERCIAL COMMUNICATIONS SATELLITES FOR SHUTTLE LAUNCH
R. D. BRISKMAN and B. I. EDELSON (COMSAT General Corp., Washington, DC) In: Making space work for mankind; Proceedings of the Nineteenth Space Congress, Cocoa Beach, FL, April 28-30, 1982. Cape Canaveral, FL, Canaveral Council of Technical Societies, 1982, p. 2-8 to 2-18.

Commercial communications satellites have grown from infancy seventeen years ago to a major element of the spaceflight program. The paper describes the major commercial communications satellites and their development with emphasis on Intelsat, United States and foreign domestic and Marisat/Inmarsat. Future direct broadcast satellites and the possibilities for geostationary platforms are also discussed. These commercial communications satellites and their off-springs will constitute a stable, growing payload base for Shuttle launches throughout this decade. It will be necessary that the costs of Shuttle launches remain economic so this payload base is not eroded by other launch vehicles. (Author)

A82-47267
THE POTENTIAL SCOPE OF SPACE MANUFACTURING
D. M. WALTZ (TRW Space and Technology Group, Redondo Beach, CA) In: Making space work for mankind, Proceedings of the Nineteenth Space Congress, Cocoa Beach, FL, April 28-30, 1982. Cape Canaveral, FL, Canaveral Council of Technical Societies, 1982, p. 5-1 to 5-11. refs

Space manufacturing is defined, and potential processes and product types are discussed. Five basic processes are involved, including crystal growth, purification/separation, mixing, solidification, and processes in fluids. A three-phase timetable for the space manufacturing is described, and major issues and considerations that apply to various points of the timetable are addressed, including the products and services most likely to be exploited, the assessment of user charges, and the handling of proprietary data. It is concluded that pharmaceuticals, electronic devices, optical products, and advanced alloys seem to hold the most promise for space manufacturing. C.D.

A82-47270
PRIVATE SECTOR INVESTMENT IN THE SPACE PROGRAM - WHY, HOW AND WHEN
J. K. LA FLEUR (GTI Corp., San Diego, CA) In: Making space work for mankind; Proceedings of the Nineteenth Space Congress, Cocoa Beach, FL, April 28-30, 1982. Cape Canaveral, FL, Canaveral Council of Technical Societies, 1982, p. 5-32 to 5-38.

This paper is a discussion of the need for private sector investments in the Space Program, the conditions that must exist if significant investments are to be made, and the nature of programs that can reasonably be expected to be funded from private sources. The use of the Joint Endeavor Agreement (JEA) between NASA and private companies as a 'bridge' between pure government funding and true commercialization is discussed using the JEA signed by NASA and GTI on January 20, 1982 as an example. The conclusions reached are that this transition must take place if continued advances are to be made in space, that it will take place if certain management structures are put in place, and that the time to start the transition is now. (Author)

A82-48026
SOUNDING ROCKET CONFERENCE, 6TH, ORLANDO, FL, OCTOBER 26-28, 1982, COLLECTION OF TECHNICAL PAPERS
Conference sponsored by the American Institute of Aeronautics and Astronautics. New York, American Institute of Aeronautics and Astronautics, 1982. 330 p.
MEMBERS, $40; NONMEMBERS, $50

The development of an Ultraviolet Imaging Telescope is considered along with the Space Ultraviolet Radiation Environment Experiment for Shuttle Space Flight, the development and flight tests of a New Middle Atmosphere Electric Field Payload, the International Ozone Intercomparison Program, and the Microgravity Research Program in Sweden. Attention is also given to mission analysis and data processing of sounding rockets, development flight test results and performance capabilities for the Malemute II rocket motor, a flight performance summary for three NASA Terrier-Malemute II sounding rockets, the development of an advanced strapdown inertial system, and a parachute suspended solar pointing control system. Other topics explored are related to the application of microprocessors in sounding rocket attitude control, improved pointing at trackable targets by integrating control valve signals, small payloads for the Shuttle, and small low-earth-orbiting payloads. G.R.

N82-10080*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
MATERIALS PROCESSING IN SPACE PROGRAMS TASKS
E. PENTECOST 1981 150 p refs
(NASA-TM-82443) Avail: NTIS HC A07/MF A01 CSCL 22A

Active research tasks as of the end of fiscal year 1981 of the materials processing in space program, NASA Office of Space and Terrestrial Applications are summarized to provide an overview of the program scope for managers and scientists in industry,

university, and government communities. The program, its history, strategy, and overall goal are described the organizational structures and people involved are identified and a list of recent publications is given for each research task. Four categories: Crystal Growth; Solidification of Metals, Alloys, and Composites; Fluids, Transports, and Chemical Processes, and Ultrahigh Vacuum and Containerless Processing Technologies are used to group the tasks. Some tasks are placed in more than one category to insure complete coverage of each category. A.R.H.

N82-10281# Acurex Corp., Mountain View, Calif Energy and Environment Div.
INFRARED AND CATALYTIC BURNER TECHNOLOGY ASSESSMENT Final Report, 21 Feb. 1980 - 20 Feb. 1981
J. P. KESSELRING, W. V. KRILL, and R. J. SCHREIBER Feb. 1981 163 p refs
(Contract GRI-5014-345-0283)
(PB81-222283; FR-80-72/EE; GRI-80/0019) Avail: NTIS HC A08/MF A01 CSCL 13A

A review of the state of the art in infrared and catalytic burner development shows that four basic types of IR burners are currently in use. Eight commercial and/or residential appliances were characterized to assess the applicability of these burners. The refractory monolith tile and the fiber matrix burners appear most applicable for appliance use. Conceptual designs for the eight appliances with IR burners were prepared to evaluate the technical feasibility. These appliances are shown to have significant fuel efficiency increase and NOx and CO emission reduction benefits. Four appliances -- the commercial rangetop, deep fat fryer, commercial water heater, and warm air furnance -- also appear economically competitive, and recommended approaches for further development are presented. Lists of IR burner literature and patents are also presented. GRA

N82-10537# Los Alamos Scientific Lab., N Mex.
STATE OF THE ART IN PASSIVE SOLAR HEATING
J. D. BALCOMB 1981 4 p Presented at the Passive and Hybrid Solar Energy Program Update Meeting, Washington, D.C., 9-12 Aug. 1981
(Contract W-7405-ENG-36)
(LA-UR-81-2185; CONF-810832-1) Avail: NTIS HC A02/MF A01

The state of the art is outlined according to four major categories: passive, solar practice, evaluation, design, and products and materials. Needed future research activities and point industry/government activities are listed. DOE

N82-10960# Committee on Science and Technology (U. S. House).
REVIEW OF 1980 FIVE-YEAR OUTLOOK REPORT ON SCIENCE AND TECHNOLOGY
Washington GPO 1981 100 p refs Hearing before the Subcomm. on Sci., Res., and Technol. of the Comm. on Sci. and Technol., 96th Congr., 2nd Sess., No. 180, 13 Jun. 1980
(GPO-67-284) Avail: Subcommittee on Science, Research, and Technology

Current and emerging problems of national significance that are identified through scientific research, or in which scientific or technical considerations are of major significance, are described. Opportunities and constraints in science and technology were examined. The problems of accurately forecasting technological growth are discussed. T.M.

N82-11093* National Aeronautics and Space Administration, Washington, D. C.
TECHNOLOGY FOR LARGE SPACE SYSTEMS: A SPECIAL BIBLIOGRAPHY
Jul. 1981 109 p
(NASA-SP-7046(05)) Avail: NTIS HC $11.00 CSCL 22A

This bibliography lists 298 reports, articles, and other documents introduced into the NASA scientific and technical information system between January 1, 1981 and June 30, 1981. Its purpose is to provide helpful, information to the researcher, manager, and designer in technology development and mission design in the area of the Large Space Systems Technology (LSST) Program. Subject matter is grouped according to systems, interactive analysis and design, structural concepts, control systems, electronics, advanced materials, assembly concepts, propulsion, solar power satellite systems, and flight experiments. T.M.

N82-11265# Edgerton, Germeshausen and Grier, Inc., Idaho Falls, Idaho.
ALCOHOL FUELS IN THE UNITED STATES
R. R. STIGER 1981 12 p refs Presented at tht Am. Nucl. Soc Ann. Meeting, Miami Beach, Fla., 7 Jun. 1981
(Contract DE-AC07-76ID-01570)
(DE81-026013; CONF-810606-75) Avail: NTIS HC A02/MF A01

An overview of the social and technical issues surrounding the production of alcohol for fuels is presented. A brief analysis of the United States Alcohol Program is followed by a discussion of technical and economic factors that affect the production of alcohol fuels. DOE

N82-11279*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
THE TELECOMMUNICATIONS AND DATA ACQUISITION REPORT Progress Report, Jul. - Aug. 1981
N. A. RENZETTI, ed. 15 Oct. 1981 244 p refs
(Contract NAS7-100)
(NASA-CR-164939; TDA-PR-42-65) Avail. NTIS HC A11/MF A01 CSCL 17B

Progress in the development and operations of the Deep Space Network is reported including develoments in Earth-based radio technology as applied to other research programs. These programs are: geodynamics, astrophysics, and the radio search for extraterrestrial intelligence in the microwave region of the electromagnetic spectrum.

N82-11321# DCS Corp., Washington, D C.
ASSESSMENT OF BUILDING DIAGNOSTICS
G. E. COURVILLE Jul. 1981 118 p refs Prepared for ORNL
(Contract W-7405-ENG-26)
(DE81-027078; ORNL/SUB-80/61602/1) Avail: NTIS HC A06/MF A01

The building diagnostics requirements for in-situ or field measurements on energy consumption in conditioned spaces and on heat gain and loss in residential and nonresidential buildings are evaluated. Energy audit programs, energy performance monitoring, energy flow in buildings, and use of computer technology are considered. A diagnostics program is outlined. DOE

N82-11348# Lincoln Lab., Mass. Inst. of Tech., Lexington.
PACKET SPEECH SYSTEMS TECHNOLOGY Semiannual Technical Summary Report, 1 Oct. 1980 - 31 Mar. 1981
C. J. WEINSTEIN and P. E. BLANKENSHIP 31 Mar. 1981 26 p
(Contract F19628-80-C-0002; ARPA ORDER 3673)
(AD-A104373; ESD-TR-81-87) Avail: NTIS HC A03/MF A01 CSCL 17B

The long-range objectives of the Packet Speech Systems Technology Program are to develop and demonstrate techniques for efficient digital speech communication on networks suitable for both voice and data, and to investigate and develop techniques for integrated voice and data communication in packetized networks, including wideband common-user satellite links. Specific areas of concern are: the concentration of statistically fluctuating volumes of voice traffic, the adaptation of communication strategies to varying conditions of network links and traffic volume, and the interconnection of wideband satellite networks to terrestrial systems. The current program has two major thrusts: i.e., the development and refinement of practical low-cost, robust, narrowband, and variable-rate speech algorithms and voice terminal structures; and the establishment of an experimental wideband satellite network to serve as a unique facility for the realistic investigation of voice/data networking strategies. This report covers

work in the following areas: digital channel vocoder development; embedded CVSD-based speech waveform encoder design and implementation; development and experimental tests of modular packet voice terminals (PVTs) and local access area (LEXNET) facilities; development of a miniconcentrator facility to mediate the flow of traffic from the LEXNET onto the wideband satellite network, and execution of packet speech experiments using this facility; and definition and planning of, and participation in, experiments on the wideband integrated voice/data network GRA

N82-11356# National Telecommunications and Information Administration, Washington, D.C.
USER'S GUIDE: VOICE AND DATA COMMUNICATIONS PROTECTION
R. NEIGHBORGALL and R. MASSEY May 1981 155 p
(PB81-221509; NTIA-CR-80-9) Avail: NTIS HC A08/MF A01
CSCL 17B

Powerful, low cost computers, combined with increasingly sophisticated telecommunications systems, have created an environment in which voice and a communications transmissions are becoming more susceptible to unauthorized interception. Protection devices and terminals, with a variety of operational features, and principles, are described for the benefit of government telecommunications managers. The vendors offering 160 products are identified. Protection systems are explained, and an extensive glossary and bibliography are included. GRA

N82-12044# Nielsen Engineering and Research, Inc , Mountain View, Calif
A SYMPOSIUM ON TRANSONIC FLOW RESEARCH
D. NIXON Sep. 1981 25 p refs Symp. held at Amer. Res. Center, 19-20 Feb. 1981
(Contract N00017-80-C-0803)
(AD-A104871, NEAR-TR-255) Avail. NTIS HC A02/MF A01
CSCL 20D

This report documents the organization and operation of the 'Transonic Perspective' conference held at NASA/Ames Research Center, February 19-20, 1981. After a period of decline in the 1960's transonic flow research has made rapid progress in the last decade. This is partly due to a renewed interest in the transonic regime for both military and civil aircraft and partly to the availability of large computers, which gave considerable impetus to the development of numerical prediction methods for realistic flows. However, not all the significant research of the decade is in the field of predictive methods; other topics such as experimental techniques for unsteady transonic flows and the super-critical wind technology, are also of importance Much of the work in the various sub-topics of transonic flow research is done by small groups and sometimes these groups operate in relative isolation to other work in other topics. It is suggested, sometimes, that research workers concentrate on their own speciality so much that they consider their achievements as ends in themselves, rather than relating their results to the dominant problem of understanding and prediction of real, practical, transonic flow problems. GRA

N82-12618# Sandia Labs , Livermore, Calif. Thermal Sciences Div.
SOLAR THERMAL CENTRAL RECEIVERS FOR INDUSTRIAL PROCESS HEAT GENERATION: USER VIEWS AND RECOMMENDATIONS FOR COMMERCIALIZATION
M. J. FISH Aug. 1981 66 p refs
(Contract DE-AC04-76DP-00789)
(DE81-029611; SAND-81-8235) Avail: NTIS HC A04/MF A01

Results of recent meetings with several private industrial groups in which solar thermal central receivers were discussed in depth as a potential for industrial process heat generation are summarized. Topics covering potential economics, technical requirements, and actions to promote commercialization of the technology are presented. These findings are then translated into recommendations for commercialization in private industrial markets. Key points include the need for small scale systems integration projects in addition to the 10 MW/sub e/ plant under construction at Barstow, CA, and the adoption of financial incentives, such as tax credits, for getting the early commercial plants built. DOE

N82-12992# Office of Technology Assessment, Washington, D C.
INFORMATION SYSTEMS AND COMPUTERS
In its Computer-based Natl. Inform Systems p 37-43 Sep. 1981 refs
Avail. SOD HC

Computers carry out a wide variety of tasks associated with processing information. It is important to understand the entire range of these capabilities in order to appreciate the nature and magnitude of the potential social impacts of this technology when used in information systems. Computer capabilities are discussed and include· data collection, information storage, information organization, calculations, communication, information presentation, and numerical control. T.M.

N82-12993# Office of Technology Assessment, Washington, D C.
INFORMATION IN SOCIETY
In its Computer-based Natl. Inform Systems p 47-54 Sep. 1981 refs
Avail· SOD HC

The nature of information is discussed. The commercial value, public value, and private value of information are considered. The role of information as an economic commodity on the development of the economy was examined. T.M.

N82-13048# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).
THE IMPACT OF NEW GUIDANCE AND CONTROL SYSTEMS ON MILITARY AIRCRAFT COCKPIT DESIGN
Aug. 1981 217 p refs In ENGLISH; partly in FRENCH Symp held in Bad-Cannstatt, West Germany, 5-8 May 1981
(AGARD-CP-312; ISBN-92-835-0297-3) Avail. NTIS HC A10/MF A01

The requirements and technologies involved in control systems were reviewed. Topics incude; displays; controls/displays system integration; automated systems/man interface; and cockpit systems evaluation. Emphasis is placed on the design of a cockpit layout with controls and displays that maximize the overall aircraft capability while keeping the pilot's workload within bounds by the use of more automation of system management.

N82-13252# Ultrasystems, Inc., Irvine, Calif.
FEASIBILITY STUDY REPORT FOR THE IMPERIAL VALLEY ETHANOL REFINERY: A 14.9-MILLION-GALLON-PER-YEAR ETHANOL SYNFUEL REFINERY UTILIZING GEOTHERMAL ENERGY
Mar. 1981 202 p Prepared in cooperation with U.S. Alcohol Fuels, East Mesa, Calif.
(Contract DE-FG07-80RA-50308, PROJ. 1013)
(DE82-000288; DOE/RA-50308/1) Avail: NTIS HC A10/MF A01

The construction and operation of a 14,980,000 gallon per year fuel ethanol from grain refinery is proposed. The refinery will use hot geothermal fluid from geothermal resources as the source of process energy. In order to evaluate the economic viability of the proposed project, exhaustive engineering, cost analysis, and financial studies were undertaken. The results of feasibility studies undertaken in geothermal resource, engineering, marketing financing, management, environment, and permits and approvals are presented. The project was found to be economically viable DOE

N82-13492*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
DISTRIBUTED PHOTOVOLTAIC SYSTEMS: UTILITY INTERFACE ISSUES AND THEIR PRESENT STATUS
M. HASSAN and J. KLEIN 15 Sep. 1981 166 p refs
(Contract NAS7-100; DE-AI01-76ET-20356; JPL PROJ. 5240-11)
(NASA-CR-165019, JPL-PUB-81-89; DOE/ET-20356/3) Avail: NTIS HC A08/MF A01 CSCL 10A

Major technical issues involving the integration of distributed photovoltaics (PV) into electric utility systems are defined and their impacts are described quantitatively. An extensive literature search, interviews, and analysis yielded information about the work in progress and highlighted problem areas in which additional work and research are needed. The findings from the literature search were used to determine whether satisfactory solutions to the problems exist or whether satisfactory approaches to a solution are underway It was discovered that very few standards, specifications, or guidelines currently exist that will aid industry in integrating PV into the utility system. Specific areas of concern identified are: (1) protection, (2) stability, (3) system unbalance, (4) voltage regulation and reactive power requirements, (5) harmonics, (6) utility operations, (7) safety, (8) metering, and (9) distribution system planning and design. Author

N82-13975# Naval Postgraduate School, Monterey, Calif.
A SUMMARY OF THE NAVAL POSTGRADUATE SCHOOL RESEARCH PROGRAM Summary Report, 1 Oct. 1979 - 30 Sep. 1980
Apr 1981 528 p
(AD-A104112; NPS-012-81-003PR) Avail: NTIS HC A23/MF A01 CSCL 05B

Two hundred thirty research projects are summarized in the following areas: computer science; mathematics, administrative sciences; defense resources management, operations research, national security affairs; physics and chemistry; electrical engineering; meteorology; aeronautics; oceanography; and mechanical engineering. Author

N82-13976# Young (Arthur) and Co., Washington, D C.
MANAGING INFORMATION TECHNOLOGY CHANGE IN THE DECADE OF THE 80'S Final Report
J. R. BORSTING, J. BROOKS, and C. P. LECHT Jan. 1981 65 p Proceedings of the DOD Long Range ADP Planning Conf., Washington, D.C., 28-29 Jan. 1981
(Contract MDA903-79-C-0690)
(AD-A099441, REPT-0690-005A) Avail: NTIS HC A04/MF A01 CSCL 05B

Abstracts of 21 presentations on automatic data processing management changes and impact expected during this decade are presented. Five conference panels were conducted and addressed the following themes: information resource management; trend projections and ADP policies for the 80's; program management; management/technical considerations; and office automation. Author

N82-13989* Jet Propulsion Lab., California Inst. of Tech., Pasadena.
MODERN OBSERVATIONAL TECHNIQUES FOR COMETS
J. C. BRANDT, ed. (NASA, Goddard Space Flight Center), J. M. GREENBERG, ed. (Leiden Univ.), B. DONN, ed. (NASA, Goddard Space Flight Center), and J. RAHE, ed. (Erlangen-Nuernberg Univ.) 1 Oct. 1981 327 p refs Workshop held at Greenbelt, Md., 22-24 Oct. 1980 Original document contains color illustrations
(Contract NAS7-100)
(NASA-CR-165006; JPL-PUB-81-68) Avail: NTIS MF <en1> A01; SOD HC $16.00 CSCL 03A

Techniques are discussed in the following areas. astrometry, photometry, infrared observations, radio observations, spectroscopy, imaging of coma and tail, image processing of observation. The determination of the chemical composition and physical structure of comets is highlighted.

N82-14426# General Electric Co., Syracuse, N Y. Military Electronic Systems Operation.
MANUFACTURING TECHNOLOGY STUDY ON RADIO FREQUENCY POWER MODULES PACKAGING TECHNIQUES Final Report, Sep. 1979 - Jun. 1981
1981 220 p refs
(Contract N00039-79-C-0378)
(AD-A105892) Avail: NTIS HC A10/MF A01 CSCL 17I

Program requirements cover manufacturing methods and technology encompassing a determination of materials, processes, and related techniques to improve producibility thereby enhancing manufacturing methods to achieve a significant reduction in production cost of R F. Power Amplifier Modules The requirement includes the fabrication and test of proof of process of 25-100 watt R.F. Microwave Hybrid Modules. The foregoing amplifiers featured the enhanced materials, processes, and techniques evolved under this program which achieved reduction of total cost of product The achieved design is directly applicable to the production design of the AN/TPS-59 Solid State Radar system with direct benefit to a wide family of other Solid State Radars and other systems which may use similar R.F Power Modules Because several hundred of these R.F. power modules are used per system, the cost savings resulting from this program are significantly multiplied and provide a very favorable payback on MM&T investment. At the outset of the program, the materials, manufacturing and test/tune methods being used for fabricating power modules at that time were reviewed with respect to their yielded final cost. GRA

N82-14520# Massachusetts Inst. of Tech., Cambridge. National Magnet Lab.
CONCEPTUAL DESIGN OF SUPERCONDUCTING MAGNET SYSTEM FOR MAGNETOHYDRODYNAMIC (MHD) ENGINEERING TEST FACILITY (ETF) 200 MWE POWER PLANT Final Report
Nov 1981 259 p refs
(Contract NAG3-100)
(NASA-CR-165053, FBNML-NAS-E-2) Avail. NTIS HC A12/MF A01 CSCL 14B

A super conducting magnet system conceptual design to meet the requirements of a magnetohydrodynamic test facility power train is presented A detailed description of the magnet is accompanied by numerous engineering drawings. Functional requirements, system interfaces, and design criteria are reviewed. System limits, safety precautions, operational procedures, and maintenance procedures are discussed. R.J.F.

N82-14661# Mid-American Solar Energy Complex, Minneapolis, Minn.
SEMINARS FOR PRIVATE COLLEGE ADMINISTRATORS ON SOLAR APPLICATIONS FOR COLLEGE BUILDINGS
Jun. 1981 8 p
(Contract DE-AC02-79CS-30150)
(DE81-027981; MASEC-CF-81-038) Avail: NTIS HC A02/MF A01

The objective of this project was to increase the working knowledge of key private college decision makers on passive and active solar fundamentals, proven passive and active technology, and conservation means integral to these technologies in the renovation of college buildings or their energy systems, to be achieved by conducting a series of three seminars. A summary of the project activities and a brief summary of workshop evaluations are given. DOE

N82-14829*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
RUGGEDIZED MINICOMPUTER HARDWARE AND SOFTWARE TOPICS, 1981: PROCEEDINGS OF THE 4TH ROLM MIL-SPEC COMPUTER USER'S GROUP CONFERENCE
Dec. 1981 214 p refs Conf. held in San Diego, Calif., 22-25 Feb. 1981
(NASA-CP-2206; L-14886) Avail: NTIS HC A11/MF A01 CSCL 09B

Presentations of a conference on the use of ruggedized minicomputers are summarized. The following topics are discussed: (1) the role of minicomputers in the development and/or certification of commercial or military airplanes in both the United States and Europe; (2) generalized software error detection techniques; (3) real time software development tools; (4) a redundancy management research tool for aircraft navigation/flight control sensors; (5) extended memory management techniques using a high order language; and (6) some comments on establishing a system maintenance scheme. Copies of presentation slides are also included.

N82-14834*# Naval Material Command, Washington, D. C. Office of the Executive Director for Acquisition.
NEW STARTS IN RESEARCH AND DEVELOPMENT, 1982
J. GROSSON *In* NASA. Langley Research Center Ruggedized Minicomputer Hardware and Software Topics, 1981 p 59-107 Dec. 1981
Avail: NTIS HC A11/MF A01 CSCL 09B

An outline in slide form, of some areas of U.S. Navy research and development utilizing airborne minicomptuers is presented. The following program considerations are addressed. (1) research and engineering management; (2) budgeting; (3) equipment specifications and construction materials, (4) computer applications; (5) technological capabilities, utilization, and transfer; and (6) military applications M.D.K.

N82-14957# Stanford Univ., Calif. Center for Materials Research
MATERIALS RESEARCH AT STANFORD UNIVERSITY Annual Report, 1 Jul. 1980 - 30 Jun. 1981
Jul. 1981 475 p refs
(Contract NSF DMR-77-24222)
(AD-A106108; CMR-81-7; AR-20) Avail: NTIS HC A20/MF A01 CSCL 05A

This Twentieth Annual Report includes the total research activity related to the science of materials at Stanford University during the period July 1, 1980 through June 30, 1981. It contains brief descriptions of research programs active during this period. The report of the research programs is organized into two groupings. (1) the research programs of CMR Members who have participated in one of the five major Thrust group programs supported by the NSF-MRL block grant including their work on the Thrust program and other related research, and (2) individual research programs; when appropriate, members are included in both the Thrust and individual programs. As indicated in their descriptions, some of the research programs were supported by private sources. GRA

N82-14958# Office National d'Etudes et de Recherches Aerospatiales, Paris (France).
AEROSPACE RESEARCH ACTIVITIES Annual Report, 1980
1981 238 p refs
Avail: NTIS HC A11/MF A01

The activities of the ONERA in 1980 are reported. Research is reported in: fluid mechanics; aerodynamics; wind tunnel tests; structural design; engine design; measurement techniques; light alloys and composites; integrated systems; and control techniques. Author (ESA)

N82-14960*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
TECHNICAL COMMUNICATION: PERSPECTIVES FOR THE EIGHTIES, PART 1. PROCEEDINGS OF THE TECHNICAL COMMUNICATIONS SESSIONS AT THE 32ND ANNUAL MEETING OF THE CONFERENCE ON COLLEGE COMPOSITION AND COMMUNICATION
J. C. MATHES, comp (Michigan Univ., Ann Arbor) and T E. PINELLI, comp. Dec. 1981 307 p refs Conf. held in Dallas, 26-28 Mar. 1981
(NASA-CP-2203-PT-1; L-14899-PT-1) Avail: NTIS HC A14/MF A01 CSCL 05B

Proceeding of the technical communication sessions at the 32nd annual meeting of the Conference on College Composition and Communication held in Dallas, Texas, March 26-28, 1981 are summarized. The proceeding suggest that technical communication has become an important subfield and is becoming an intrinsic part of many undergraduate curricula. Technical communication as a separate discipline, however, is relatively new. For that reason, proceedings that can make current research available as quickly as possible are suggested for preparation The following topics were addressed: (1) a history and definition of technical writing, (2) the case method is technical communication (3) teaching technical writing (4) oral communication and rhetorical theory, and (5) new approaches in and practical applications of technical writing.

N82-15126# Comelin, Limours (France).
GROUPE MATRA COMPOSITES CONFERENCE [JOURNEE COMPOSITE DU GROUPE MATRA]
1981 112 p In FRENCH Presented at Velizy, France, 24 Apr. 1981 Original contains color illustrations
Avail: NTIS HC A06/MF A01

Technology based on the use of composite materials is reviewed. Various topics include: composite structures; applications of composites in missiles; and quality control. Filament winding and manufacturing stamping tools of resin are also discussed

N82-15350# Semikron Gesellschaft fuer Gleichrichterbau und Elektronik m.b.H , Nuremberg (West Germany).
ELECTRON IRRADIATION OF SEMICONDUCTOR DEVICES Final Report, Dec. 1979
H. FUCHS, R. GRUBE, W. TURSKY, and J. KNOPP Bonn Bundesministerium fuer Froschung und Technologie Feb. 1981 76 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-81-045; ISSN-0340-7608) Avail: NTIS HC A05/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 16

Electron beam irradiation technology, applied for modeling of electrical semiconductor device parameters, was investigated, especially for producing fast switching devices with high blocking capability. Applicability of this method to local carrier lifetime adjustment was also studied. For adjusting the switching times of semiconductor devices, electron beam irradiation surpasses gold diffusion considerably as far as expenditure, accuracy and reproducibility are concerned. The ratio of on-state voltage to turn-off time which is inferior in comparison to gold diffusion be improved by adapting the device dimensions carrier lifetime was proved. Equipment and methods for series production were developed and tested with pilot production quantities. The basis for introducing this technology into production is now available.
Author (ESA)

N82-15711*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
STS-1 MEDICAL REPORT
S. L. POOL, ed , P. C. JOHNSON, JR., ed., and J. A. MASON, ed. Dec. 1981 114 p
(NASA-TM-58240; S-509) Avail: NTIS HC A06/MF A01 CSCL 06P

The report includes a review of the health of the crew before, during and immediately after the first Shuttle orbital flight (April 12-14, 1981). Areas reviewed include: health evaluation, medical

debriefing of crewmembers, health stabilization program, medical training, medical kit carried inflight; tests and countermeasures for space motion sickness, cardiovascular profile, biochemistry and endocrinology results; hematology and immunology analyses; medical microbiology; food and nutrition; potable water; shuttle toxicology; radiological health; cabin acoustical noise. Also included is information on: environmental effects of Shuttle launch and landing, medical information management; and management, planning and implementation of the medical program.

N82-16057# Department of Energy, Washington, D. C.
SYMPOSIUM ON COMMERCIAL-AVIATION ENERGY-CONSERVATION STRATEGIES
1981 373 p refs Proceedings of Symp. on Commercial Aviation Energy Conserv. Strategies, Washington, D.C., 2-3 Apr. 1981 Sponsored in part by FAA, Washington, D.C.
(DE81-028406; CONF-8104103) Avail: NTIS HC A16/MF A01

Energy conservation strategies applicable to commercial aviation are presented General topics discussed include Federal and industry conservation programs such as flight operations, air traffic control, engineering and maintenance, and corporate management strategies. Included is a discussion of possible future actions. DOE

N82-16101*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
THE TELECOMMUNICATIONS AND DATA ACQUISITION REPORT Progress Report, Sep. and Oct. 1981
N. A. RENZETTI, ed. 15 Dec. 1981 370 p refs
(NASA-CR-165111; JPL-TDA-PR-42-66) Avail: NTIS HC A16/MF A01 CSCL 22A

Deep Space Network operations, engineering, and implementation are reported. Developments in Earth-based radiotechnology as applied to other research programs in the fields of Geodynamics, Astrophysics, and programs related to radio searchers (instrumentation and methods) in extraterrestrial areas in the microwave region of the electromagnetic spectrum are also presented.

N82-16288# Oak Ridge National Lab., Tenn. Engineering Technology Div.
DEVELOPMENT OF ADVANCED BUILDING MATERIALS FOR THE PASSIVE SOLAR APPLICATION
J. J. TOMLINSON 1981 5 p refs Presented at the Thermal Energy Storage Ann. Contr. Rev. Meeting, Washington, D C. 14-16 Sep. 1981
(Contract W-7405-ENG-26)
(DE81-032009; CONF-810940-7) Avail: NTIS HC A02/MF A01

A program to develop the concept of incorporation of phase change materials (PCMs) into conventional building materials has been initiated and consists of in-house analyses to characterize the thermal performance of a porous matrix suffused with a PCM, and concept experimental development through subcontracted efforts. The program is directed toward the development of material concepts which provide greater collection/storage efficiency and increased levels of thermal comfort in direct gain passive solar applications. DOE

N82-16354# University of Southern California, Los Angeles. Electronic Sciences Lab.
RESEARCH IN ELECTRONICS: JSEP Final Report, 1 Apr. 1976 - 31 Mar. 1981
Z. A. KAPRIELIAN Mar. 1981 80 p refs
(Contract F44620-76-C-0061, AF PROJ. 2305)
(AD-A107624; AFOSR-81-0722TR) Avail: NTIS HC A05/MF A01 CSCL 09C

This final technical report summarizes accomplishments and progress of 31 work units (project) for research performed during the reporting period under the Joint Services Electronics Program by the USC Electronic Sciences Laboratory. Author (GRA)

N82-16540# Mid-American Solar Energy Complex, Minneapolis, Minn.
PASSIVE SOLAR PRODUCTS CATALOG, 1981
M M. DOTSETH 1981 362 p
(Contract DE-AC02-79CS-30150)
(DE82-000292; MASEC-H-81-041) Avail: NTIS HC A16/MF A01

The Passive Solar Products Catalog was compiled through contacts with over 500 manufacturers and distributors across the country. The product listings are from manufacturers who responded to requests for information and the descriptions are based on information contained in the product literature. Only those products which can be marketed at this time are listed in the 1981 catalog. The catalog contains over 300 product listings. The catalog is organized according to product function and application including passive solar components and design resonances and miscellaneous products. Manufacturer and product indexes are included as a cross reference in the back of the catalog. Distributors *are not listed since most manufacturers prefer to have product* inquiries initially directed to them DOE

N82-17043*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
THE 1981 NASA/ASEE SUMMER FACULTY FELLOWSHIP PROGRAM: RESEARCH REPORTS Final Report, 1 Jun. - 7 Aug. 1981
G. R KARR, J. B. DOZIER, M I KENT, and B F BARFIELD Jan 1982 578 p refs Prepared in cooperation with NASA Marshall Space Flight Center and Alabama Univ., University
(Contract NGT-01-008-021)
(NASA-CR-161855) Avail: NTIS HC A25/MF A01 CSCL 05I

Research reports related to spacecraft industry technological advances, requirements, and applications were considered. Some of the topic areas addressed were: (1) Fabrication, evaluation, and use of high performance composites and ceramics, (2) antenna designs, (3) electronics and microcomputer applications and mathematical modeling and programming techniques, (4) design, fabrication, and failure detection methods for structural materials, components, and total systems, and (5) chemical studies of bindary organic mixtures and polymer synthesis. Space environment parameters were also discussed.

N82-17349# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).
AIRCRAFT CORROSION
Aug. 1981 194 p refs Partly in ENGLISH, partly in FRENCH Meeting held in Cesme, Turkey, 5-10 Apr. 1981
(AGARD-CP-315; ISBN-92-835-0298-1) Avail: NTIS HC A09/MF A01

Corrosion resistant materials and protection systems for aircraft are addressed. The incidence of corrosion of aircraft structures under varying environmental conditions is discussed. Maintenance, cost facators, education and retraining, and the communication link among the designers, manufactures and the research community are among the topics covered.

N82-18431# Council for Scientific and Industrial Research, Pretoria (South Africa).
THE 2ND SEMINAR ON EFFICIENT METAL FORMING AND MACHINING
1980 252 p refs Proceedings of Conf. held at Pretoria, 18 Nov 1980
(PB82-109745; CSIR-S-234; ISBN-0-7988-2015-2) Avail: NTIS HC A12/MF A01 CSCL 13H

Metalspinning, shear and flow forming are discussed. Optimized machining is surveyed. Automatic tool wear compensation is addressed. Ceramic coatings for wear resistance are covered. Creep grinding using diamond wheel is presented. Economics of numerical control machining are reported. Amber Boron Nitride and its industrial application is discussed. Wear resistant coatings on hard metal are described. The explosive hardening of metals is examined. The selection of machining parameters using Amborite on hard ferrous material is discussed. Drawing and wall ironing of metal cans is investigated. Economical cutting with the CO2 gas

laser is presented. Developments in the deep drawing of a cylindrical cup are considered. Training black machinist is reviewed. The role of investment casting in modern engineering practices is covered. Cold forming of internal threads is included. High speed steel cutting tools are described. Hot forging is summarized. N.W.

N82-18750# Teknekron, Inc., McLean, Va.
ASSESSMENT OF FUTURE ENVIRONMENTAL TRENDS AND PROBLEMS: INDUSTRIAL USE OF APPLIED GENETICS AND BIOTECHNOLOGIES Final Report
R. H. ZAUGG and J. R. SWARZ Sep 1981 169 p refs
(Contract EPA-68-02-3638)
(PB82-118951; EPA-600/8-81-020) Avail: NTIS HC A08/MF A01 CSCL 06C

The proposed study is to be a technological assessment of genetic engineering as it applies to commercial industries and its potential effects on the environment This includes a detailed literature review and state of the art analysis of genetic engineering, an analysis of how applied genetics will affect public health and public welfare, its probable impact on the environmental policies and an analysis of knowledge gaps, including identification of inadequacies of analytical methods and techniques. Additionally, the socioeconomic impact of genetic engineering on commercial industry will be examined. The approach will include a literature review of five key industrial sectors. Pharmaceutical and Cosmetic, Industrial Chemical, Energy, Food Manufacturing and Preservation, and Mining. Areas that will be examined at length include Environment and Populations, Government Policy, and Technology GRA

N82-19134*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
ELECTRIC FLIGHT SYSTEMS
N. J. GROOM, ed. and R. V. HOOD, ed. Feb. 1982 269 p Proceedings of workshop held in Hampton, Va., 9-10 Jun. 1981
(NASA-CP-2209, L-14965) Avail. NTIS HC A12/MF A01 CSCL 01C

Materials illustrating presentations on the development of electric flight systems for the all-electric aircraft and for spacecraft are presented.

N82-19135*# Lockheed-California Co., Burbank.
ELECTRIC FLIGHT SYSTEMS, OVERVIEW
M. J. CRONIN *In* NASA. Langley Research Center Elec. Flight Systems p 61-94 Feb 1982
Avail: NTIS HC A12/MF A01 CSCL 01C

Materials illustrating a presentation on electric flight systems are presented. Fuel consumption, the power plant assembly, flight control technology, electromechanical actuator systems and components of possible power systems are surveyed. J.D.H.

N82-19136*# General Electric Co., Cincinnati, Ohio. Aircraft Engine Group.
A PROPULSION VIEW OF THE ALL-ELECTRIC AIRPLANE
R. P. WAGNER *In* NASA. Langley Research Center Elec. Flight Systems p 95-102 Feb. 1982
Avail: NTIS HC A12/MF A01 CSCL 21E

Materials illustrating a presentation on electric propulsion systems are presented. The electric engine and engine/generator configurations are described and NASA's role outlined. J.D.H.

N82-19137*# Pratt and Whitney Aircraft Group, East Hartford, Conn. Commercial Products Div.
POTENTIAL PROPULSION CONSIDERATIONS AND STUDY AREAS FOR ALL-ELECTRIC AIRCRAFT
T. G. LENOX *In* NASA. Langley Research Center Elec Flight Systems p 103-112 Feb. 1982
Avail: NTIS HC A12/MF A01 CSCL 21E

Materials illustrating a presentation on all-electric aircraft propulsion systems are presented. Propulsion system impacts on aircraft design and areas requiring further study are outlined. J.D.H.

N82-19138*# Westinghouse Electric Corp., Lima, Ohio. Air All-Electronics Div
A LOOK INTO THE FUTURE: THE POTENTIAL OF THE ALL-ELECTRIC SECONDARY POWER SYSTEM FOR THE ENERGY EFFICIENT TRANSPORT
A. E. KING *In* NASA. Langley Research Center Elec. Flight Systems p 113-124 Feb. 1982
Avail: NTIS HC A12/MF A01 CSCL 01C

Materials illustrating a presentation on the all-electric aircraft power system are presented. The advantages of the system and the planning time table are outlined. J.D.H

N82-19139*# Sundstrand Aviation-Rockford, Ill
THE 400-HERTZ CONSTANT-SPEED ELECTRICAL GENERATION SYSTEMS
R MCCLUNG *In* NASA. Langley Research Center Elec. Flight Systems p 125-146 Feb. 1982
Avail. NTIS HC A12/MF A01 CSCL 09C

Materials illustrating a presentation on 400 Hz constant speed generation systems are presented. The system features are outlined, components and functioning described, and display graphics illustrated. J.D H.

N82-19140*# AiResearch Mfg. Co., Torrance, Calif.
ELECTRIC ECS
D. O. MOELLER *In* NASA. Langley Research Center Elec. Flight Systems p 147-154 Feb 1982
Avail. NTIS HC A12/MF A01 CSCL 01C

Materials illustrating a presentation on electric environmental control systems for electric flight systems are presented. Requirements are outlined and schematics presented J.D.H

N82-19141*# Hamilton Standard, Windsor Locks, Conn.
ENVIRONMENTAL CONTROL SYSTEMS
F. M. ROSENBUSH *In* NASA. Langley Research Center Elec Flight Systems p 155-188 Feb. 1982
Avail: NTIS HC A12/MF A01 CSCL 01C

Materials illustrating a presentation on environment control systems for electric flight systems are presented. Schematics and flow diagrams of fresh air source and air conditioning systems, and vapor cycle and air cycle parts lists are presented. J.D.H.

N82-19142*# Honeywell, Inc., Clearwater, Fla.
OVERVIEW OF HONEYWELL ELECTROMECHANICAL ACTUATION PROGRAMS
C. WYLLIE *In* NASA. Langley Research Center Elec. Flight Systems p 163-187 Feb. 1982
Avail: NTIS HC A12/MF A01 CSCL 01C

Materials illustrating a presentation on electromechanical actuation programs (EMA) are presented. The development history is outlined. Space shuttle flight control systems and the advantages of EMAS, and EMA technology status and development requirements are outlined. J.D.H.

N82-19143*# Rockwell International Corp., Cedar Rapids, Iowa.
DIGITAL FLIGHT CONTROLS
J. C. HALL *In* NASA. Langley Research Center Elec. Flight Systems p 189-212 Feb. 1982
Avail: NTIS HC A12/MF A01 CSCL 01C

Materials illustrating a presentation on digital flight controls for electric flight systems are presented. System architecture and design criteria are outlined, and components described. J.D.H.

N82-19144*# Boeing Commercial Airplane Co., Seattle, Wash.
ELECTRIC FLIGHT SYSTEMS
C. W. CLAY *In* NASA. Langley Research Center Elec. Flight Systems p 213-234 Feb. 1982
Avail: NTIS HC A12/MF A01 CSCL 09C

Materials used to illustrate a presentation on the development of electric flight systems are presented. Systems concepts are outlined J.D.H.

N82-19145*# National Aeronautics and Space Administration Lewis Research Center, Cleveland, Ohio.
ENGINE TECHNOLOGY
A. C. HOFFMAN *In* NASA. Langley Research Center Elec. Flight Systems p 235-240 Feb. 1982
Avail. NTIS HC A12/MF A01 CSCL 21E

Materials used in a presentation on development of engine technology for electric flight systems are presented. Component and system technology issues, NASA's role, and flight test requirements are outlined. J.D H

N82-19146*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
POWER SYSTEMS
R. FINKE *In* NASA. Langley Research Center Elec. Flight Systems p 241-246 Feb 1982
Avail: NTIS HC A12/MF A01 CSCL 01C

Materials illustrating a presentation of the development of power systems are presented. The technology issues and tradeoffs, the role of NASA, and testing requirements are outlined. J.D.H

N82-19147*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
ENVIRONMENTAL CONTROL SYSTEMS
F. HRACH *In* NASA. Langley Research Center Elec. Flight Systems p 247-252 Feb. 1982
Avail: NTIS HC A12/MF A01 CSCL 06K

Materials illustrating a presentation on environmental control systems for electric flight systems are presented The major technology issues, major development and application steps, the role of NASA, and required flight testing are outlined. J.D.H.

N82-19148*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex
ELECTROMECHANICAL ACTUATORS
J BIGHAM *In* NASA Langley Research Center Elec. Flight Systems p 253-258 Feb. 1982
Avail: NTIS HC A12/MF A01 CSCL 01C

Materials illustrating a presentation on the development of electromechanical actuators (EMA) for electric flight systems are presented. Technology issues are identified, and major steps relative to EMA development, NASA's role, and a technology procurement plan are outlined. J.D.H.

N82-19149*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
DIGITAL FLIGHT CONTROLS
B DOVE *In its* Elec Flight Systems p 259-261 Feb 1982
Avail: NTIS HC A12/MF A01 CSCL 01C

Materials illustrating the presentation on digital flight controls are presented Technology issues, the role of NASA, and steps in the development of flight controls are outlined. J.D.H.

N82-19150*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
ELECTRIC FLIGHT SYSTEMS INTEGRATION
R. V. HOOD *In its* Elec. Flight Systems p 263-268 Feb. 1982
Avail: NTIS HC A12/MF A01 CSCL 01C

Materials illustrating a presentation on the integration of components and subsystems of electric flight systems are presented. The technology issues are outlined, and near and far term implications of issues affecting the systems integration are outlined. J.D.H.

N82-19162# Messerschmitt-Boelkow-Blohm G m.b.H., Ottobrunn (West Germany). Betriebsbereich
THE EUROPEAN AIRBUS: A CHALLENGE TO THE AMERICAN COMMERCIAL AIRCRAFT INDUSTRY [DER EUROPAEISCHE AIRBUS EINE HERAUSFORDERUNG AN DIE AMERIKANISCHE VERKEHRSFLUG ZEUG-INDUSTRIE]
H. FLOSDORFF 1981 56 p Partly in GERMAN and ENGLISH Presented at 7th A.W Quick-B H. Geothhert vorfesung, Aachen, 18 Feb 1981
(MBB-UH-01-81-O) Avail: NTIS HC A04/MF A01

The challenge and competition of the European Airbus to the American aircraft industry is discussed The history of the colaboration between western European countries in the development, planning, construction, and management of short and intermediate haul commercial jet airplanes is described. It is contended that sales to third world, oriental, and south east Asian countries, and the expansion to wide bodied airplanes established the airbus industry as an firm competitior on the world market. The wide bodied two engine aircraft shows considerable technical superiority and obvious aerodynamics improvements as compared to technologically equal wide bodied jets. The following comparisons with American similar aircrafts are made. performance reliability; flight operations data; aerodynamic standards; fuel consumption; noise absorption; weight/actual load operating span; production efficiency and strategy; A 310 advanced technology, cockpits; warning systems, and marketing potentials.
Transl. by E.A.K.

N82-19345# Wisconsin Univ., Madison.
STUDY OF PHOTOPHYSICAL PROCESSES AND MOLECULAR TRANSFORMATIONS OF EXCITED STATES Final Report, 25 Sep. 1978 - 24 Sep. 1981
H. E. ZIMMERMAN 14 Dec 1981 17 p
(Contract DAAG29-78-G-0204)
(AD-A109137; ARO-15917.3-C) Avail. NTIS HC A02/MF A01 CSCL 05B

A brief description, including bibliography and personnel, is given for 26 years of ARO support. The areas of photophysical processes and molecular transformations of excited states are reported.
Author (GRA)

N82-19410*# SRI International Corp., Menlo Park, Calif.
COMPRESSED TELEVISION TRANSMISSION: A MARKET SURVEY
R. M. LIZAK and L. Q. CAGAN Oct. 1981 58 p refs
(Contract NAS2-10143)
(NASA-CR-168614) Avail. NTIS HC A04/MF A01 CSCL 17B

NASA's compressed television transmission technology is described, and its potential market is considered; a market that encompasses teleconferencing, remote medical diagnosis, patient monitoring, transit station surveillance, as well as traffic management and control In addition, current and potential television transmission systems and their costs and potential manufacturers are considered L.F.M.

N82-19839# Research Inst. of National Defence, Stockholm (Sweden). Huvudavdelning 5.
HUMAN FACTORS IN SYSTEM DEVELOPMENT: EXPERIENCES AND TRENDS
B. BERGSTROEM, ed., H. FURUSTIG, ed., and J. PALM, ed. Jun. 1981 156 p refs Proceedings of Symp., Karlstad, Sweden, 24-25 Sep. 1980
(FOA-A-56003-H9) Avail. NTIS HC A08/MF A01

The role of human factors engineering and research in present and future systems development is evaluated. Limitations on the man machine systems design process are pointed out. Status and effectiveness of human factors engineering are assessed. Ergonomic considerations in product design and evaluation are highlighted. Human factors and safety in nuclear power plant operation are discussed.

N82-19964# RAND Corp., Santa Monica, Calif.
THE DEVELOPMENT OF HIGH-INTENSITY NEGATIVE ION SOURCES AND BEAMS IN THE USSR
N. WELLS Sep. 1981 81 p refs
(Contract MDA903-78-C-0189; ARPA ORDER 3520)
(AD-A108935, RAND/R-2816-ARPA) Avail: NTIS HC A05/MF A01 CSCL 20G

This report reviews Soviet R and D of (1) high-intensity negative ion sources and (2) transport and focusing of negative ion beams, using Soviet open literature of the past ten years, and correlates this data with data on Soviet institutes responsible for negative ion beam development. The Soviets are developing intense negative ion beams as the basis for creating neutral beams for injection into mirror traps and tokamaks, for inertial confinement fusion, and possibly for exoatmospheric beam weapon applications. The report focuses specifically on surface-plasma-type ion sources, which were first developed in the USSR and which show great promise for creating beams of high intensity, high brightness, and low emittance. Mechanisms for optimum negative ion beam transport are also discussed. GRA

N82-20024# Commerce Dept., Washington, D.C. Patent and Trademark Office.
TECHNOLOGY ASSESSMENT AND FORECAST REPORT, 10TH
Nov. 1981 175 p
(REPT-10) Avail: NTIS HC A08/MF A01

Patent and Trademark Office subclasses that are very active or predominantly of foreign origin are examined as an aid to identifying technologies having such characteristics. The 50 most active subclasses in chemical, electrical, and mechanical disciplines are presented showing highest growth, highest growth rate, and highest foreign resident inventor share. The influence in the U.S. technology market of five European and five Japanese corporations owning and/or controlling the most U.S. Patents for the period 1969-1980 is assessed. Patenting in computer software related technologies is analyzed with focus on the present status of the law in this field and the effects of laws on seismic data processing. Applications for and patents granted in aerospace technology are discussed with particular emphasis on the uses of patent information for historical review, as a research tool, and as a bibliographical data source. A.R.H.

N82-20138# Office of Naval Research, London (England).
EUROPEAN SCIENTIFIC NOTES, VOLUME 35, NUMBER 11 Monthly Publication Report, 30 Nov. 1981
F. A. RICHARDS, ed. and D. J. PETERS, ed. 30 Nov. 1981 37 p
(AD-A109387; ESN-35-11) Avail: NTIS HC A03/MF A01 CSCL 05A

A collection of articles on recent developments in European scientific research is presented. The following topics are discussed: Artificial and Human Intelligence; Organizational Change in Merchant Shipping; Unit of Blood Pressure: Protecting the Millimeter of Mercury; Third International Symposium on Inorganic Ring Systems; NATO Advanced Research Institute on Surface Modification and Alloying of Materials by Direct Energy Processing, and FRAM Ice Floe Stations. E.A.K.

N82-20318# Office of Naval Research, London (England).
POLYMER AND SURFACE SCIENCE IN EUROPE, ISRAEL AND EGYPT: SOME OBSERVATIONS
W. D. BASCOM 25 Nov. 1981 14 p
(AD-A109859; ONRL-R-6-81) Avail: NTIS HC A02/MF A01 CSCL 11I

This report contains the author's observations relating to polymer and surface science research activities in European and Middle Eastern countries with emphasis on the quality and quantity of research and the directions research efforts are taking. The information was obtained in visits to university and industrial laboratories and government research organizations over a period of 21 months. Author (GRA)

N82-20494*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
PROCEEDINGS OF THE THIRTEENTH ANNUAL PRECISE TIME AND TIME INTERVAL (PTTI) APPLICATIONS AND PLANNING MEETING
S. C WARDRIP Mar. 1982 864 p refs Meeting held at Washington, D C, 1-3 Dec. 1981; sponsored by the Naval Observatory, NASA. Goddard Space Flight Center, Naval Electronic Systems Command, NRL, Defense Communications Agency, Chief of Naval Operations, NBS, Army Electronics Technology and Devices Lab., RADC
(NASA-CP-2220; NAS 1.55.2220) Avail: NTIS HC A99/MF A01 CSCL 20E

Proceedings of an annual Precise Time and Time Interval (PTTI) Applications and Planning Meeting are summarized. A transparent view of the state-of-the-art, an opportunity to express needs, a view of important future trends, and a review of relevant past accomplishments were considered for PTTI managers, systems engineers, and program planner. Specific aims were: to provide PTTI users with new and useful applications, procedures, and techniques; to allow the PTTI researcher to better assess fruitful directions for research efforts M D.K.

N82-20547# Army Materials and Mechanics Research Center, Watertown, Mass. Materials Testing Technology Div
TIRE TESTING SYMPOSIA: A SUMMARY Final Report
C. P. MERHIB Dec. 1981 14 p
(AD-A109692; AMMRC-MS-81-1) Avail: NTIS HC A02/MF A01 CSCL 13F

Four symposia on nondestructive testing of tires were held from April 1973 to May 1978. Sponsored by AMMRC, these symposia gathered together NDT tire experts from the United States and foreign countries to present the results of their work, exchange ideas, and provide a forum for discussion of problems common to government and industry. Working panels on various NDT methods were conducted during these symposia. Proceedings of the four symposia, including panel summaries, have been published. This report summarizes and offers comments on the overall findings of the working panels. GRA

N82-20942# Naval Postgraduate School, Monterey, Calif.
IVONNE: AN INTERACTIVE NETWORK MODEL-BUILDING SYSTEM M.S. Thesis
C. S. BURCHINAL Sep. 1981 59 p refs
(AD-A109600) Avail: NTIS HC A04/MF A01 CSCL 12B

Fast and efficient mathematical programming routines have been developed for network flow problems, but due to their complexity the average manager or lay analyst does not possess the mathematical programming background required to construct the models or use the solution technology available. This problem is solved here by the development of an interactive network generating system designed to create, update, and solve a single-commodity network with only a minimal knowledge of network structure and only a rudimentary mastery of computer terminal use. Author (GRA)

N82-21111# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Systems and Logistics.
A PROCEDURE FOR DETERMINING THE RESOURCE UTILIZATION POTENTIAL OF COAL ASH M.S. Thesis
J. F. KARASEK Sep. 1981 140 p refs
(AD-A109877; AFIT-LSSR-58-81) Avail: NTIS HC A06/MF A01 CSCL 21B

A combination of the increased utilization of coal as an energy source and more stringent environmental regulations is creating problems for the disposal of the ash by-product from the combustion of coal. Utilization of the coal ash as an alternate resource has proven to be a partial solution to the problem. The U.S. Air Force coal conversion program will increase coal consumption and the production of coal ash; this has a potential to create a disposal problem for coal-burning bases. The purpose of this thesis was to develop a procedure to aid an engineer in determining the resource utilization potential of the coal ash at

the base The quality and quantity of the ash are the two main factors that affect the resource utilization potential of the ash. These two factors are a function of the nature of the feed coal, and the production, collection, handling, and storage systems utilized at the base. The procedure does not address the determination of the market potential of the ash, but rather its potential to be utilized as an alternate resource. The procedure provides a sequence of steps to follow in determining the resource utilization potential of a coal ash. Author (GRA)

N82-21576# National Bureau of Standards, Washington, D.C Center for Electronics and Electrical Engineering.
SENSOR HANDBOOK FOR AUTOMATIC TEST, MONITORING, DIAGNOSTIC, AND CONTROL SYSTEMS APPLICATIONS TO MILITARY VEHICLES AND MACHINERY Final Report
P. S. LEDERER Oct. 1981 467 p refs Sponsored in part by Army Communications Research and Development Command, Ft. Monmouth, N.J.
(PB82-123746; NBS-SP-615; LC-81-600127) Avail: NTIS HC A20/MF A01 CSCL 14B

The handbook is intended as a guide for those who design, specify, use, and test military automatic test equipment containing sensors The handbook addresses measurands and principles of measurement, data acquisition, sensor calibration and testing, environmental considerations, stability, durability, reliability, and error assessment. Sensor manufacturers and sensor calibration and evaluation resources are included as is an annotated bibliography. The handbook is based largely on the present, proved state-of-the-art. Possible future trends are briefly discussed. The handbook is addressed to the general engineer, system designer, or manager with an engineering background. It does not provide the highly detailed technical information needed by the measurement engineer, although ample references are included for further study. GRA

N82-21660*# Washington Univ., St Louis, Mo. Center for Development Technology.
PROGRAM ON STIMULATING OPERATIONAL PRIVATE SECTOR USE OF EARTH OBSERVATION SATELLITE INFORMATION Final Report, 1 Nov. 1979 - 15 Jan. 1981
L. F. EASTWOOD, JR., J. FOSHAGE, G. GOMEZ, B. KIRKPATRICK, B KONIG, and R. STEIN, Principal Investigators 15 Jan. 1981 216 p refs Original contains imagery. Original photography may be purchased from the EROS Data Center, Sioux Falls, S.D 57198. ERTS
(Contract NASW-3331)
(E82-10131; NASA-CR-168515; NAS 1 26.168515) Avail: NTIS HC A10/MF A01 CSCL 05B

Ideas for new businesses specializing in using remote sensing and computerized spatial data systems were developd. Each such business serves as an 'information middleman', buying raw satellite or aircraft imagery, processing these data, combining them in a computer system with customer-specific information, and marketing the resulting information products. Examples of the businesses the project designed are: (1) an agricultural facility site evaluation firm; (2) a mass media grocery price and supply analyst and forecaster; (3) a management service for privately held woodlots; (4) a brokerage for insulation and roofing contractors, based on infrared imagery; (5) an expanded real estate information service. In addition, more than twenty-five other commercially attractive ideas in agribusiness, forestry, mining, real estate, urban planning and redevelopment, and consumer information were created The commercial feasibility of the five business was assessed. This assessment included market surveys, revenue projections, cost analyses, and profitability studies. The results show that there are large and enthusiastic markets willing to pay for the services these businesses offer, and that the businesses could operate profitably. M G.

N82-22397 Royal Signals and Radar Establishment, Malvern (England).
AN ANNOTATED BIBLIOGRAPHY OF CONGESTION CONTROL IN PACKET-SWITCHED COMMUNICATIONS NETWORKS
D P. TAYLOR Nov. 1981 48 p
(RSRE-81011; BR81771) Avail: Issuing Activity

Papers on flow control, buffer allocation, deadlock prevention, traffic flow, routing, and the topological aspects of nonmilitary communication networks are reviewed. Author (ESA)

N82-22449# Valvo G.m.b.H., Hamburg (West Germany).
DEVELOPMENT OF FAST ANALOG-DIGITAL INTERFACE CIRCUITS IN NMOS TECHNOLOGY Final Report, Oct. 1980
P. DRAHEIM and W. DEMMER Bonn Bundesministerium fuer Forschung und Technologie Dec. 1981 99 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-81-212; ISSN-0340-7608) Avail: NTIS HC A05/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 21

Interface circuits with geometries on the order of 4 micrometers were developed, using a NMOS method. These circuits include track and hold circuits, comparators, and differential amplifiers. Analog to digital as well as digital to analog converters were designed. A high speed 6 bit parallel analog to digital converter in NMOS and an 8 bit digital to analog converter were realized for video signal applications (6 MHz bandwidth). It is shown that both converters have a conversion rate higher than 25 MHz.
Author (ESA)

N82-22546*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif..
WESTERN REGIONAL REMOTE SENSING CONFERENCE PROCEEDINGS, 1981
Sep. 1981 263 p refs Conf. held at Monterey, Calif., 30 Mar - 2 Apr. 1981 Original contains imagery. Original photography may be purchased from the EROS Data Center, Sioux Falls, S. Dak., 57198 ERTS
(E82-10104; NASA-CP-2195; NAS 1.55:2195; A-8663) Avail: NTIS HC A12/MF A01 CSCL 05A

Diverse applications of LANDSAT data, problem solutions, and operational goals are described by remote sensing users from 14 western states. The proposed FY82 federal budget reductions for technology transfer activities and the planned transition of the operational remote sensing system to NOAA's supervision are also considered.

N82-22652*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
THE 19TH PROJECT INTEGRATION MEETING Progress Report, Jul. - Nov. 1981
R. R. MCDONALD Nov. 1981 397 p refs
(Contract NAS7-100, DE-AI01-76ET-20356)
(NASA-CR-168822; JPL-PUB-82-11, DOE/JPL-1012-67; NAS 1.26:168822; PR-19) Avail. NTIS HC A17/MF A01 CSCL 10A

The Flat-Plate Solar Array Project is described. Project analysis and integration is discussed. Technology research in silicon material, large-area silicon sheet and environmental isolation; cell and module formation; engineering sciences, and module performance and failure analysis. It includes a report on, and copies of visual presentations made at, the 19th Project Integration Meeting held at Pasadena, California, on November 11, 1981.
Author

N82-23015# Standard Elektnk Lorenz A.G , Stuttgart (West Germany). Forschungszentrum.
OPTICAL COMMUNICATION SYSTEM FOR WAVELENGTHS AROUND 1200 NM Final Report, Aug. 1981
W. BOROWSKI, R. DORN, K HESS, K. LOESCH, and G. SCHEMMEL Bonn Bundesministerium fuer Forschung und Technologie Feb. 1982 78 p refs In GERMAN, ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-82-012; ISSN-0340-7608) Avail· NTIS HC A05/MF A01, Fachinformationszentrum, Karlsruhe, West Germany DM 16,40

A fiber optical communication system with a maximum fiber length of 36 km, without a repeater, was· developed The electro-optical effect was studied and an operating wavelength of 1200 nm was chosen, due to the low attenuation of glass fibers in this spectral region. For the source and reception ends, an SiO2 strip laser and photodetector were fabricated, using liquid phase epitaxy and vacuum deposition. Drive and signal reception amplifying circuitry was also designed. With these components and a low loss gradient fiber, a laboratory model was set up. At 34 Mbit/sec transmission rate, a bit error rate of 10 to the minus 9th power is shown. Author (ESA)

N82-23045# Deutsche Gesellschaft fuer Luft- und Raumfahrt, Cologne (West Germany).
ERNST HEINKEL: MILESTONES IN HIS LIFE [ERNST HEINKEL: MEILENSTEINE AN SEINEM LEBENSWEG]
H. D. KOEHLER 1981 80 p In GERMAN, ENGLISH summary
(DLR-MITT-81-01) Avail: NTIS HC A05/MF A01, DGLR, Cologne DM 18,50

A short biography of Ernst Heinkel is presented A chronological account of his achievements as an aircraft designer and an industrialist is presented Notable achievements and inventions of Heinkel's assistants are also described. Author (ESA)

N82-23108*# Houston Univ., Tex.
THE 1981 NASA ASEE SUMMER FACULTY FELLOWSHIP PROGRAM, VOLUME 1 Technical Final Report
N. G. ROBERTSON and C. J. HUANG 20 Aug 1981 324 p refs 2 Vol.
(Contract NGT-44-005-115)
(NASA-CR-168775; NAS 1.26:168775) Avail: NTIS HC A14/MF A01 CSCL 05I

A review of NASA research programs related to developing and improving space flight technology is presented. Technical report topics summarized include. space flight feeding; aerospace medicine; reusable spacecraft; satellite soil, vegetation, and climate studies; microwave landing systems, anthropometric studies; satellite antennas; and space shuttle fuel cells.

N82-23568*# Environmental Research Inst. of Michigan, Ann Arbor.
LANDSAT TECHNOLOGY TRANSFER TO THE PRIVATE AND PUBLIC SECTORS THROUGH COMMUNITY COLLEGES AND OTHER LOCALLY AVAILABLE INSTITUTIONS Final Report, 20 Dec. 1979 - 20 Dec. 1980
R. H. ROGERS, Principal Investigator Dec. 1980 59 p ERTS
(Contract NASW-3308)
(E82-10181; NASA-CR-168846; NAS 1.26 168846;
ERIM-147200-13-F) Avail: NTIS HC A04/MF A01 CSCL 05A

Major first year accomplishments are summarized and plans are provided for the next 12-month period for a program established by NASA with the Environmental Research Institute of Michigan to investigate methods of making LANDSAT technology readily available to a broader set of private sector firms through local community colleges. The program applies a network where the major participants are NASA, university or research institutes; community colleges, and obtain hands-on training in LANDSAT data analysis techniques, using a desk-top, interactive remote analysis station which communicates with a central computing facility via telephone line, and provides for generation of land cover maps and data products via remote command. A.R.H

N82-23734# Department of Energy, Washington, D. C Office of Facility Planning and Support.
ENERGY CONSERVATION IN BUILDINGS AND GENERAL OPERATIONS Annual Report
Jan 1981 26 p
(DE82-002723, DOE/MA-0004) Avail. NTIS HC A03/MF A01

An In-house Energy Management program designed to reduce energy consumption and increase energy efficiency in buildings and general operations facilities, is described. The major goals of the program are: retrofit of all buildings to improve energy efficiency and assure minimum life cycle costs by 1990; reduction, in existing DOE buildings by 20% and in new DOE buildings by 45%, of average energy use per gross square foot by FY 1985, as compared to FY 1975 usage; reduction of petroleum-based fuels use by 30% by FY 1985, as compared to FY 1975 usage; and discontinuation of petroleum in major fuel burning installations by FY 2000; discontinuation of the use of natural gas in MFBI by FY 2000, and implementation of cost effective solar and other renewable energy systems DOE's active program in energy conservation surveys and studies, retrofit and maintenance improvements, procurement of fuel efficient vehicles, driver training, and employee awareness enabled the Department to reduce its energy consumption in FY 1980 by approximately 14%, as compared to the embargo year of 1973. DOE

N82-23836# California Univ., Livermore. Lawrence Livermore Lab.
SOME EFFECTS OF STRESS, FRICTION AND FLUID FLOW ON HYDRAULIC FRACTURING
M. E. HANSON, G. D. ANDERSON, R. J. SHAFFER, and L. D THORSON Mar. 1981 31 p refs
(Contract W-7405-ENG-48)
(DE82-001674; UCRL-85003; SPE/DOE-9381) Avail NTIS HC A03/MF A01

A research program to understand the hydraulic fracturing process, especially those phenomena and parameters which strongly affect or control the fracture geometry was conducted Theoretical and experimental studies consistently confirm the well known fact that in-situ stress has a primary effect on fracture geometry and that fractures propagate perpendicular to the least principal stress It was found that frictional interfaces in reservoirs can affect fracturing. Some of the effects on fracture geometry due to frictional slippage along interfaces was quantified. Variation of friction along an interface can result in abrupt steps in the fracture path. These effects were seen in the mine back of emplaced fractures and are demonstrated both theoretically and in the laboratory. Further experiments and calculations are starting to indicate the possible control of the fracture height by the vertical change in the cables to X-608A wells should be replaced, and develop v across categories of persons affected. The management plan for the operation of the plant is also discussed. DOE

N82-24010*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
PROCEEDINGS OF THE SIXTH ANNUAL SOFTWARE ENGINEERING WORKSHOP
1981 277 p refs Conf held in Greenbelt, Md , 2 Dec 1981
(NASA-TM-84189; NAS 1.15:84189) Avail: NTIS HC A13/MF A01 CSCL 09B

Software development characteristics, models, and methodologies were presented and discussed. 0

N82-24016*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
IDENTIFICATION AND EVALUATION OF SOFTWARE MEASURES
D. N. CARD *In its* Proc. of the Sixth Ann. Software Eng. Workshop 28 p 1981 refs
Avail: NTIS HC A13/MF A01 CSCL 09B

A large scale, systematic procedure for identifying and evaluating measures that meaningfully characterize one or more elements of software development is described The background of this research, the nature of the data involved, and the steps of

the analytic procedure are discussed. An example of the application of this procedure to data from real software development projects is presented. As the term is used here, a measure is a count or numerical rating of the occurrence of some property Examples of measures include lines of code, number of computer runs, person hours expended, and degree of use of top down design methodology. Measures appeal to the researcher and the manager as a potential means of defining, explaining, and predicting software development qualities, especially productivity and reliability. S.L.

N82-24138# Committee on Science and Technology (U. S. House).
INNOVATION IN THE BASIC MATERIALS INDUSTRIES. PROCEEDINGS OF THE SIXTH ANNUAL ENGINEERING FOUNDATION CONFERENCE ON MATERIALS POLICY
Washington GPO Jun. 1981 586 p refs Rept. presented to the Comm. on Sci and Technol., 97th Congr., 1st Sess., Jun 1981 Conf held in Henniker, N.H., 27 Jul. - 1 Aug. 1980 Prepared by Congressional Research Service, Library of Congress
(GPO-80-527) Avail: Committee on Science and Technology

The need for initiatives in promoting technological innovation in the basic materials was considered Special emphasis was placed upon developing ideas on ways industries can contribute inputs to such issues as investment policy, tariff regulations, capitalization, and environmental control that affect government-industry relations in the areas of materials and technological innovation. J.D.

N82-24139# Purdue Univ., Lafayette, Ind. Automotive Transportation Center.
OPPORTUNITY AND RISK ASSESSMENT (OPRA 1980). ELECTRIC AND HYBRID VEHICLES: STRATEGIC ISSUE FOR THE 1980S Final Report
Oct. 1981 219 p refs
(Contract DE-AS02-77CS-54250; EPRI PROJ. 1524-1)
(DE82-003121; EPRI-EM-2068) Avail: NTIS HC A10/MF A01

The national strategy which might be followed by the Department of Energy and the Electric Power Research Institute (EPRI) in fostering the acceptance of these technologies is presented. The assessment is based on a set of national objectives on which an electric and hybrid vehicle stragegy could be based. It raises issues based on the state of the art of these technologies and their potential use, and examines alternative strategies which might resolve the issues. The opportunities, risks, and recommendations are synthesized based on this process. The recommmendations are to initiate a focused information program, to strengthen electric vehicles, to establish and rationalize financial incentives, to evolve the present DOE market demonstration program into a program of large scale market and technology tests, and to develop government and utility markets for research and development. For each of these recommendations, joint, coordinated programs among industry, government, and utility participants are stressed It is envisioned that EPRI might play a pivotal role in fostering such programs. DOE

N82-24215# Centre National d'Etudes Spatiales, Toulouse (France)
THE TECHNOLOGY OF SPACEBORNE SCIENTIFIC EXPERIMENTS [LA TECHNOLOGIE DES EXPERIENCES SCIENTIFIQUES SPATIALES]
1981 1111 p refs In FRENCH Proc. of CNES Cours de Technol Spatiale 1981, Toulouse, 11-22 May 1981
(ISSN-0244-8041) Avail: NTIS HC A99/MF A01

The planning and execution of space projects was discussed. Topics covered the French scientific space program, environmental and other constraints on space missions, experiment development technology and data processing with relation to spaceborne experiments.

N82-24253# Joint Publications Research Service, Arlington, Va.
USSR REPORT: SPACE, NO. 15
29 Mar. 1982 138 p refs Transl. into ENGLISH from various Russian publications
(JPRS-80424) Avail: NTIS HC A07/MF A01

This serial report contains news items, abstracts and articles of scientific reports on all aspects of the Soviet space program. The reports include manned mission highlights, space sciences, interplanetary research, space biology and medicine, space engineering, applications (satellite geodesy, meteorology, communications, remote sensing) and space science policy and administration.

N82-24652# Courtesy Associates, Inc., Washington, D.C.
PROCEEDINGS OF THE DOE THERMAL AND CHEMICAL STORAGE ANNUAL CONTRACTOR'S REVIEW MEETING
Mar. 1981 361 p refs Meeting held at McLean, Va., 14-16 Oct. 1980 Prepared for Brookhaven National Lab.
(Contract DE-AC02-76CH-00016)
(CONF-801055) Avail: NTIS HC A16/MF A01

Overviews of Thermal Energy Storage and Chemical/Hydrogen Energy Storage Programs are presented. The progress and accomplishments of each subcontractor, program management and interested researchers from industry, academia, and government are summarized.

N82-24975# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
METHOD OF MANUFACTURING OPTICAL SURFACES OF REVOLUTION
V. V. GORELIK and S. I. DENISOV 3 Feb 1982 6 p Transl. into ENGLISH of Russian patent no. 315569, 1 Oct. 1971 p 1-2
(AD-A111409; FTD-ID(RS)T-1731-81) Avail: NTIS HC A02/MF A01 CSCL 13H

A method of manufacturing optical surfaces of revolution, primarily of second order, by grinding and polishing the blank with a tubular tool with a scarf. In order to increase precision and productivity the blank is machined on an elliptical trajectory.
M G

N82-25673*# Colorado State Univ., Fort Collins Dept. of Atmospheric Science.
INITIAL STUDIES OF MIDDLE AND UPPER TROPOSPHERIC STRATIFORM CLOUDS Final Technical Report
S. K. COX 18 May 1982 484 p refs
(Contract NSG-5357)
(NASA-CR-168971; NAS 1.26:168971) Avail. NTIS HC A21/MF A01 CSCL 04A

The spatial and temporal occurrence of cloud layers, the development of a physical-numerical model to simulate the life cycles of tropospheric cloud layers, and the design of an observational program to study the properties of these layers are described.

N82-26053# Los Alamos Scientific Lab., N. Mex.
ANALYSIS OF ALTERNATE-FUELED PASSENGER VEHICLES: A SAMPLE TECHNOLOGY ASSESSMENT
A. T PEASLEE, JR and G. R THAYER Oct. 1981 18 p refs
(Contract W-7405-ENG-36)
(DE82-004190; LA-9068-MS) Avail: NTIS HC A02/MF A01

Ten passenger vehicles powered by the following were characterized on a common engineering and economic basis. gasoline internal combustion, diesel internal combustion, liquid-hydrogen internal combustion, liquid-hydrogen fuel cell, hydrogen internal combustion, hydrogen fuel cell, methanol internal combustion, methanol fuel cell, Ni/Zn battery, and Pb/Acid battery. Levelized life cycle costs were computed for each vehicle. The market penetration of the nongasoline vehicles was studied over a 50 yr period using a generalized equilibrium energy economic model Results indicate that only the methanol internal combustion vehicle using methanol produced from coal is a viable alternative to the gasoline internal combustion vehicle. The market penetration of alternate vehicles was enhanced more by reduction in acquisition

costs than by comparable improvements in engineering parameters. DOE

N82-26490# Department of Energy, Washington, D. C. Office of Transportation Programs.
SYMPOSIUM ON COMMERCIAL AVIATION ENERGY CONSERVATION STRATEGIES, PAPERS AND PRESENTATIONS
Apr. 1981 354 p refs Symp held in Washington, D.C., 2-3 Apr. 1981 Sponsored in part by FAA
(AD-A107106) Avail. NTIS HC A16/MF A01 CSCL 21D

The Symposium provided a forum in which representatives from DOE, FAA, National Aeronautics and Space Administration (NASA) and the aviation industry exchanged information and ideas regarding current and future efforts to conserve fuel and to promote energy conservation within the commercial aviation sector. General topics discussed included Federal and industry energy conservation programs such as flight operations, air traffic control, engineering and maintenance, and corporate management strategies. The Symposium, was highlighted by a panel discussion entitled 'Energy Conservation: Where Do We Go From Here?' This report contains the papers and presentations from the Symposium. GRA

N82-26617# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
MEMORY DEVICE
N. A. PASHKIN, V N MALYUTIN, and V V YEFREMOV 3 Mar 1982 5 p Transl. into ENGLISH of the Russian patent no. 196457, 16 May 1967
(AD-A112161; FTD-ID(RS)T-0163-82) Avail: NTIS HC A02/MF A01 CSCL 13G

A memory device for pneumoautomatic system is described. In order to ensure the possibility of obtaining an immediate rewrite of information and its long term storage with no expenditure of compressed gas, the information carrier is made in the form of a film or layer of an elastic material, with cone like projections The information carrier is arranged between the pusher of the recording mechanism and the real nozzle, which also is the pusher of the erasure mechanism. J.D.

N82-26857# Booz-Allen and Hamilton, Inc , Bethesda, Md
SOLAR CENTRAL RECEIVERS: THE TECHNOLOGY, INDUSTRY, MARKETS, AND ECONOMICS
1 Sep. 1981 155 p
(Contract DE-AC03-81SF-11436)
(DE82-005267; DOE/SF-11436/2) Avail: NTIS HC A08/MF A01

Major solar central receiver (SCR) technology development occurring in the public and private sectors is assessed The economic characteristics of SCR systems are discussed and their ability to compete with conventional system costs is evaluated. The effects of various federal assistance options on the market prospects for SCR are quantified. The forms of possible federal assistance, impacts of such assistance on SCR costs, and the preference of potential SCR suppliers and purchasers towards these assistance options are identified. An overview is presented of private sector developers from which a viable supply industry can evolve and their capabilities to commercialize SCR techniques. DOE

N82-27994# South African Inst. of Civil Engineers, Pretoria.
SYMPOSIUM ON COMPUTERS IN CIVIL ENGINEERING
1981 203 p refs Symp. held in Pretoria, 1981 Sponsored in part by the Construction Industry Computer Information Centre
(ISBN-0-7988-2097-9) Avail: NTIS HC A10/MF A01

Electronic computation in planning, management, and process control is discussed. Trends in computing are considered. Quality control in software is reviewed. Management of inhouse computer facilities is discussed. Graphics software is considered. A drafting system for highway plans is presented. Topgraphic reference surfaces are examined. Transportation systems modelling is considered. Transportation packages are reviewed. Computer methods in highway engineering are discussed. A two-dimensional finite difference hydraulic model is applied to tidal circulation and harbor resonance. The effects of disruption in contract adminstration are assessed. Computer detailing of concrete reinforcement is discussed. N.W.

N82-28189# Lincoln Lab., Mass. Inst. of Tech., Lexington.
SOLID STATE RESEARCH: 1981 - 1983 Quarterly Technical Summary Report, 1 May - 31 Jul. 1981
A. L. MCWHORTER 15 Aug. 1981 86 p refs
(Contract F19628-80-C-0002; AF PROJ. 649L)
(AD-A112696; ESD-TR-81-278) Avail: NTIS HC A05/MF A01 CSCL 20L

This report covers in detail the solid state research work of the Solid State Division at Lincoln Laboratory for the period 1 May through 31 July 1981. The topics covered are Solid State Device Research, Quantum Electronics, Materials Research, Microelectronics, and Analog Device Technology. Funding is primarily provided by the Air Force, with additional support provided by the Army, DARPA, Navy, NASA, and DOE. Author (GRA)

N82-28214# Carnegie-Mellon Univ., Pittsburgh, Pa. Dept. of Social Science.
SYMPOSIUM ON INFORMATION PROCESSING IN ORGANIZATIONS Final Technical Report, Oct. 1981 - Apr. 1982
L. S. SPROULL and P. D. LARKEY Apr 1982 286 p refs Symp. held at Pittsburgh, 16-17 Oct. 1982
(Contract N00014-82-G-0004; NR PORJ. 170-1982)
(AD-A113658) Avail. NTIS HC A13/MF A01 CSCL 09B

A two-day symposium was held at Carnegie-Mellon University in October 1981 to bring together social scientists doing research in the area of information processing in organizations. The eight papers were presented and discussed in detail include: The maximization process under uncertainty; Information systems in organizations; Formulating and justifying budget problems; Communicating with people in emergencies; Gossip, information and decision making, An on-going case study in technological innovation, information and ambiguity in organizational change; and The nature of managenal attention. GRA

N82-29104# Polytechnic Inst. of New York, Brooklyn. Dept. of Electrical Engineering and Computer science.
THE 10TH IFIP CONFERENCE ON SYSTEM MODELING AND OPTIMIZATION Final Report, 31 Aug. - 4 Sep. 1981
R. F. DRENICK and F. KOZIN 15 Jan. 1982 254 p refs Conf. held in New York, 31 Aug. 4 Sep. 1981
(Contract AF-AFOSR-0008-80; AF PROJ. 2304)
(AD-A113126; AFOSR-82-0244TR) Avail: NTIS HC A12/MF A01 CSCL 12B

Abstracts of the contributed papers are grouped in these subject areas: control theory, games, identification and estimation, control applications, optimum control theory differential equations, stochastic control, programming theory, multiobjective optimization, programming algorithms, programming applications, combinatorial programming, computational complexity, socioeconomic models, mathematical economics, biological models, computer-aided design, systems problems, power systems, transportation problems, simulation studies, and management science. GRA

N82-29106# Stanford Univ., Calif Systems Optimization Lab.
PILOT-1980 ENERGY-ECONOMIC MODEL. VOLUME 1: MODEL DESCRIPTION Interim Report
G. B. DANTZIG, B. AVI-ITZHAK, and T. J. CONNOLLY Nov. 1981 322 p refs Sponsored by EPRI
(Contract EPRI PROJ. 652-1)
(DE82-901280; EPRI-EA-2090-VOL-1) Avail. NTIS HC A14/MF A01

PILOT-1980 is a US national energy-economic model that can be used to assess the impact of energy policy decisions and resource availability estimates over the next 40 to 10 years. PILOT's dynamic linear programming formulation allows a full look-ahead capability in a model integrating detailed energy sectors, the general economy, and foreign trade. A utility function measuring consumer's welfare captures price and income substitution effects. The model

consists of a detailed description of energy technologies for extraction and conversion of energy resources, linked to a less detailed input-output model of the genera economy. An Industrial Energy Services Module uses engineering process-type representations to model demand substitutions in industry, implicitly changing the input-output coefficients. A simlr Consumers Energy Services Module gives process-type modeling of demand substitutions in the private sector. The consumers utility function, PILOT's objective function, models price- and income-induced shifts in final demand patterns. DOE

N82-29473# Army Facilities Engineering Support Agency, Fort Belvoir, Va. Technology Support Div
COAL-OIL MIXTURES PROBLEMS AND OPPORTUNITIES
J. F. THOMPSON, JR. 15 Jan. 1982 26 p refs
(AD-A113533, USAFESA-T-2100) Avail. NTIS HC A03/MF A01 CSCL 21D

This report presents the problem areas and identifies solutions for implementing Coal-Oil Mixture Technology. The report also contains an overview of industrial and Government experiences in fuel production, stabilization, and combustion. The report provides references and points of contact/addresses of those manufacturers currently involved in Coal-Oil Mixture Technology. Author (GRA)

N82-29492# Studsvik Energiteknik A.B, Nykoping (Sweden). Research Center.
ASSESSMENT OF POTENTIAL FUTURE MARKET IN SWEDEN FOR HYDROGEN AS AN ENERGY CARRIER Final Report
G. CARLESON Sep. 1980 382 p refs Sponsored in part by the International Energy Agency
(DE82-900643; NE/EPA-80/4) Avail: NTIS (US Sales Only) HC A17/MF A01; DOE Depository Libraries

Future hydrogen markets during the period 1980-2025 were projected. The probable range of hydrogen production costs were evaluated as well as the expected market shares in competition with alternative energy carriers. Three different energy scenarios were developed, based on nuclear energy, renewable indigenous energy sources and the present energy picture, respectively. Within each of the three scenarios, an analysis was made of the competitiveness of hydrogen on both the demand and the supply sides of the sectors: chemical industry, steel industry, peak power production, residential and commercial heating, and transportation. Costs were calculated for the production, storage and transmission of hydrogen. Health, enviromental and societal implications were taken into consideration. The results were used to estimate the market penetration of hydrogen. DOE

N82-29526# National Oceanic and Atmospheric Administration, Boulder, Colo. Wave Propagation Lab.
REPORT ON THE SKYWAVE SEA-STATE-RADAR WORKSHOP
T. M. GEORGES and J W. MARESCA, JR. (SRI International, Menlo Park, Calif) Oct. 1981 34 p refs Workshop held in Rockville, Md., 20-22 May 1981
(PB82-160979; NOAA-TM-ERL-WPL-81; NOAA-81120701) Avail. NTIS HC A03/MF A01 CSCL 08C

HF skywave radar as an ocean remote sensor is discussed. Potential users of skywave radar services were invited to state their operational needs and to express candidly their views on where skywave radar might most profitably concentrate its future development effort. Author

N82-29579*# National Aeronautics and Space Administration Goddard Space Flight Center, Greenbelt, Md
MAGNETIC TAPE RECORDING FOR THE EIGHTIES
F KALIL, ed Apr. 1982 176 p refs
(NASA-RP-1075; NAS 1.61.1075) Avail. NTIS CSCL 14E

The practical and theoretical aspects of state-of-the-art magnetic tape recording technology are reviewed. Topics covered include the following: (1) analog and digital magnetic tape recording, (2) tape and head wear, (3) wear testing, (4) magnetic tape certification, (5) care, handling, and management of magnetic tape, (6) cleaning, packing, and winding of magnetic tape, (7) tape reels, bands, and packaging, (8) coding techniques for high-density digital recording, and (9) tradeoffs of coding techniques. Author

N82-30237*# Jet Propulsion Lab., California Inst of Tech., Pasadena.
THE TELECOMMUNICATIONS AND DATA ACQUISITION REPORT
N A RENZETTI, ed. 15 Jun 1982 212 p refs Sponsored by NASA
(NASA-CR-169195; JPL-TDA-PR-42-69, NAS 1 26:169195) Avail: NTIS HC A10/MF A01 CSCL 05A

Developments in Earth based radio technology with applications to space communications, geodynamics, and astrophysics are reported.

N82-30336*# National Aeronautics and Space Administration Lewis Research Center, Cleveland, Ohio.
HIGH TEMPERATURE COMPOSITES. STATUS AND FUTURE DIRECTIONS
R A. SIGNORELLI 1982 25 p refs Presented at the 4th Intern. Conf on Composite Mater., Tokyo, 25-28 Oct. 1982
(NASA-TM-82929, E-1280; NAS 1.15:82929) Avail: NTIS HC A02/MF A01 CSCL 11D

A summary of research investigations of manufacturing methods, fabrication methods, and testing of high temperature composites for use in gas turbine engines is presented Ceramic/ceramic, ceramic/metal, and metal/metal composites are considered Directional solidification of superalloys and eutectic alloys, fiber reinforced metal and ceramic composites, ceramic fibers and whiskers, refractory coatings, metal fiber/metal composites, matrix metal selection, and the preparation of test specimens are discussed. J.D.

N82-30609 American Society of Mechanical Engineers, New York Solar Energy Div.
SOLAR ENGINEERING, 1981
R. L. REID, ed. (Tennessee Univ., Knoxville), L. M. MURPHY, ed. (Midwest Research Inst.), and D. S. WARD, ed. (Colorado State Univ) 1981 776 p refs Proc. of the 3rd Ann. Conf. of Systems Simulation, Econ. Anal./Solar Heating and Cooling Operational Results, Reno, Nev., 27 Apr. - 1 May 1981 Sponsored in part by DOE
(CONF-810405; N-151746; LC-81-65532) Avail: Issuing Activity

Solar heating and cooling systems for residential, commercial, and industrial applications are discussed

N82-30749# Sandia Labs., Albuquerque, N. Mex. PV System Definition Div.
ASSESSMENT OF THE FEASIBILITY OF THE WIDESPREAD PHOTOVOLTAIC RETROFITS
J. L. JACKSON 1981 14 p refs Presented at the Univ. of Mo. Dept of Nat. Resources Conf on Energy, Rolla, 6 Nov. 1981
(Contract DE-AC04-76DP-00789)
(DE82-003051; SAND-81-1147C; CONF-811137-1) Avail: NTIS HC A02/MF A01

Some of the economic implications of retrofits and retrofit designs which might be employed are considered Residential and commercial retrofits may represent a significant national market for photovoltaic (PV) systems. Techniques for estimating the photovoltaic retrofits market and present preliminary conclusions about physical market size are discussed. Possible institutional barriers to widespread retrofits are reviewed. GRA

N82-30833*# Massachusetts Inst of Tech., Cambridge.
PROCEEDINGS OF THE SIXTEENTH ANNUAL CONFERENCE ON MANUAL CONTROL
1980 643 p refs Conf. held at Cambridge, Mass., 5-7 May 1980 Sponsored by NASA. Ames Research Center
(NASA-CR-169243; NAS 1.26:169243) Avail: NTIS HC A99/MF A01 CSCL 05H

Operator modeling is reviewed. Measurement of human response is considered Pilot/operator opinion is also considered. The effects of motion are reviewed. Aircraft displays are discussed.

Supervisory control is considered. Automobile driving and remote manipulation are also considered.

N82-31352# Centre National d'Etudes Spatiales, Toulouse (France).
THE FUTURE OF LAUNCHERS IN EUROPE
1982 678 p refs Partly in FRENCH and ENGLISH Proc. of Intern. Conf., Paris, 19-21 Jan. 1982
Avail: NTIS HC A99/MF A01

Developments in mission type, launch vehicles, propulsion systems, aerospace technology, and reusable systems until the end of the 20th century were discussed

N82-31559# Oak Ridge National Lab., Tenn.
INTERNATIONAL SURVEY OF COAL PREPARATION TECHNOLOGY
J. C. MOYERS and K. O. JOHNSSON Apr. 1982 73 p refs
(Contract W-7405-ENG-26)
(DE82-009870; ORNL/TM-8207) Avail: NTIS HC A04/MF A01

A survey of the technology and coal preparation in foreign nations was conducted The objectives were to determine the extent and practices of coal preparation, to identify new developments, and to identify problem areas that warrant additional research and development emphasis. The fraction of national hard coal production that is prepared ranges from less than 25% in China and India to more than 75% in Australia, Poland, and the United Kingdom. The same basic preparation processes and equipment are used worldwide, but there is a wide range in the complexity of preparation plants due to the differences in coal characteristics and market requirements. The most significant new development appears to be the introduction of modern control systems that utilize computers and on-line analytical instruments. The major problem facing the industry appears to be that of cleaning and dewatering fine coal. DOE

N82-31562# TRW, Inc., Redondo Beach, Calif.
DEVELOPMENT OF TECHNOLOGY FOR COALBED METHANE RECOVERY. PROGRAM PLANNING Final Report, Sep. 1980 - Jul. 1981
A. GILLIES and A. SNYGG Jun 1981 215 p refs
(Contract GRI-5080-321-0333)
(PB82-168436; GRI-81/0008-1) Avail. NTIS HC A10/MF A01 CSCL 21D

A program option for the development of technology for economic recovery of coalbed methane was developed. As a first step in the planning process, an assessment of technology currently used in the oil and gas industry was conducted to determine its suitability for use in recovery of methane from coalbeds. It was determined that the most limiting technology was stimulation of water and gas flow from the deeper, more gassy, coal formations. Twenty R&D projects addressing stimulation techniques and related topics were selected by the GRI and the GRI project advisors and plans for their conduct developed. These individual project plans were consolidated into a representative program plan option which describes how the individual stimulation tests can be integrated into three types of production scale tests each targeted at a particular class of coal formation. GRA

N82-31563# TRW, Inc., Redondo Beach, Calif.
DEVELOPMENT OF TECHNOLOGY FOR COALBED METHANE RECOVERY PROGRAM PLANNING: APPENDIX A: TECHNOLOGY OPTIONS Final Report
Dec. 1981 60 p refs
(PB82-169699; GRI-81/0008-2-APP-A) Avail: NTIS HC A04/MF A01 CSCL 21D

Program planning for the technology development necessary for the efficient recovery of methane from coalbeds is discussed. The various options and techniques now available and used in the past are summarized. L.F.M.

N82-32054 International Inst. for Applied Systems Analysis, Laxenburg (Austria).
ACTIVITIES OF THE INTERNATIONAL SCIENTIFIC RESEARCH INSTITUTIONS Annual Report, 1981
1981 70 p refs Original doc. contains color illustration
Avail: Issuing Activity

Energy systems, food and agriculture, Earth resources and the environment, human settlements and services, and management sciences research is summarized Energy needs were analyzed. National agricultural models were developed The greenhouse effect was studied. Migration and spatial population growth patterns were analyzed Author (ESA)

N82-32275# Joint Publications Research Service, Arlington, Va.
USSR REPORT: SPACE, NO. 17
17 Aug 1982 110 p refs Transl. into ENGLISH of various Russian articles
(JPRS-81552) Avail: Issuing Activity

Highlights from the manned space mission of the Salyut-7 flight are reported. Topics studied include: aerospace sciences, interplanetary sciences, life sciences, aerospace engineering, aerospace applications, and aerospace policy and administration.

N82-32391# Netherlands Committee for Geophysics and Space Research, Amsterdam
SPACE RESEARCH IN THE NETHERLANDS Annual Report, 1981
1981 86 p refs
Avail: NTIS HC A05/MF A01

The designing, building, testing, and operating of space scientific instruments is treated along with interpretation of data collected with these instruments. Innovations in technique and management, arising from this work, are considered for their impact on industry. Participation in the ESA program for microgravity research, including biological and materials science experiments based on Spacelab and sounding rocket flight opportunities, is summarized. Results obtained by scientific satellite instruments, by balloon-borne instruments, and by laser ranging of satellites for geodetical studies are set forth. Author (ESA)

N82-32557# National Academy of Sciences - National Research Council, Washington, D. C. Committee on Computer-Aided Manufacturing.
TECHNICAL REVIEW OF THE ICAM PROGRAM, 25-27 JUNE 1980, PART 1
1981 75 p Sponsored in part by AFSC 2 Vol.
(Contract E49620-78-C-0027)
(PB82-163098) Avail: NTIS HC A04/MF A01 CSCL 13I

The Integrated Computer-Aided Manufacturing (ICAM) program of the U.S. Air Force Systems Command was evaluated. The Committee's assessment is that the ICAM program performs a valuable service to the United States in bringing together government, industry, and academia to further the development of computer-aided manufacturing modules and their integration. Contributions are being made in the areas of hardware and software, enabling technologies, individual CAM modules, and integration of modules. Comments on technology transfers, the level of effort of the ICAM program, and the balance of effort between projects in the ICAM program are discussed. In addition, it gives detailed reviews of key ICAM projects as of June 25-27, 1980. GRA

N82-32558# National Academy of Sciences - National Research Council, Washington, D. C. Committee on Computer-Aided Manufacturing.
TECHNICAL REVIEW OF THE ICAM PROGRAM, FEBRUARY 1981, PART 2
1981 32 p Sponsored in part by AFSC 2 Vol.
(Contract E49620-78-C-0027)
(PB82-163080) Avail: NTIS HC A03/MF A01 CSCL 13I

A review of U.S. Air Force's Integrated Computer-Aided Manufacturing program is presented. Projects and technology

transfer activities were assessed Manufacturing architecture, fabrication, data bases, computer aided design, and materials handling and storage are among the topics considered. GRA

N82-32563# National Science Foundation, Washington, D.C. Environment, Energy and Resources Group.
FEDERAL ROLE IN THE COMMERCIALIZATION OF ACTIVE SOLAR HEATING AND COOLING TECHNOLOGY: PAPERS FOR AND A SUMMARY OF A WORKSHOP
1981 225 p refs Workshop held in Washington, D.C., 18-19 Sep 1980
(PB82-173402; NSF/PRA-81021) Avail: NTIS HC A10/MF A01 CSCL 13A

Active solar heating and cooling technology and prospects for commercial applications is assessed. Decision factors affecting commercialization emphasize land use controls and solar access issues; barriers and conditions which appear to retard commercial viability and social technology; government intervention to accelerate implementation; criteria to allocate resources among alternate incentive programs, analysis of solar incentives, and frustrations, concerns, and insights of a pioneer in solar technology GRA

N82-32882# Hawaii Univ., Honolulu Hawaii Natural Energy Inst
OCEAN THERMAL ENERGY CONVERSION: A REVIEW
P. C. YUEN Oct. 1981 178 p refs
(DE82-901167; HNEI-81-03) Avail: NTIS HC A09/MF A01

The OTEC principle along with general system and cycle, types, specific OTEC designs, OTEC applications, and the ocean thermal resource are discussed. The historic development of OTEC is reviewed, and the status of French, Japanese, EUROCEAN, and US programs is assessed Power system components of the more technically advanced closed cycle OTEC concept are examined These include: heat exchangers, corrosion and biofouling countermeasures, working fluids, ammonia power systems, and on platform seawater systems Several open cycle features are also discussed. The ocean engineering aspects of OTEC power systems are reviewed. Major subsystems such as platform, cold water pipe, mooring system, dynamic positioning system, power transmission cable system are assessed for their relationships with the ocean environment and with each other. Possible environmental and social effects of OTEC development are discussed DOE

N82-33215# National Science Foundation, Washington, D.C. Div. of Policy Research and Analysis.
MOBILIZATION OF THE PRIVATE SECTOR IN EFFECTIVE DEVELOPMENT OF FUSION ENERGY: PAPERS FOR AND A SUMMARY OF A WORKSHOP
1981 104 p Workshop held in Washington, D.C., 29-30 Sep. 1980
(PB82-173469, NSF/PRA-81023) Avail: NTIS HC A06/MF A01 CSCL 18A

Four papers and a summary of a workshop on the mobilization of the private sector in developing fusion energy is reported. The workshop is one of a series which assesses Federal policy options relating to the commercialization of selected energy technologies viewed as alternatives to petroleum-derived fuels The papers focused on the potential roles to be played by fusion energy in the future electric generating industry; current commitments and participation of the private sector in fusion energy development; suggestions for policy incentives to enhance private participation in fusion research, organization, staffing, and operating a center for fusion engineering; the industrial structure and practices in developing and deploying power generating facilities and their implications in relation to fusion energy development, and characteristics required by any new energy-producing technology such as low capital and operating costs and minimal environmental output. Author

N82-33727# Shock and Vibration Information Center (Defense), Washington, D. C.
THE SHOCK AND VIBRATION DIGEST, VOLUME 13, NO. 10 Monthly Report
J NAGLE-ESHLEMAN, ed. Dec. 1980 117 p refs
(AD-A106486) Avail: SVIC, Code 5804, Naval Research Lab., Washington, D.C 20375 CSCL 20K

Recent progress in the dynamic plastic behavior of structure is reviewed. Plate vibration research between 1976 and 1980 is summarized

N82-33728# Liverpool Univ (England). Dept of Mechanical Engineering.
RECENT PROGRESS IN THE DYNAMIC PLASTIC BEHAVIOR OF STRUCTURES, PART 3
N. JONES *In* Shock and Vibration Inform. Center The Shock and Vibration Digest, Vol. 13, No. 10 p 3-16 Dec. 1980 refs
Avail: SVIC, Code 5804, Naval Research Lab., Washington, D.C. 20375 CSCL 20K

The literature on the dynamic plastic response of structures published since 1978 is surveyed The review focuses on the behavior of such simple structural components as beams, plates, and shells subjected to large dynamic loads that cause extensive plastic flow of the material. Author

N82-33845# Institute of Public Administration, Washington, D C.
AN ASSESSMENT OF THE FIELD STATUS OF ACTIVE SOLAR SYSTEMS
Feb. 1982 87 p
(Contract DE-AC03-80SF-11485)
(DE82-011939, DOE/SF-11485/1) Avail: NTIS HC A05/MF A01

Findings and recommendations by experts from basic data gathered through first hand interviews with over 150 solar industry people in various parts of the country are assessed. Domestic hot water systems are emphasized. The following topics are included: industry description, product problems and marketing. DOE 1

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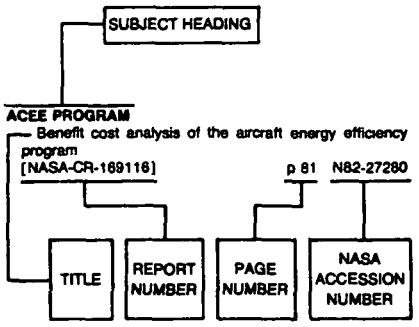

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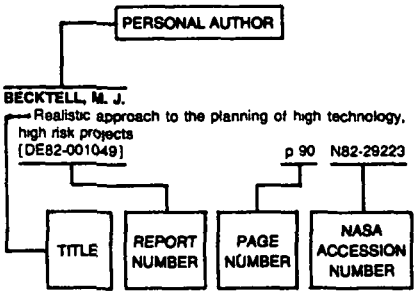

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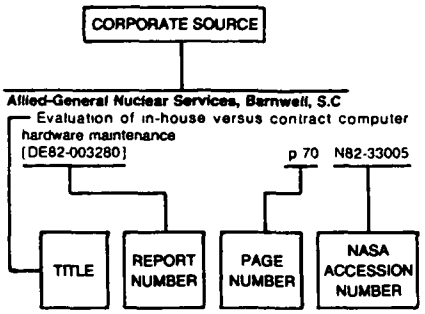

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Abt/West, Denver, Colo.
Visibility benefits assessment guidebook
[PB82-126129] p 80 N82-23820

Acurex Corp., Mountain View, Calif.
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[PB81-222283] p 119 N82-10281

Admiralty Marine Technology Establishment, Teddington (England).
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Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).
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Aerospace Corp., Los Angeles, Calif.
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Air Force Academy, Colo.
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Air Force Geophysics Lab., Hanscom AFB, Mass.
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Air Force Human Resources Lab., Brooks AFB, Tex.
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Air Force Systems Command, Andrews AFB, Md.
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AiResearch Mfg. Co., Torrance, Calif.
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Aktiebolaget Ergonomilaboratoriet, Stockholm (Sweden).
Ergonomic considerations in product design and evaluation p 88 N82-19842

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Allied-General Nuclear Services, Barnwell, S.C.
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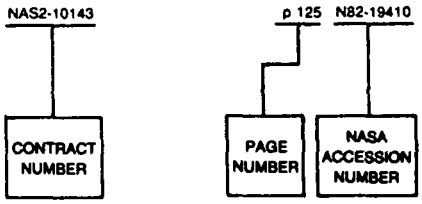

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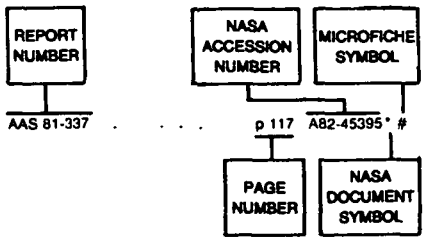

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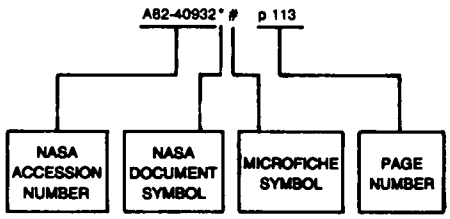

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