NASA SP-7078

Working with People to Improve
PRODUCTIVITY AND QUALITY

A BIBLIOGRAPHY
WITH INDEXES
1984-1988

A selection of annotated references to reports and journal articles entered into the NASA scientific and technical information system from 1984 through 1988.

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Office of Management
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FOREWORD

The joint efforts of government and industry contribute fundamentally to realizing national quality and productivity objectives—people working together to assure superior products and services in the competitive world. Successful teamwork is crucial to this effort. Sharing quality and productivity information is a key to achieving excellence through teamwork for NASA and its contractors.

High-level managers can stimulate change in an organization. They are most effective when they share their thoughts and perceptions with other team members, thus arriving at a consensus on the actions to increase the quality of goods and services and the productivity of the work force.

How do you develop quality measures that are not subjective descriptions of quality? This bibliography is an attempt to help answer that question. Entries are drawn from the literature entered into the NASA scientific and technical information database 1984-1988. It is hoped that managers will be able to follow up on leads they find here, to improve their management of human resources and thus the processes and services of federal agencies and their contractors.

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TYPICAL REPORT CITATION AND ABSTRACT

NASA SPONSORED

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ACCESSION NUMBER → **N87-16869*#** Lockheed Missiles and Space Co., Sunnyvale, CA. ← CORPORATE SOURCE

TITLE → **SPACE STATION HUMAN PRODUCTIVITY STUDY, VOLUME 1 Final Report**

PUBLICATION DATE → Nov. 1985 71 p

(Contract NAS9-17272)

REPORT NUMBERS → (NASA-CR-171961; NAS 1.26:171961; LMSC-F060784/1-VOL-1)

AVAILABILITY SOURCE → Avail: NTIS HC A04/MF A01 CSCL 22/2 ← COSATI CODE

The primary goal was to develop design and operations requirements for direct support of intra-vehicular activity (IVA) crew performance and productivity. It was recognized that much work had already been accomplished which provided sufficient data for the definition of the desired requirements. It was necessary, therefore, to assess the status of such data to extract definable requirements, and then to define the remaining study needs. The explicit objectives of the study were to: review existing data to identify potential problems of space station crew productivity and to define requirements for support of productivity insofar as they could be justified by current information; identify those areas that lack adequate data; and prepare plans for managing studies to develop the lacking data, so that results can be input to the space station program in a timely manner. Author

TYPICAL JOURNAL ARTICLE CITATION AND ABSTRACT

ACCESSION NUMBER → **A84-39712**

TITLE → **AN ANALYSIS OF CREW CO-ORDINATION PROBLEMS IN COMMERCIAL TRANSPORT AIRCRAFT**

AUTHOR → J. L. WHEALE (RAF, Institute of Aviation Medicine, Farnborough, Hants., England) International Journal of Aviation Safety (ISSN 0264-6803), vol. 2, June 1984, p. 83-89. refs

PUBLICATION DATE

JOURNAL TITLE

This report describes a survey of co-ordination problems and attitudes amongst a sample of 250 commercial airline pilots. The results indicate that co-ordination problems are most likely when workload is high. Deviation from standard operating procedures was also identified by the pilots as a major source of co-ordination problems. Disputes on the flight deck were more likely if one crew member had an interaction style that was difficult to cope with, or was deviating from normal role behavior, or held attitudes about the operation of the aircraft that differed significantly from other crew members. The data indicate that social psychological factors can have a strong influence on co-ordination behavior and the variables which influence teamwork are discussed. Author

PRODUCTIVITY AND QUALITY 1984-1988

A Bibliography with Indexes

OCTOBER 1989

THE NATIONAL QUALITY AND PRODUCTIVITY IMPROVEMENT PROGRAM

A85-17781
QUALITY CIRCLES - SQUARE DEAL FOR PRODUCTIVITY
B. HUNT (General Dynamics Corp., Pomona, CA) Engineering Management International (ISSN 0167-5419), vol. 2, July 1984, p. 271-278. refs

It is pointed out that the United States productivity growth is at an all time low, trailing several industrial nations, particularly Japan. Fullmer (1981) has stated that a failure to tap the tremendous amount of personal energy available in the U.S. has contributed to a declining position. He claims that only 10 percent of the individual potential is used. The investigation of avenues related to an optimization of human creative effort is an important aspect of the productivity formula. One avenue, 'quality circles', has already been used successfully in Japan. The present investigation is concerned with questions regarding a successful application of this concept in the U.S., taking into account a study conducted by an American aerospace company. The study included a six-month pilot program. It was found that 'quality circles' are an effective means to productivity improvement which taps that other 90 percent of human potential which, according to Fullmer, is still available. G.R.

A85-43201#
HURDLES STIFLING THE FEDERAL MANAGER'S ABILITY TO IMPROVE PRODUCTIVITY
A. TRIPLETT (Office of Management and Budget, Washington, DC) IN: White-collar productivity and quality issues; Proceedings of the Symposium on Productivity and Quality: Strategies for Improving Operations in Government and Industry, Washington, DC, September 25, 26, 1984. New York, AIAA, 1985, p. 161-164.

A85-43202#
PRODUCTIVITY INITIATIVES AT USDA
J. J. FRANKE, JR. (U.S. Department of Agriculture, Washington, DC) IN: White-collar productivity and quality issues; Proceedings of the Symposium on Productivity and Quality: Strategies for Improving Operations in Government and Industry, Washington, DC, September 25, 26, 1984. New York, AIAA, 1985, p. 165-168.

A86-34979* National Aeronautics and Space Administration, Washington, DC.
PRODUCTIVITY IMPROVEMENT AND QUALITY ENHANCEMENT AT NASA
D. R. BRAUNSTEIN (NASA, Washington, DC) IN: Space and society - Progress and promise; Proceedings of the Twenty-second Space Congress, Cocoa Beach, FL, April 23-26, 1985. Cape Canaveral, FL, Canaveral Council of Technical Societies, 1985, p. 9-1 to 9-6.

NASA's Productivity Improvement and Quality Enhancement (PIQE) effort has as its objectives the encouragement of greater employee participation in management decision-making and the identification of impediments as well as opportunities for high productivity. Attempts are also made to try out novel management practices, and to evolve productivity trend analysis techniques. Every effort is made to note, reward, and diffuse successfully instituted PIQE approaches throughout the NASA-contractor organization. O.C.

A86-34982
TRW'S PRODUCTIVITY PROGRAM
E. A. STEIGERWALD (TRW, Inc., Cleveland, OH) IN: Space and society - Progress and promise; Proceedings of the Twenty-second Space Congress, Cocoa Beach, FL, April 23-26, 1985. Cape Canaveral, FL, Canaveral Council of Technical Societies, 1985, p. 9-14 to 9-25.

The generic TRW productivity program is described with specific reference to the efforts and results in the operating units that deal with space technology. The ten key elements of the program are discussed: top management involvement, organization, definition of productivity, training, information resources, communications, employee participation, measurements, goal setting and program evaluation. Along with the overall approach to promoting productivity, particular projects that have been successful in the TRW Space Technology Group are described in some detail to illustrate the applicability of accepted productivity tools. Author

A87-45976
A TIME OF TESTING FOR THE SHUTTLE
SUE BUTLER HANNIFIN Space World (ISSN 0038-6332), vol. X-6-282, June 1987, p. 11-15.

Ongoing NASA efforts to redesign the Space Shuttle solid rocket boosters (SRBs) and resume launch operations after the loss of the Challenger are examined critically. Economic and political factors limiting the range of choices open to project managers are stressed; the reasons for delays in the testing program are discussed; and it is argued that the SRB R&D effort may have to be started over if the joint modifications proposed so far should prove to be inadequate. Also included is a brief history of solid propulsion, with a focus on the advantages and disadvantages of solid rocket motors for manned space missions. T.K.

A87-49647* American Inst. of Aeronautics and Astronautics, New York, NY.
STRATEGIES FOR REVITALIZING ORGANIZATIONS; PROCEEDINGS OF THE SECOND NASA SYMPOSIUM ON QUALITY AND PRODUCTIVITY, WASHINGTON, DC, DEC. 2, 3, 1986
MIREILLE GERARD, ED. and PAMELA W. EDWARDS, ED. (AIAA, New York) Symposium sponsored by NASA,. New York, American Institute of Aeronautics and Astronautics, 1987, 275 p. No individual items are abstracted in this volume.
(Contract NASW-4096)

Attention is given to topics concerning managerial improvement of the American economy's goods and services through enhanced workforce productivity. The broad topic of entrepreneurialism in management organizations was addressed with a view to its effect on innovation in large corporations, and methods for measuring and sharing productivity increases were treated with respect to white collar productivity. Also discussed are participative management techniques and their implementation, and worker involvement in the enhancement of product quality. O.C.

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

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

N84-11048# Department of Defense, Washington, DC.
BOTTOM LINE ACADEMIA CONFERENCE Final Report
24 Jun. 1983 105 p Conf. held at Washington, D.C., 28 Apr. 1983
(AD-A131043) Avail: NTIS HC A06/MF A01 CSCL 05/1

Initatives which the academic community could take to meet industry and DoD needs for the improved application and management of the quality functions are explored. The necessity of improving the image of quality in industry for both competitive and economic reasons, thus assuring the readiness of defense forces is highlighted. The role academia could play in restructuring curricula include more quality management courses in preparing future industrial leaders are discussed as being the possible catalyst in returning America to the forefront in quality. J.M.S.

N84-12510# Hanford Engineering Development Lab., Richland, WA.
QUALITY IS NOT A DIRTY WORD
V. A. COSTON 1983 6 p Presented at the Am. Soc. for Quality Control Conf., Richland, Wash., 17-19 Apr. 1983
(Contract DE-AC06-76FF-02170)
(DE83-012166; HEDL-SA-2890-FP; CONF-830475-2) Avail: NTIS HC A02/MF A01

There is a great deal of emphasis today on management's commitment to quality. Yet with all the hue and cry about this commitment do we find much more happening than just lip service. Are quality professionals aiding and abetting the nonacceptance of quality organizations, resulting in their exclusion from the management. Quality professionals must recognize they cannot divorce themselves from cost and schedule. They must recognize they are not policemen with omnipotent authority. Self-recognition must occur and be acted upon for changes in attitudes and opinions of others to be affected. There are, of course, other factors involved. But in searching for the root cause of the problem, does the evidence of those other factors again point back to the Quality professionals. Quality is not a dirty word. We must convince ourselves before we can convince others. DOE

N84-21404*# National Aeronautics and Space Administration, Washington, DC.
NASA'S EMERGING PRODUCTIVITY PROGRAM
D. R. BRAUNSTEIN *In its* NASA Admin. Data Base Management Systems, 1983 p 1-8 Apr. 1984
Avail: NTIS HC A08/MF A01 CSCL 05/2

The goals, membership, and organizational structure of the NASA Productivity Steering Committee are described as well as steps taken to make NASA a leader in the development and application of productivity and quality concepts at every level of agency management. The overall strategy for the Productivity Improvement and Quality Enhancement (PIQE) Program is through employee involvement, both civil servant and contractor, in all phases of agency-wide activity. Elements of the PIQE program and initial thrusts are examined. A.R.H.

N84-21415*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.
NASA-WIDE STANDARD ADMINISTRATIVE SYSTEMS
P. SCHNECK *In* NASA. Goddard Space Flight Center NASA Admin. Data Base Management Systems, 1983 p 145-152 Apr. 1984
Avail: NTIS HC A08/MF A01 CSCL 05/2

Factors to be considered in developing agency-wide standard administrative systems for NASA include uniformity of hardware and software; centralization vs. decentralization; risk exposure; and models for software development. A.R.H.

N84-24490# Army Research Inst. for the Behavioral and Social Sciences, Alexandria, VA.
AN OVERVIEW OF PRODUCTIVITY IMPROVEMENT EFFORTS IN ARMY ORGANIZATIONS
L. W. OLIVER and P. V. RIJN Feb. 1984 26 p
(Contract DA PROJ. 2Q2-63743-A-794)
(AD-A138589; ARI-RN-84-55) Avail: NTIS HC A03/MF A01 CSCL 05/1

This paper presents an overview of the types of productivity improvement efforts being conducted in the Army. The activities of the formal Army programs, which are associated with comptroller offices, typically reflect the traditional industrial engineer approach stressing efficiency with relatively little emphasis on behavioral science concerns. An exception is the Productivity Enhancement, Measurement and Evaluation (EEMI) program which includes projects such as quality circles that are based on behavioral science principles and techniques. The activities of the Army's Organizational Effectiveness (OE) program do not usually make productivity improvement their principal focus, although productivity indicators may be used to evaluate OE operations. Examples are presented of Army productivity improvement projects based on behavioral science approaches. These include gainsharing, quality circles, and organizational interventions founded on sociotechnical systems theory. Problems encountered in the measurement of productivity are discussed, and a pilot study to develop and test measures of scientist/engineer productivity is also described. GRA

N85-16665*# National Aeronautics and Space Administration, Washington, DC.
THE MANAGEMENT OF RESEARCH INSTITUTIONS: A LOOK AT GOVERNMENT LABORATORIES
H. MARK and A. LEVINE 1984 311 p refs
(NASA-SP-481; NAS 1.21:481) Avail: NTIS MF A01; SOD HC $9.00 as SN-033-000-00937-2 CSCL 05/1

Technology development; project management; employment patterns; research productivity; legal status of support services; functions of senior executives; the role of the sponsoring agency; research diversification; obstacles to technical innovation; organizational structures; and personnel management are addressed. B.G.

N86-15157*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.
R AND D PRODUCTIVITY: NEW CHALLENGES FOR THE US SPACE PROGRAM
O. W. BASKIN, ed. (Houston Univ., Clear Lake) and L. J. SULLIVAN, ed. 1985 596 p refs Conference held in Houston, Tex., 10-11 Sep. 1985; sponsored in cooperation with NASA. Johnson Space Center, Houston Univ., AIAA, and the American Productivity Center
(NASA-TM-87520; NAS 1.15:87520) Avail: NTIS HC A25/MF A01 CSCL 05/1

Various topics related to research and development activities applicable to their U.S. space program are discussed. Project management, automatic control technology, human resources, management information systems, computer aided design, systems engineering, and personnel management were among the topics covered.

N86-15159*# Air Force Systems Command, Andrews AFB, MD.
THE USAF SYSTEMS COMMAND AND R AND D PRODUCTIVITY
V. LUCHAINGER *In* NASA. Johnson (Lyndon B.) Space Center

R and D Productivity: New Challenges for the US Space Program p 10-17 1985
Avail: NTIS HC A25/MF A01 CSCL 05/1

The United States Air Force Systems Command (AFSC) is charged with the development and acquisition of aerospace technology systems. Much of that activity is concerned with space systems development, acquisition, and operations. Heavy emphasis is being placed on productivity in organizational and process functions which will keep aerospace systems on the leading edge of technology, with plans extending capability into the future. The productivity emphasis ranges from people-oriented activities to resource and technological functions which support national aerospace objectives. The AFSC space-related missions is discussed as a special area of productivity efforts. Author

N86-15176*# McDonnell-Douglas Astronautics Co., Houston, TX.
A PERFORMANCE MEASUREMENT SYSTEM FOR ENGINEERING SERVICES
R. L. WEST *In* NASA. Johnson (Lyndon B.) Space Center R and D Productivity: New Challenges for the US Space Program p 213-219 1985 refs
Avail: NTIS HC A25/MF A01 CSCL 05/1

A performance measurement system which provides both a means of monitoring performance and a resource to support management decision making is described. The process of performance indicator development is discussed and typical indicators are described. The paper concludes with a summary of some of the lessons learned in applying productivity measurements to engineering services tasks and in automating data collection, evaluation and interpretation. B.W.

N86-15183*# Arizona State Univ., Tempe. School of Public Affairs.
INFORMATION FLOW AND WORK PRODUCTIVITY THROUGH INTEGRATED INFORMATION TECHNOLOGY
R. T. WIGAND *In* NASA. Johnson (Lyndon B.) R and D Productivity: New Challenges for the US Space Program p 289-309 1985 refs
Avail: NTIS HC A25/MF A01 CSCL 05/2

The work environment surrounding integrated office systems is reviewed. The known effects of automated office technologies is synthesized and their known impact on work efficiency is reviewed. These effects are explored with regard to their impact on networks, work flow/processes, as well as organizational structure and power. Particular emphasis is given to structural changes due to the introduction of newer information technologies in organizations. The new information technologies have restructed the average organization's middle banks and, as a consequence, they have shrunk drastically. Organizational pyramids have flattened with fewer levels since executives have realized that they can get ahold of the needed information via the new technologies quicker and directly and do not have to rely on middle-level managers. Power shifts are typically accompanied with the introduction of these technologies resulting in the generation of a new form of organizational power. B.W.

N86-15184*# Hughes Aircraft Co., Los Angeles, CA.
TRAINING MANAGERS FOR HIGH PRODUCTIVITY: GUIDELINES AND A CASE HISTORY
R. M. RANFTL *In* NASA. Johnson (Lyndon B.) Space Center R and D Productivity: New Challenges for the US Space Program p 310-323 1985
Avail: NTIS HC A25/MF A01 CSCL 05/1

Hughes Aircrafts 13-year productivity study clearly identifies management as the key link in the entire productivity chain. This fact led to the establishment of a long-term series of seminars on personal, managerial, organizational, and operational productivity for all levels and sectors of line and staff management. To inspire the work force to higher levels of productivity and creativity management, itself, must first be inspired. In turn they have to clearly understand the productive and creative processes, fashion an effective productivity improvement plan with sound strategy and implementation, create an optimal environmental chemistry, and provide the outstanding leadership necessary to propel their organizations to achieve full potential. The primary goals of the seminars are to (1) ignite that spark of inspiration, enabling productive action to follow, (2) provide participants a credible roadmap and effective tools for implementation, and (3) develop a dedicated commitment to leadership and productivity throughout the management team. Author

N86-15188*# San Jose State Univ., CA. Dept. of Organization and Management.
THE SPACE STATION AND HUMAN PRODUCTIVITY: AN AGENDA FOR RESEARCH
C. B. SCHOONHOVEN *In* NASA. Johnson (Lyndon B.) Space Center R and D Productivity: New Challenges for the US Space Program p 352-367 1985 refs
Avail: NTIS HC A25/MF A01 CSCL 05/1

Organizational problems in permanent organizations in outer space were analyzed. The environment of space provides substantial opportunities for organizational research. Questions about how to organize professional workers in a technologically complex setting with novel dangers and uncertainties present in the immediate environment are examined. It is suggested that knowledge from organization theory/behavior is an underutilized resource in the U.S. space program. A U.S. space station will be operable by the mid-1990's. Organizational issues will take on increasing importance, because a space station requires the long term organization of human and robotic work in the isolated and confined environment of outer space. When an organizational analysis of the space station is undertaken, there are research implications at multiple levels of analysis: for the individual, small group, organizational, and environmental levels of analysis. The research relevant to organization theory and behavior is reviewed. E.A.K.

N86-15194*# McDonnell-Douglas Technical Services Co., Inc., Houston, TX.
STREAMLINING: REDUCING COSTS AND INCREASING STS OPERATIONS EFFECTIVENESS
R. K. PETERSBURG *In* NASA. Johnson (Lyndon B.) Space Center R and D Productivity: New Challenges for the US Space Program p 415-424 1985
Avail: NTIS HC A25/MF A01 CSCL 05/1

The development of streamlining as a concept, its inclusion in the space transportation system engineering and operations support (STSEOS) contract, and how it serves as an incentive to management and technical support personnel is discussed. The mechanics of encouraging and processing streamlining suggestions, reviews, feedback to submitters, recognition, and how individual employee performance evaluations are used to motivation are discussed. Several items that were implemented are mentioned. Information reported and the methodology of determining estimated dollar savings are outlined. The overall effect of this activity on the ability of the McDonnell Douglas flight preparation and mission operations team to support a rapidly increasing flight rate without a proportional increase in cost is illustrated. E.A.K.

N86-15195*# McDonnell-Douglas Technical Services Co., Inc., Houston, TX.
ACTIONS FOR PRODUCTIVITY IMPROVEMENT IN CREW TRAINING
G. E. MILLER *In* NASA. Johnson (Lyndon B.) Space Center R and D Productivity: New Challenges for the US Space Program p 425-436 1985
Avail: NTIS HC A25/MF A01 CSCL 05/1

Improvement of the productivity of astronaut crew instructors in the Space Shuttle program and beyond is proposed. It is suggested that instructor certification plans should be established to shorten the time required for trainers to develop their skills and improve their ability to convey those skills. Members of the training cadre should be thoroughly cross trained in their task. This provides better understanding of the overall task and greater flexibility in instructor utilization. Improved facility access will give instructors the benefit of practical application experience. Former crews should be integrated into the training of upcoming crews to bridge some of the gap between simulated conditions and the real world. The information contained in lengthy and complex training manuals can be presented more clearly and efficiently as computer lessons. The illustration, animation and interactive capabilities of the computer combine an effective means of explanation. E.A.K.

N86-15198*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.
PRODUCTIVITY INCREASE THROUGH IMPLEMENTATION OF CAD/CAE WORKSTATION
L. K. BROMLEY *In its* R and D Productivity: New Challenges for the US Space Program p 461-473 1985
Avail: NTIS HC A25/MF A01 CSCL 05/1
The tracking and communication division computer aided design/computer aided engineering system is now operational. The system is utilized in an effort to automate certain tasks that were previously performed manually. These tasks include detailed test configuration diagrams of systems under certification test in the ESTL, floorplan layouts of future planned laboratory reconfigurations, and other graphical documentation of division activities. The significant time savings achieved with this CAD/CAE system are examined: (1) input of drawings and diagrams; (2) editing of initial drawings; (3) accessibility of the data; and (4) added versatility. It is shown that the Applicon CAD/CAE system, with its ease of input and editing, the accessibility of data, and its added versatility, has made more efficient many of the necessary but often time-consuming tasks associated with engineering design and testing. E.A.K.

N86-15199*# Honeywell, Inc., Clearwater, FL.
R AND D PRODUCTIVITY IMPROVEMENT AT HONEYWELL: A CASE STUDY
W. E. LYONS *In* NASA. Johnson (Lyndon B.) Space Center R and D Productivity: New Challenges for the US Space Program p 474-480 1985
Avail: NTIS HC A25/MF A01 CSCL 05/1
The problems encountered when computer-aided-design/documentation was applied to a large design program at Honeywell; how a study team was established to solve the problem; the techniques used by the team and the resulting solutions are described. The techniques used in this instance may be applied to other problem areas in the R&D process to improve productivity. E.A.K.

N86-15202*# Lockheed Engineering and Management Services Co., Inc., Houston, TX.
PRODUCTIVITY ENHANCEMENT PLANNING USING PARTICIPATIVE MANAGEMENT CONCEPTS
M. E. WHITE and J. C. KUKLA *In* NASA. Johnson (Lyndon B.) Space Center R and D Productivity: New Challenges for the US Space Program p 495-505 1985
Avail: NTIS HC A25/MF A01 CSCL 05/1
A productivity enhancement project which used participative management for both planning and implementation is described. The process and results associated with using participative management to plan and implement a computer terminal upgrade project where the computer terminals are used by research and development (R&D) personnel are reported. The upgrade improved the productivity of R&D personnel substantially, and their commitment of the implementation is high. Successful utilization of participative management for this project has laid a foundation for continued style shift toward participation within the organization. E.A.K.

N86-21419*# American Productivity Center, Houston, TX.
WHITE COLLAR PRODUCTIVITY IMPROVEMENT: SPONSORED ACTION RESEARCH 1983 - 1985
1985 41 p Presented at the National Conference on White Collar Productivity Improvement, Dallas, 30-31 Oct. 1985; sponsored by Dun and Bradstreet Corp., General Dynamics Corp., McDonnell Douglas Corp., Northern Telecom Ltd., Westinghouse Furniture Systems, and the US Dept. of Labor Sponsored in part by Armco., Inc., Atlantic Richfield Co., Johnson and Johnson Motorola, Inc., Ortho Pharmaceutical Corp., Rockwell International Corp., TRW, Inc., and Warner-Lambert Co.
(Contract NASW-3834)
(NASA-CR-176366; NAS 1.26:176366) Avail: NTIS HC A03/MF A01 CSCL 05/1
A program developed by the American Productivity Center to boost white collar worker effectiveness is described. This program is the culmination of a two-year sponsored action research project, White Collar Productivity Improvement. Traditional attempts aimed at cutting costs or staffing levels, often alienating workers at the outset. They typically focused on increased efficiencies in individual activities or specific procedures, such as paperwork processing. In contrast, the Center's approach to white collar productivity focuses on the effectiveness of actual outputs, typically professional services. These typically consist of both tangible products, such as a financial report or research study, and intangibles, such as the expertise, advice or guidance that accompanies the product. Eight general observations about white collar productivity improvement are summarized. B.W.

N87-12909# Committee on Science and Technology (U.S. House).
NASA'S QUALITY ASSURANCE PROGRAM
1986 163 p Hearing before the Subcommittee on Space Science and Applications of the Committee on Science and Technology, 99th Congress, 2d Session, No. 126, 21 May 1986
(GPO-63-142) Avail: Subcommittee on Space Science and Applications
The number of quality assurance personnel have declined dramatically since the Apollo Program. The facts and implications of the decline were examined. A system of checks and balances to accomplish quality control were also discussed. A panel of well-known experts described how an ideal quality assurance program should work. B.G.

N87-12912# Naval Personnel Research and Development Center, San Diego, CA. Human Factors and Organizational Systems Lab.
QUALITY MANAGEMENT: AN ANNOTATED BIBLIOGRAPHY
M. MONDA, P. J. THRAPP, and E. L. GOLDBERG Jun. 1986 92 p
(AD-A169816; HFOSL-TN-72-86-07) Avail: NTIS HC A05/MF A01 CSCL 05/1
As America strives to compete in the international marketplace, many U.S. businesses have adopted a new way of managing and measuring quality and productivity. The quality management methods focus on the systematic measurement and control of work processes. Successful quality management programs are credited with increases in profit, reduction of waste, and improved management-worker relations. This annotated bibliography is oriented toward those persons who are new to or only recently acquainted with the concept of quality management. The main body of journal articles, books, videotapes, and magazines selected from academia and industry focus on the introduction of the concepts, the terminology, and the personalities associated with the quality management movement. Citations include information about the author, date, title, and source, as well as a set of terms that summarize the key concepts of the citation and a brief abstract. Several articles are identified and recommended as an orientation to the field of total quality management. GRA

N87-16653*# National Aeronautics and Space Administration, Washington, DC.
SUMMARY OF STRATEGIES FOR PLANNING PRODUCTIVITY IMPROVEMENT AND QUALITY ENHANCEMENT (PIQE)
Apr. 1986 40 p
(NASA-TM-89310; NAS 1.15:89310; PB87-103743) Avail: NTIS HC A03/MF A01 CSCL 05/1
The Summary of NASA Strategies for Productivity Improvement and Quality Enhancement respond to NASA's eighth top goal: Establish NASA as a leader in the development and application of advanced technology and management practices which

contribute to significant increases in both Agency and national productivity. The Strategies provide the framework for development of the agency-wide Productivity Improvement and Quality Enhancement (PIQE) Plans. GRA

N87-16865*# Lockheed Missiles and Space Co., Sunnyvale, CA.
SPACE STATION HUMAN PRODUCTIVITY STUDY. VOLUME 4: ISSUES Final Report
Nov. 1985 178 p
(Contract NAS9-17272)
(NASA-CR-171963; NAS 1.26:171963; LMSC-F060784/4-VOL-4; DR-SE-1093T-VOL-4) Avail: NTIS HC A09/MF A01 CSCL 22/2

The 305 Issues contained represent topics recommended for study in order to develop requirements in support of space station crew performance/productivity. The overall subject matter, space station elements affecting crew productivity, was organized into a coded subelement listing, which is included for the reader's reference. Each issue is numbered according to the 5-digit topical coding scheme. The requirements column on each Issue page shows a cross-reference to the unresolved requirement statement(s). Because topical overlaps were frequently encountered, many initial issues were consolidated. Apparent gaps, therefore, may be accounted for by an Issue described within a related subelement. A glossary of abbreviations used throughout the study documentation is also included. Author

N87-16866*# Lockheed Missiles and Space Co., Sunnyvale, CA.
SPACE STATION HUMAN PRODUCTIVITY STUDY. VOLUME 5: MANAGEMENT PLANS Final Report
Nov. 1985 517 p
(Contract NAS9-17272)
(NASA-CR-171964; NAS 1.26:171964; LMSC-F060784/5-VOL-5; DR-SE-1093T-VOL-5) Avail: NTIS HC A22/MF A01 CSCL 22/2

The 67 Management Plans represent recommended study approaches for resolving 108 of the 305 Issues which were identified. Each study Management Plan is prepared in three formats: Management Plan Overview (lists the subsumed Issues, study background, and related overview information); Study Plan (details the study approach by tasks, lists special needs, and describes expected study products); Schedule-Task Flow (provides a time-lined schedule for the study tasks and resource requirements). The Management Relationships Matrix, included in this volume, shows the data input-output relationships among all recommended studies. A listing is also included which cross-references the unresolved requirements to Issues to management plans. A glossary of all abbreviations utilized is provided. Author

N87-16868*# Lockheed Missiles and Space Co., Sunnyvale, CA.
SPACE STATION HUMAN PRODUCTIVITY STUDY. VOLUME 2: EXECUTIVE SUMMARY AND ORAL REVIEW PRESENTATION Final Report
Nov. 1985 81 p
(Contract NAS9-17272)
(NASA-CR-171962; NAS 1.26:171962; LMSC-F060784/2-VOL-2; DR-SE-1093T-VOL-2) Avail: NTIS HC A05/MF A01 CSCL 22/2

Definition of design/operations requirements for support of human productivity, identification of problem areas lacking data for requirements definition, generation of management plans for conduct of studies to acquire needed data for timely space station program impact, and correlation of all issue study management plans with space station progam milestone need dates were addressed. B.G.

N87-16869*# Lockheed Missiles and Space Co., Sunnyvale, CA.
SPACE STATION HUMAN PRODUCTIVITY STUDY, VOLUME 1 Final Report
Nov. 1985 71 p
(Contract NAS9-17272)
(NASA-CR-171961; NAS 1.26:171961; LMSC-F060784/1-VOL-1) Avail: NTIS HC A04/MF A01 CSCL 22/2

The primary goal was to develop design and operations requirements for direct support of intra-vehicular activity (IVA) crew performance and productivity. It was recognized that much work had already been accomplished which provided sufficient data for the definition of the desired requirements. It was necessary, therefore, to assess the status of such data to extract definable requirements, and then to define the remaining study needs. The explicit objectives of the study were to: review existing data to identify potential problems of space station crew productivity and to define requirements for support of productivity insofar as they could be justified by current information; identify those areas that lack adequate data; and prepare plans for managing studies to develop the lacking data, so that results can be input to the space station program in a timely manner. Author

N88-20202*# National Academy of Engineering, Washington, DC. Committee on Shuttle Criticality Review and Hazard Analysis Audit.
POST-CHALLENGER EVALUATION OF SPACE SHUTTLE RISK ASSESSMENT AND MANAGEMENT
Jan. 1988 150 p
(Contract NASW-4003)
(NASA-CR-182461; NAS 1.26:182461; PB88-190624) Avail: NTIS HC A07/MF A01 CSCL 05/1

As the shock of the Space Shuttle Challenger accident began to subside, NASA initiated a wide range of actions designed to ensure greater safety in various aspects of the Shuttle system and an improved focus on safety throughout the National Space Transportation System (NSTS) Program. Certain specific features of the NASA safety process are examined: the Critical Items List (CIL) and the NASA review of the Shuttle primary and backup units whose failure might result in the loss of life, the Shuttle vehicle, or the mission; the failure modes and effects analyses (FMEA); and the hazard analysis and their review. The conception of modern risk management, including the essential element of objective risk assessment is described and it is contrasted with NASA's safety process in general terms. The discussion, findings, and recommendations regarding particular aspects of the NASA STS safety assurance process are reported. The 11 subsections each deal with a different aspect of the process. The main lessons learned by SCRHAAC in the course of the audit are summarized. B.G.

PEOPLE AND PRODUCTIVITY: EXCELLENCE AS A GOAL

A84-14304
AUGUSTINE'S LAWS AND MAJOR SYSTEM DEVELOPMENT PROGRAMS
N. R. AUGUSTINE New York, American Institute of Aeronautics and Astronautics, 1982, 222 p.

A series of rubrics gleaned from historical, popular, and literary sources elucidate burdensome or pointless practices which impinge on the ability of humans in organized activities to produce new works. The emphasis is placed on projects most familiar to the authors experience, those concerned with the DoD. Acerbic comments draw attention to an uncontrolled growth of paperwork necessary to initiate a project, contract awarding processes that neglect consideration of past performances, and the failure of awarding agencies to penalize performance failures that lead to cost overruns. Criticism is also leveled on cost estimates from insufficient data, communications heavily laced with acronyms unintelligible to the uninitiated, and trends in Congresional defense budget approvals which indicate that a more political than pragmatic process rules. The ineffectiveness of waiting to begin a project until slight, anticipated advances occur is examined, as are communication-inhibiting authority hierarchies, and the trust given to total pervasivness of electronic devices. The impacts of scheduling and rescheduling are investigated, together with acceptance of a low bid made by parties not capable of delivering. It is concluded that the quality of the managers of an enterprise will often determine its success, provided enough discipline is applied to carry through original program goals and yet make necessary minimal changes. M.S.K.

A84-15597

R&D AND QUALITY ASSURANCE PARTNERSHIP

H. J. KOHOUTEK (Hewlett-Packard Co., Fort Collins Systems Div., Fort Collins, CO) IEEE Transactions on Engineering Management (ISSN 0018-9391), vol. EM-30, Nov. 1983, p. 200-204. refs

Complex R&D programs, such as end product oriented VLSI development, require utilization and integration of teams consisting of individuals representing a wide variety of different areas of expertise. VLSI development and pilot manufacturing, particularly, require dimensional and material quality control expertise not usually found in computer product or process design laboratories. The needed expertise can be provided by a highly professional quality assurance team equipped with state-of-the-art analytical instrumentation. Its integration into the total program team with additional program and market-oriented objectives can provide an increased overall effectiveness. The integrated team conditions stimulate creativity and leadership in all areas of expertise and improve the quality assurance team acceptance by other organizational units, even those not associated with the project. Successful experience with the combined team strategy, as applied during the Hewlett-Packard 32-bit VLSI development program, is described here in terms of the program environment, conditions leading to the decision to invite the quality assurance team to participate, changes introduced, and specialized knowledge contributed. Results of this strategy are evaluated in the context of program and project management. Author

A84-15600

MANAGING ENGINEERS EFFECTIVELY

H. J. THAMHAIN (Worcester Polytechnic Institute, Worcester, MA) IEEE Transactions on Engineering Management (ISSN 0018-9391), vol. EM-30, Nov. 1983, p. 231-237. refs

The professional needs of engineering personnel are investigated. Their degree of satisfaction is positively associated with overall engineering performance. All of the 16 specific needs analyzed involve 3 primary issues: (1) people skills, (2) organizational structure, and (3) management style, influenced by the task to be performed and the surrounding environment. To be effective, engineering managers must understand the dynamics of their organizations so they can diagnose potential problems and the need for change. Specific suggestions are made to increase the engineering manager's effectiveness and to improve overall engineering productivity. Author

A84-23990

MANAGING CREATIVE INDIVIDUALS IN HIGH-TECHNOLOGY RESEARCH PROJECTS

W. B. ZACHARY (San Jose State University, San Jose, CA) and R. M. KRONE (Southern California, University, Los Angeles, CA) IEEE Transactions on Engineering Management (ISSN 0018-9391), vol. EM-31, Feb. 1984, p. 37-40. refs

A84-31212

A STUDY OF TEMPORARY TASK TEAMS

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

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

A84-34009#

HUMAN SYSTEMS INTERFACES FOR SPACE STATIONS

B. J. BLUTH (California State University, Northridge, CA) IN: Space Systems Technology Conference, Costa Mesa, CA, June 5-7, 1984, Technical Papers. New York, American Institute of Aeronautics and Astronautics, 1984, p. 40-49. refs
(AIAA PAPER 84-1115)

The Space Station is to be primarily an operational vehicle which has to tend successfully to customer demands. The special position of the Space Station with respect to other spacecraft and the Space Shuttle lead to an important modification in the place and importance of the role of Human Systems in the design, development, and operation of a Space Station. Human productivity is now a far more significant factor than it has been before. Aspects of human productivity are considered along with the context of human productvity, the effects of weightlessness on the physiological status of the human body, food as an important biochemical variable and a psychological and social factor, human systems interfaces, preliminary results, and the implementation of human productivity. G.R.

A84-39712

AN ANALYSIS OF CREW CO-ORDINATION PROBLEMS IN COMMERCIAL TRANSPORT AIRCRAFT

J. L. WHEALE (RAF, Institute of Aviation Medicine, Farnborough, Hants., England) International Journal of Aviation Safety (ISSN 0264-6803), vol. 2, June 1984, p. 83-89. refs

This report describes a survey of co-ordination problems and attitudes amongst a sample of 250 commercial airline pilots. The results indicate that co-ordination problems are most likely when workload is high. Deviation from standard operating procedures was also identified by the pilots as a major source of co-ordination problems. Disputes on the flight deck were more likely if one crew member had an interaction style that was difficult to cope with, or was deviating from normal role behavior, or held attitudes about the operation of the aircraft that differed significantly from other crew members. The data indicate that social psychological factors can have a strong influence on co-ordination behavior and the variables which influence teamwork are discussed. Author

A84-40632

DESIGN OF MICROGRAVITY SPACE ENVIRONMENTS TO ENHANCE CREW HEALTH, MORALE, AND PRODUCTIVITY

L. BELL (Houston, University, Houston, TX) IN: Space - The next twenty years; Proceedings of the Twentieth Space Congress, Cocoa Beach, FL, April 26-28, 1983. Cape Canaveral, FL, Canaveral Council of Technical Societies, 1984, p. IIIC-1 to IIIC-14.

This paper discusses habitability issues and design concepts which apply to large and small space stations. Special emphasis is placed upon opportunities and constraints posed by microgravity and upon special problems and needs associated with long-term isolation under confined conditions. Design concepts are illustrated through photographs of drawings and models. Types of functional areas addressed include crew quarters, food preparation/dining areas, work areas, and exercise/recreation facilities. Author

A84-41571

SOCIAL-PERCEPTUAL PROCESSES OF GROUP DECISION MAKING [SOTSIAL'NO-PERTSEPTIVNYE PROTSESSY V USLOVIIAKH GRUPPOVOGO PRINIATIIA RESHENII]

A. G. KOSTINSKAIA Voprosy Psikhologii (ISSN 0042-8841), Jan.-Feb. 1984, p. 75-80. In Russian. refs

The degree of group polarization in making a decision concerning the difficulty of a task to be performed is found to correlate negatively with the efficiency of the group. The degree of polarization is also found to depend directly on the ability of self-evaluation within the group, and is connected positively with the ability to understand the structure and workings of the leadership in the group. Group efficiency is therefore found to be a combined effect of both social-perceptual phenomena and of the proper differentiation of various roles within the group under decision making conditions. I.H.

A84-49313
ENGINEERING PSYCHOLOGY: ECONOMIC PROBLEMS [INZHENERNAIA PSIKHOLOGIIA: EKONOMICHESKIE PROBLEMY]
B. A. SMIRNOV, B. A. DUSHKOV, and F. P. KOSMOLINSKII Moscow, Izdatel'stvo Ekonomika, 1983, 223 p. In Russian. refs

Problems in the economic assessment of engineering-psychology research (EPR) are examined. Particular attention is given to a general definition of the economic (cost) effectiveness of EPR, the economic effect of engineering-psychological design, economic effectiveness in connection with the determination of human-factor effects on production, and methods for the standardization of operator activity. Also considered are economic problems in connection with increasing the quality and reliability of man-machine systems; economic effectiveness in relation to the assessment of engineering-psychological requirements in the operation of complex systems; and the social significance of engineering psychology. B.J.

A85-11660#
THE AVERAGE $100,000,000 DESIGN ENGINEER
C. A. RODENBERGER, C. F. HERNDON, S. O. MAJORS, and W. A. ROGERS (General Dynamics Corp., Fort Worth, TX) IN: Computers in engineering 1983; Proceedings of the International Conference and Exhibit, Chicago, IL, August 7-11, 1983. Volume 1. New York, American Society of Mechanical Engineers, 1983, p. 33-38. refs

The value of decisions made by the structural design engineer in designing a modern fighter is estimated over a billion dollars for a production run of 2500 aircraft. In the light of an analysis of the value of design decisions in the aerospace industry, it is shown that 100,000 dollars invested in computer aided design (CAD) support for the structural engineer can result in millions of dollars of savings for each percent improvement. It is emphasized that a particularly large increase in engineering productivity is achieved by integrating computer analyses with CAD systems. V.L.

A85-13149*# California State Univ., Northridge.
COST BENEFITS FROM HUMAN PRODUCTIVITY DESIGN
B. J. BLUTH (California State University, Northridge, CA) International Astronautical Federation, International Astronautical Congress, 35th, Lausanne, Switzerland, Oct. 7-13, 1984. 11 p. refs
(Contract NAGW-659)
(IAF PAPER 84-233)

The degree to which changing definitions of productivity influence the design of space systems is discussed from a sociological point of view. Particular attention is given to the importance of subjective criteria used in judgements about the cost and benefits of designing a Space Station. It is recommended that designers, administrators, and potential private industrial participants recognize the objectives and goals of other groups involved in the Space Station program in order to establish the most cooperative and productive design environment. I.H.

A85-14109
QUALITY ASSURANCE IN A PRODUCTION ENVIRONMENT
A. W. THOMPSON (Bristol Composite Materials Engineering, Ltd., Bristol, England) IN: Testing, evaluation and quality control of composites; Proceedings of the International Conference, Guildford, Surrey, England, September 13, 14, 1983. Sevenoaks, Kent, England, Butterworth Scientific, Ltd., 1983, p. 127-136.

A development history is presented for the methods used to achieve consistently high quality in the fabrication of composite structures, at a major British manufacturing plant, over the course of 30 years. A series of recommendations are made on the basis of experience with numerous and varied aerospace and defence composites-manufacturing tasks. It is noted that workmen must have both adequate training and explanations justifying the procedures and methods to be employed. In order to keep complicated records systems, batches of components must remain clearly differentiated from others for all manufacturing and assembly operations. The recurrence of processing errors is best prevented by making the worker in question responsible for the remedial action required. O.C.

A85-18439#
CAD/CAM INTEGRATION - THE IMPERATIVES
R. H. JACKSON (Rockwell International Corp., Tulsa, OK) Aerospace America (ISSN 0740-722X), vol. 23, Jan. 1985, p. 102, 103.

The assimilation of CAD/CAM capabilities into the organizational/production aspects of a manufacturing company are discussed. One company has begun the process by automating the engineering department, with all final design products subject to one vice-president's approval before being sent to the production line, which will eventually become an integrated part of the automated process. Another firm has established a CAE team within the engineering department to refine preliminary work and recommendations from other sources and fit them into manufacturing specifications. It is recommended that all managers and users be familiarized with CAD/CAM systems and that all defect-tendencies induced into people working under production pressure be anticipated and eliminated. It is emphasized that incorporating CAD/CAM into a company is as much a matter of the people involved as the technical considerations. M.S.K.

A85-21298#
MANAGING PROJECTS FOR HIGH PERFORMANCE
H. SHEPARD (Portsmouth Consulting Group, Stamford, CT) and J. GONZALEZ (Bell Northern Research, Ltd., Ottawa, Canada) American Society of Mechanical Engineers, Annual Energy Sources Technology Conference and Exhibit, 7th, New Orleans, LA, Feb. 11-17, 1984. 5 p.
(ASME PAPER 84-MGT-8)

The effectiveness of organizations developed to handle particular projects was assessed through interviews with managers of twenty different efforts. The projects covered energy, aerospace and chemical endeavors. Team management solving problems in an ongoing manner was found preferable to vertical management structures. Communication among the managers is therefore a critical need, as are clearly defined goals, role clarity, teamwork values, flexibility in response to need and a team commitment to success. Rewards and recognition assure teamwork when combined with open dealings with shortfalls. A clear, consistent management philosophy must be articulated at the outset and must account for interim goals and a gradual introduction of the operational organization as the project progresses. Blurring the distinctions between contract and project personnel is recommended, as are celebrations of milestones. Finally, emphasis is laid on factors such as open communications, dealing with whatever problems arise as they are perceived, and maintaining a matrix consciousness of the entire system. M.S.K.

A85-21565#
UNITED AIRLINES' COCKPIT RESOURCE MANAGEMENT TRAINING
D. L. JACKSON (United Air Lines, Inc., Denver, CO) IN: Symposium on Aviation Psychology, 2nd, Columbus, OH, April 25-28, 1983, Proceedings. Columbus, OH, Ohio State University, 1984, p. 131-137. refs

This paper describes a unique pilot training program which focuses on five elements of synergistic cockpit crew teamwork.

The five elements are: inquiry, advocacy, conflict resolution, critique and decision making. The Managerial Grid provides a theoretical basis for crew self-assessment of performance effectiveness on each of the five elements. The primary goal of this training program is to improve aviation safety. The data indicate a positive acceptance of the program by flight crewmembers and a positive effect upon their performance during annual proficiency checks. Plans for future data collection on United Airlines and recommendations for industry-wide data collection are discussed. Author

A85-21595#
PSYCHOPHYSICAL ASSESSMENT OF SIMULATOR VISUAL DISPLAYS
E. J. RINALDUCCI, M. J. PATTERSON (Georgia Institute of Technology, Atlanta, GA), J. DEMAIO, and R. BROOKS (USAF, Human Resources Laboratory, Williams AFB, AZ) IN: Symposium on Aviation Psychology, 2nd, Columbus, OH, April 25-28, 1983, Proceedings. Columbus, OH, Ohio State University, 1984, p. 489-494. refs

The present study investigated the use of a psychophysical technique to provide a quick, low-cost evaluation of altitude cues provided by five visual display system conditions in which terrain features were varied in detail and density. Both pilot and non-pilot subjects were employed. Differences between pilots and non-pilots existed for the accuracy of altitude estimation, but the rankings of the effectiveness of the visual environments were the same for both groups. These results indicate that the use of non-pilot subjects can contribute to the overall cost-effectiveness and development of future is simulator displays. Author

A85-23289
STYLE OF PERSONAL CONTACT AS A FACTOR IN THE EFFICIENCY OF COMMUNAL ACTIVITY [STIL' OBSHCHENIIA KAK FAKTOR EFFEKTIVNOSTI SOVMESTNOI DEIATEL'NOSTI]
T. E. ARGENTOVA Psikhologicheskii Zhurnal, vol. 5, Nov.-Dec. 1984, p. 130-133. In Russian.

A85-33745
HUMAN PRODUCTIVITY IN THE SPACE STATION PROGRAM - THE IMPACT OF THE ENVIRONMENTAL CONTROL AND LIFE SUPPORT SYSTEM
C. A. POYTHRESS (United Technologies Corp., Hamilton Standard Div., Windsor Locks, CT) AIAA, SAE, ASME, AIChE, and ASMA, Intersociety Conference on Environmental Systems, 14th, San Diego, CA, July 16-19, 1984. 8 p.
(SAE PAPER 840932)

The Environmental Control and Life Support (ECLS) System can be a major contributor to Space Station productivity through creative approaches to analysis and design, installation and maintenance. Emulation/simulation computer modeling can enhance ECLSS design, performance predictions and anomaly investigations. Innovative design approaches can yield an integrated ECLSS that provides a more manageable work package, improves ground processing and crew operations. Productivity can also be enhanced by proper attention to equipment design and integration, especially in terms of accessibility for maintenance and the selected level for on-orbit replacement. Author

A85-43192#
A CORPORATE PERSPECTIVE ON THE ADEQUACY OF HUMAN CAPITAL
O. B. BUTLER (Procter and Gamble Co., Cincinnati, OH) IN: White-collar productivity and quality issues; Proceedings of the Symposium on Productivity and Quality: Strategies for Improving Operations in Government and Industry, Washington, DC, September 25, 26, 1984. New York, AIAA, 1985, p. 103-106.

A85-43194#
COUNTERACTING THE STIFLING EFFECTS OF A LARGE ORGANIZATION
H. WEISS and R. L. HILL (Digital Equipment Corp., Maynard, MA) IN: White-collar productivity and quality issues; Proceedings of the Symposium on Productivity and Quality: Strategies for Improving Operations in Government and Industry, Washington, DC, September 25, 26, 1984. New York, AIAA, 1985, p. 121-125.

Techniques for improving productivity in a large organization are discussed using examples from a computer-manufacturing corporation. The measures examined and their applications are: thinking differently (redesign of a factory from conventional assembly line to assembly of the total product by a single worker), investing in people (installation of a company-wide electronic-mail network to lower costs and facilitate communication), and focusing on the organizational mission (restructuring the organization, with establishment of regional management centers and emphasis on strategic rather than short-term goals). T.K.

A85-43195#
BUILDING TEAMS AND MAINTAINING TRUST
L. L. HILL (U.S. Navy, Naval Surface Weapons Center, Dahlgren, VA) IN: White-collar productivity and quality issues; Proceedings of the Symposium on Productivity and Quality: Strategies for Improving Operations in Government and Industry, Washington, DC, September 25, 26, 1984. New York, AIAA, 1985, p. 126-131.

The techniques used to improve productivity and work quality at the Naval Surface Weapons Center, a large RTD&E facility responsible for science and technology, systems/subsystems development, and fleet support/in-service engineering, are reviewed. The organizational structure, current activities, and facilities of the Center are described; management and team productivity seminars, implementation assistance, quality circles, productivity steering committees, and work-unit-level productivity measurements are characterized; and strategic-planning measures such as fostering entrepreneurial spirit, building institutional values, defining strategic business units (of related technical programs), evaluating long-term needs, developing action plans, and establishing 1990 manpower goals are discussed. The extension of the industrial-funding concept to other government agencies is considered. T.K.

A85-43200#
LABOR-MANAGEMENT COOPERATIVE PROGRAMS
J. R. STEPP (U.S. Department of Labor, Washington, DC) IN: White-collar productivity and quality issues; Proceedings of the Symposium on Productivity and Quality: Strategies for Improving Operations in Government and Industry, Washington, DC, September 25, 26, 1984. New York, AIAA, 1985, p. 157-160.

A85-43205#
THE DANA STYLE - PARTICIPATION BUILDS THE CLIMATE FOR PRODUCTIVITY
C. H. HIRSCH (Dana Corp., Toledo, OH) IN: White-collar productivity and quality issues; Proceedings of the Symposium on Productivity and Quality: Strategies for Improving Operations in Government and Industry, Washington, DC, September 25, 26, 1984. New York, AIAA, 1985, p. 192-196.

The management strategies developed at Dana corporation to maintain and increase productivity are reviewed. The measures discussed include employee stock-purchase plans, quality circles, productivity-gain sharing, continuous communication, and a minimal five-level management structure (indirect/direct ratio = 0.75) involving strict regionalization and ad hoc structures to solve superregional problems. The emphasis on the initiative of individual employees or small groups is shown to have produced significant productivity increases at large, medium-sized, and small manufacturing plants. T.K.

A85-43206*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.
CONTRACTOR AND GOVERNMENT - TEAMWORK AND COMMITMENT
G. D. GRIFFIN (NASA, Johnson Space Center, Houston, TX) IN: White-collar productivity and quality issues; Proceedings of the Symposium on Productivity and Quality; Strategies for Improving

Operations in Government and Industry, Washington, DC, September 25, 26, 1984. New York, AIAA, 1985, p. 197-201.

Procedures being implemented at NASA to improve cooperation with contractors and increase productivity are reviewed from the NASA point of view. The goals of the U.S. space program for the coming 25 years are listed, and the importance of the commercial utilization of space in these plans is stressed. Consideration is given to the ongoing American Productivity Center White-Collar Productivity-Improvement Project, the implementation of the recommendations of the 1984 NASA/Contractor Conferences in present and future contracts, and the use of incentive contracts to create situations in which both NASA and the contractor benefit from increased productivity. Future plans call for increased industry responsibility in managing and operating the STS; steamlining of Shuttle operations; advanced design-to-cost procedures, increased commonality, better NASA-contractor communications, and more use of CAD/CAM and robotics for the Space Station; and accommodation of greatly expanded private investment and exploitation of space. T.K.

A86-26033* National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.

PREPARING FOR THE UNEXPECTED - A PSYCHOLOGIST'S CASE FOR IMPROVED TRAINING

H. C. FOUSHEE (NASA, Ames Research Center, Moffett Field, CA) IN: Aerospace Behavioral Engineering Technology Conference, 3rd, Long Beach, CA, October 15-18, 1984, Proceedings. Warrendale, PA, Society of Automotive Engineers, Inc., 1984, p. 249-254.

In the procedures designed to minimize human errors that lead to aircraft incidents, the improved human factor engineering and automation approaches must be supplemented by new training methods. Changes are suggested in the preprogrammed training principles which are currently based almost exclusively on the procedures-oriented environment, with insufficient training for cognitive processing and awareness. Use of the Line-Oriented Flight Training procedure, in which a training simulator is supplemented by a highly structured script or scenario to simulate the total line operational environment for the purpose of simultaneously training the entire flight crew, offers one way of providing pilots and other crewmembers with the experience of dealing with unexpected or stressful events. Of primary importance is maximal coordination between the aircraft captain and other crewmembers during the flight, which puts emphasis on the importance of teamwork and personal relations among all other crewmembers. The current FARs governing training and proficiency will have to be modified to accommodate new training appoaches. I.S.

A86-34983

THE ROLE OF THE TECHNOLOGIST IN SPACE PRODUCTIVITY

K. E. MCKEE (IIT Research Institute, Chicago, IL) IN: Space and society - Progress and promise; Proceedings of the Twenty-second Space Congress, Cocoa Beach, FL, April 23-26, 1985. Cape Canaveral, FL, Canaveral Council of Technical Societies, 1985, p. 9-26 to 9-36.

In this paper the role of technologists throughout the space program is reviewed, i.e., from R&D through system maintenance. The interactions of the technologists with management, labor, capital, technology, and government are considered. Recommendations to enhance the contribution of the technical staff are made. Author

A87-15836*# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Cologne (Germany, F.R.).

ASSESSMENT OF SPACE STATION DESIGN AND OPERATION THROUGH BIOASTRONAUTICS

K. E. KLEIN, H. M. WEGMANN (DFVLR, Institut fuer Flugmedizin, Cologne, West Germany), and B. J. BLUTH (NASA, Office of Space Station, Washington, DC) IAF, International Astronautical Congress, 37th, Innsbruck, Austria, Oct. 4-11, 1986. 8 p. refs
(IAF PAPER 86-54)

The main elements which affect human well-being and productivity during a mission on the Space Station are reviewed. These include: the physical environment, the nature of operations the crew is required to perform, man's physiological response to microgravity, and the psychological and social conditions. The individual components of each of these elements are presented, and special design and support needs are identified. Particular attention is given to noise pollution, ionizing radiation, and behavioral factors. K.K.

A88-22330*# Loyola Univ., Chicago, IL.

CREW PRODUCTIVITY ISSUES IN LONG-DURATION SPACE FLIGHT

JOHN M. NICHOLAS (Loyola University, Chicago, IL), H. CLAYTON FOUSHEE (NASA, Ames Research Center, Moffett Field, CA), and FRANCIS L. ULSCHAK (H. Lee Moffitt Cancer Research Institute, Tampa, FL) AIAA, Aerospace Sciences Meeting, 26th, Reno, NV, Jan. 11-14, 1988. 13 p. refs
(AIAA PAPER 88-0444)

Considerable evidence suggests the importance of teamwork, coordination, and conflict resolution to the performance and survival of isolated, confined groups in high-technology environments. With the advent of long-duration space flight, group-related issues of crew functioning will take on added significance. This paper discusses the influence of crew roles, status, leadership, and norms on the performance of small, confined groups, and offers guidelines and suggestions regarding organizational design, crew selection, training, and team building for crew productivity and social well-being in long-duration spaceflight. Author

A88-27634#

QUALITATIVE REQUIREMENTS OF A MODERN FIGHTER AIRCRAFT

B. D. JAYAL Aviation Medicine, vol. 30, June 1986, p. 9-12.

The requirements of a combat aircraft are examined together with the operational principles and the utility of devices that help to achieve an effective pilot-vehicle interface, such as electronic cockpits, head-up displays, multifunction displays, hands-on throttle and stick layout, voice command systems, helmet-mounted sights, and touch panels. It is pointed out that, to cope with the multirole aircraft requirements where a very high volume of information will be processed and displayed, a two-pilot concept may become necessary to maintain physical and mental alertness of the crew. The need for the protection of the crew in a nuclear biological and chemical environment by supplying a special airconditioning system, clothing, mask, and oxygen system is emphasized. I.S.

A88-35407

SUBJECTIVE WORKLOAD UNDER INDIVIDUAL AND TEAM PERFORMANCE CONDITIONS

BARRY H. BEITH (North Carolina State University, Raleigh) IN: Human Factors Society, Annual Meeting, 31st, New York, NY, Oct. 19-23, 1987, Proceedings. Volume 1. Santa Monica, CA, Human Factors Society, 1987, p. 67-71. refs

This study compares an individual's workload when working alone versus working with another person on a complex cognitive task. Twenty-four participants worked alone and in dyadic teams under varying conditions of team interaction and time stress. Measures of performance and individual ratings of self and team workload were recorded. Results address subjective workload under individual and team conditions. Further individual perceptions of personal workload and team workload are compared. These results have implications for the use of teams in operational systems. Author

A88-54373#

TEAMING - A CASE STUDY

STEVEN D. WHITE (Textron, Inc., Avco Lycoming Textron, Stratford, CT) and ROBERT A. WOLFE (Pratt and Whitney, East Hartford, CT) ASME, Gas Turbine and Aeroengine Congress and Exposition, Amsterdam, Netherlands, June 6-9, 1988. 7 p.
(ASME PAPER 88-GT-304)

Textron Lycoming and Pratt and Whitney teamed to develop the T800 for the Army's LHX program and other applications. A teamed approach was selected in order to answer the Armny's requirement for true competition during the production phase of the program. Clear definition of this requirement, while not specifying teaming as absolutely necessary, was a critical element in the rapid and smooth initiation of the teamed effort. Additional key elements were management compatibility, equal technical contribution, willingness to transfer technology, and team focus on a clear goal. An organization was structured which utilizes a Joint Program Office (JPO) as the managing unit. This office is located at Stratford, CT, and is staffed by Textron Lycoming and Pratt and Whitney personnel. The JPO structure has been successful in forcing the joint decision process to function within both organizations. This case study focuses on the process of teaming for the development of complex systems. It addresses initiation of the team, management structure, unique management issues, benefits to participants and customers, and lessons learned. Author

N84-10354# Joint Publications Research Service, Arlington, VA.
DESIGNERS VOICE COMPLAINTS, SUGGESTIONS REGARDING THEIR WORK
V. PARFENOV *In its* USSR Rept.: Sci. and Technol., No. 19 (JPRS-84497) p 41-46 7 Oct. 1983 Transl. into ENGLISH from Pravda (Moscow), 7 May 1983 p 2
Avail: NTIS HC A06

An assessment by designers is made of the transfer of scientific discovery to industrial products. The acceleration of scientific and technical progress was also examined. B.G.

N84-10356# Joint Publications Research Service, Arlington, VA.
SCIENTISTS DISCUSS INCREASED PRODUCTION WITH FEWER WORKERS
A. L. MERSON *In its* USSR Rept.: Sci. and Technol., No. 19 (JPRS-84497) p 51-55 7 Oct. 1983 Transl. into ENGLISH from Leningr. Pravda (Leningrad), 26 May 1983 p 2
Avail: NTIS HC A06

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

N84-10358# Joint Publications Research Service, Arlington, VA.
ACCELERATION OF S&T PROGRESS DISCUSSED
M. ZARIPOV *In its* USSR Rept.: Sci. and Technol., No. 19 (JPRS-84497) p 61-65 7 Oct. 1983 Transl. into ENGLISH from Sov. Rossiya (Moscow), 18 May 1983 p 2
Avail: NTIS HC A06

The Order of Lenin Nizhnekamskneftekhim Production Association is a young enterprise which started production about 15 years ago. During these years, the enterprise has become equal with industrial giants and has become a test area for carrying out bold engineering solutions. The ways production was increased and the possible causes of success are discussed. E.A.K.

N84-10812# Sandia National Labs., Albuquerque, NM.
CAD/CAM: INFLUENCING THE SKILLED TRADES
P. W. PLOMP 1983 8 p refs Presented at the 14th Ann. Conf. of Vocational, Tech. and Adult Educators, Albuquerque, N. Mex., 3-5 Aug. 1983
(Contract DE-AC04-76DP-00789)
(DE83-015188; SAND-83-1604C; CONF-830892-1) Avail: NTIS HC A02/MF A01

CAD/CAM is influencing many of the skilled trades. Computers are permitting an increase in productivity with a resulting need for people with greater mental rather then motor skills. Computers are used for the control of a wide variety of manufacturing operations and the trend is accelerating rapidly. The net result is a smaller need for semi-skilled jobs but an increasing demand for skilled craftsmen. DOE

N84-15805# Carnegie-Mellon Univ., Pittsburgh, PA. Robotics Inst.
THE HUMAN SIDE OF ROBOTICS: RESULTS FROM A PROTOTYPE STUDY ON HOW WORKERS REACT TO A ROBOT Interim Report
L. ARGOTE, P. S. GOODMAN, and D. SCHKADE May 1983 28 p
(AD-A133438; AD-E750844; CMU-RI-TR-83-11) Avail: NTIS HCA03/MFA01 CSCL 06/4

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

N84-16059# University of Southern California, Los Angeles. Center for Effective Organizations.
PERFORMANCE APPRAISAL REVISITED
E. E. LAWLER, III, A. M. MOHRMAN, JR., and S. M. RESNICK Mar. 1983 27 p
(Contract N00014-81-K-0048)
(AD-A132841; G-83-7-(38); TR-11) Avail: NTIS HC A03/MF A01 CSCL 05/9

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

N84-17600# Council for Scientific and Industrial Research, Pretoria (South Africa). Production Engineering Advisory Service.
MINI-SEMINAR ON QUALITY ASSURANCE
Nov. 1982 64 p refs Seminar held in Pretoria, 21 Mar., 22 Apr., 29 Jun., 7 Sep., and 26 Oct. 1983 and in Johannesburg, 25 May and 31 Aug. 1983 and in Port Elizabeth, South Africa, 27 Jul. 1983
(CSIR-TSD-0008/82; ISBN-0-7988-2364) Avail: NTIS HC A04/MF A01

Items discussed at a conferences on quality assurance in production engineering are presented. The following topics were presented: quality circles, management information system, industrial training, value engineering, finishing techniques, CAD/CAM, productivity improvement, and nondestructive testing.

N84-17837# Army Intelligence and Threat Analysis Center, Arlington, VA.
THE CONCEPT OF WORKING CAPACITY OF THE FLIGHT CREW
N. M. RUDNYY and V. A. BODROV *In its* Mil. Med. J., No. 4, 1983 p 65-72 Apr. 1983 refs Transl. into ENGLISH from Voenno-Med. Zh. (Moscow), no. 4, Apr. 1983
Avail: NTIS HC A07/MF A01

The concept of work capacity, especially as it applies to flight crews, is discussed. It is argued that working capacity should be looked upon as one of the basic social - biological properties of man, reflecting his ability to perform work of specific content under specific conditions of activity for a specific time and with the required effectiveness and quality. The structure of the working capacity of aviation specialists and the classification of flying crew working capacity indices are discussed. R.J.F.

N84-23813# North American Air Defense Command, Peterson AFB, CO. System Control Div.
RELIABILITY IN SPACE: PROGRAM MANAGER AND USER AWARENESS
A. J. W. ANDERSON *In* AF Academy Proc. of the 1983 Symp. on Mil. Space Commun. and Operations p 33-35 1983 refs
(AD-P002148) Avail: NTIS HC A07/MF A01 CSCL 05/1

Space systems and satellite communications are now a reality. As these systems become more important to our military missions, we must ensure we have reliable equipment. The role of reliability is not just the responsibility of the project reliability engineer. The program manager and the user must understand the importance of the reliability program. The designers and users must have a mutual understanding of the program goals. If the engineer is the only one who can understand the system, the user will not agree it is what is needed and the program manager will not support the funding requirement. Author

N84-33252# Air Command and Staff Coll., Maxwell AFB, AL.
DETERMINATION OF FACTORS AFFECTING PERFORMANCE AND PRODUCTIVITY IN AN ENGINEERING/DESIGN ENVIRONMENT
R. J. ROSALES, JR. Mar. 1984 108 p
(AD-A143315; ACSC-84-2225) Avail: NTIS HC A06/MF A01 CSCL 05/1

Within all organizations there exist opportunities for constructive change, e.g., improving employee motivation, increasing management effectiveness, and enriching the quality of work life. This study attempts to generalize employee perceptions towards their organization and through inductive reasoning offer a basis for strategy selection to maximize the effects of the constructive change being sought. This study delves into the structure of a Real Property Maintenance Activity, its people and their perceptions of the work environment. It attempts a critical analysis not for the purpose of censure but rather to introduce one method that can precede constructive change in order to realize the full potential of the change. GRA

N84-34165*# National Aeronautics and Space Administration, Washington, DC.
HUMAN CAPABILITIES IN SPACE
A. E. NICOGOSSIAN Oct. 1984 58 p refs
(NASA-TM-87360; NAS 1.15:87360) Avail: NTIS HC A04/MF A01 CSCL 05/8

Man's ability to live and perform useful work in space was demonstrated throughout the history of manned space flight. Current planning envisions a multi-functional space station. Man's unique abilities to respond to the unforeseen and to operate at a level of complexity exceeding any reasonable amount of previous planning distinguish him from present day machines. His limitations, however, include his inherent inability to survive without protection, his limited strength, and his propensity to make mistakes when performing repetitive and monotonous tasks. By contrast, an automated system does routine and delicate tasks, exerts force smoothly and precisely, stores, and recalls large amounts of data, and performs deductive reasoning while maintaining a relative insensitivity to the environment. The establishment of a permanent presence of man in space demands that man and machines be appropriately combined in spaceborne systems. To achieve this optimal combination, research is needed in such diverse fields as artificial intelligence, robotics, behavioral psychology, economics, and human factors engineering. Author

N84-34307# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
RESEARCH SALARIES [SALARIOS NA CARREIRA DE PESQUISA]
I. J. KANTOR, A. M. PICCINA, J. LIBERATO, JR., and C. J. SACCHI Nov. 1983 31 p In ARABIC
(INPE-2971-NTE/209) Avail: NTIS HC A03/MF A01

The effect of Brazilian national salary policy on the staffing of the Institute of Space Research during the period 1976 to 1983 is analyzed. Relevant data from the journal Conjuntura Economica, The Getulio Vargas Foundation, and official documents and decrees are analyzed. The effects of salary adjustments, minimum salaries, inflation, and indexing are examined. It is predicted that inequitable adjustments of researchers' salaries will lead to an exodus of scientific talent from the Institute of Space Research. Transl. by B.G.

N85-16680# Applied Science Associates, Inc., Valencia, PA.
MODEL OF TEAM ORGANIZATION AND BEHAVIOR AND TEAM DESCRIPTION METHOD
J. T. ROTH, R. J. HRITZ, and D. W. MCGILL Oct. 1984 243 p
(Contract MDA903-81-C-0198; DA PROJ. 2Q2-63743-A-794)
(AD-A147540; ARI-RN-84-129) Avail: NTIS HC A11/MF A01 CSCL 05/10

This report describes a model of team organization and performance, and a method for describing the structures and behavior of teams. Both the model and description method were developed and validated through the field observation of Army teams performing selected team missions. The model is a set of concepts which are used to describe the formal and actual (mission) structure of teams and the behavior of teams and team members. The description method essentially provides a structured means of identifying, gathering, and verifying the data required to describe teams and team missions, using the concepts of the model. Originator-supplied keywords include: Teamwork, Team mission, Team description method, and Team modeling. GRA

N85-17377# Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Systems and Logistics.
A STUDY OF AIR FORCE QUALITY CIRCLE PROGRAM EFFECTIVENESS AS VIEWED THROUGH FACILITATOR'S PERCEPTIONS M.S. Thesis
D. R. MURVIN and N. L. SINGER Sep. 1984 97 p
(AD-A147633; AFIT/GLM/LSM/84S-49) Avail: NTIS HC A05/MF A01 CSCL 05/10

Since August 1981, the Air Force Inst. of Technology, School of Systems and Logistics, Dept. of Organizational Behavior and Science (AFIT/LSB) has been training both Air Force civilian and military personnel to function as Air Force Quality Circle facilitators. This thesis project was an exploratory effort to determine the effectiveness of Air Force Quality Circle programs as perceived by the facilitators, and to identify characteristics present in effective programs. Literature was reviewed which discussed the history of Quality Circles, application and results of Quality Circle implementation, and elements instrumental in successful Quality Circle programs. Air Force military personnel trained by AFIT/LSB as Quality Circle facilitators were surveyed to determine their Quality Circle programs perceived effectiveness, and to determine characteristics of those programs contributing to their success. Only the use of a written implementation plan surfaced as significantly related to the effectiveness of those programs. This factor, as well as other characteristics examined and their findings, are presented, and recommendations for future research provided. GRA

N85-17541# Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Systems and Logistics.
AN INVESTIGATION OF THE RELATIONSHIP BETWEEN STRESSFUL LIFE EVENTS AND PSYCHOLOGICAL, BEHAVIORAL AND PHYSIOLOGICAL OUTCOMES M.S. Thesis
B. E. NIELSEN and R. L. TREMAINE Sep. 1984 105 p
(AD-A147754; AFIT/GSM/LSY/84S-23) Avail: NTIS HC A06/MF A01 CSCL 05/10

Individuals in organizations are subjected to stress from a variety of sources. Problems and uncertainties on and off-the-job can cause stress in the individual. Stress effects have been estimated in 1983 to cost American organizations over 50 billion dollars annually. In an attempt to assess the impact of stress on Department of Defense personnel, the Air Force Institute of Technology administered the Life Events Survey (LES) to 76 individuals, measuring variables associated with 83 potentially stressful life events. Additionally, these participants completed a multi-inventory Stress Assessment Package (SAP-2) and contributed blood samples. This thesis statistically explored the relationship between the major stressful life events as measured in the LES and the following variables measured by the SAP-2: (1) perceived off-the-job stress, (2) perceived on-the-job stress, (3) ratio of total blood cholesterol with high density lipoprotein cholesterol, (4) job satisfaction, (5) intent to remain, and (6) Type A behavior characteristics. Job related stressful life events were found to be significantly related to job satisfaction and Type A behavior, and the life event of Vacations was found to be significantly related to the ratio of total blood cholesterol to HDL cholesterol. Author (GRA)

N85-18026*# Air Midwest, Inc., Wichita, KS.
PILOT EDUCATION AND SAFETY AWARENESS PROGRAMS
M. SHEARER and W. D. REYNARD *In* NASA. Ames Research Center Flight Training Technol. for Regional/Commuter Airline Operations p 229-239 Dec. 1984
Avail: NTIS HC A12/MF A01 CSCL 01/3

Guidelines necessary for the implementation of safety awareness programs for commuter airlines are discussed. A safety office can be viewed as fulfilling either an education and training function or a quality assurance function. Issues such as management structure, motivation, and cost limitations are discussed. B.W.

N85-24728*# Johns Hopkins Univ., Baltimore, MD. Dept. of Psychiatry.
ANALYSIS OF TEAM PERFORMANCE IN A PROGRAMMED ENVIRONMENT Final Report
H. H. EMURIAN 11 Feb. 1985 18 p
(Contract NGR-21-001-111; N00014-80-C-0467)
(NASA-CR-175634; NAS 1.26:175634; AD-A150991; TR-ONR-11)
Avail: NTIS HC A02/MF A01 CSCL 05/10

A research project was undertaken to investigate performance effectiveness within the context of a laboratory environment in which both interpersonal and work behaviors can be continuously monitored and evaluated over extended time periods (e.g., days). The project did not attempt to simulate a specific operational environment. Rather, the laboratory facility was designed to address a broad range of performance problems from the perspective of a functional analysis of performance effectiveness. It is essentially a programmed environment with design features and measurement capabilities that permit the accurate assessment of relationships between antecedent conditions (e.g., incentive schedules, membership turnover, etc.), and performance effectiveness. This report summarizes fourteen residential studies devoted to analyses of incentive schedules and team turbulence on individual and small-group performance in a continuously programmed environment. During the contract period, a Team Multiple Task Performance Battery (TMTPB) was developed that required a coordinated response among members of three-person teams. GRA

N85-27534# Army Construction Engineering Research Lab., Champaign, IL.
DESIGN OF COMPUTER-RELATED WORKSTATIONS IN RELATION TO JOB FUNCTIONS AND PRODUCTIVITY Final Report
C. C. LOZAR and R. D. NEATHAMMER Dec. 1984 100 p
(Contract MIPR-80-939-5)
(AD-A151938; CERL-P-85/09) Avail: NTIS HC A05/MF A01 CSCL 05/5

This research analyzed offices at the Defense Systems Automation Center, Defense Logistics Agency, Columbus, OH, to determine workstation design criteria for computer-related job functions. This was done by determining the functional needs of employees and by a before and after renovation evaluation of a prototypical workstation area. The prototype was compared and evaluated to control groups. Certain hypotheses about spatial adequacy, privacy, and productivity were tested within the limits fo the control group and the overall survey. The results of this analysis were related to previous research and then transplanted into recommended design actions which can be interpreted by interior designers, architects, and office managers. This will improve performance in computer-related job functions through layout, furnishings selection, and support services within the physical envelope and the management structure of the organization. GRA

N85-29556*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.
HUMAN PRODUCTIVITY PROGRAM DEFINITION
D. B. CRAMER *In its* Proc. of the Seminar on Space Station Human Productivity 26 p Mar. 1985
Avail: NTIS HC A99/MF E03 CSCL 06/11

The optimization of human productivity on the space station within the existing resources and operational constraints is the aim of the Human Productivity Program. The conceptual objectives of the program are as follows: (1) to identify long lead technology; (2) to identify responsibility for work elements; (3) to coordinate the development of crew facilities and activities; and (4) to lay the foundation for a cost effective approach to improving human productivity. Human productivity work elements are also described and examples are presented. B.W.

N85-29558*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.
OVERVIEW: HUMAN FACTORS ISSUES IN SPACE STATION ARCHITECTURE
M. M. COHEN *In its* Proc. of the Seminar on Space Station Human Productivity 27 p Mar. 1985
Avail: NTIS HC A99/MF E03 CSCL 06/11

An overview is presented of human factors issues in space station architecture. The status of the space station program is given. Habitability concerns such as vibroacoustics, lighting systems, privacy and work stations are discussed in detail. B.W.

N85-29563*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.
HUMAN PRODUCTIVITY EXPERIENCE AND UNDERSEA HABITAT DESIGN
T. C. TAYLOR (TAI) and J. S. SPENCER (SHDA) *In its* Proc. of the Seminar on Space Station Human Productivity 16 p Mar. 1985
Avail: NTIS HC A99/MF E03 CSCL 05/8

Lessons learned from the Alaskan North Slope construction camps and the Western Regional Undersea Laboratory are analyzed with respect to possible improvements for space station interior space utilization and living areas. The human factors engineering aspects have a direct bearing on the condition of crew and occupants. G.L.C.

N85-29570*# Lockheed Aircraft Corp., Burbank, CA.
MOCKUPS AND HUMAN PRODUCTIVITY STUDIES
T. FISHER *In* NASA. Ames Research Center Proc. of the Seminar on Space Station Human Productivity 20 p Mar. 1985
Avail: NTIS HC A99/MF E03 CSCL 05/8

Idea outlines are presented concerning mockup candidates, mockup utilization and schedules/sequence in mockup development. Mockup candidates which aid in human productivity investigations and assessment are given. Areas which are considered in the mockups are the safe haven zone, general purpose workstations, maintenance and servicing area, sleep quaters, multiple docking adapter, airlock, hygiene station, food station, habitation zones, group gathering area and lab areas. Some aesthetic concerns in human productivity are also given. E.R.

N85-29572*# Rockwell International Corp., Pittsburgh, PA. Crew/Habitation Group.
ROCKWELL EXPERIENCE APPLICATIONS TO AMES SPACE STATION MOCKUP HABITABILITY/PRODUCTIVITY STUDIES
J. A. ROEBUCK *In* NASA. Ames Research Center Proc. of the

Seminar on Space Station Human Productivity 17 p Mar. 1985
Avail: NTIS HC A99/MF E03 CSCL 05/8

The use of Rockwell experiences to assist NASA/Ames with planning for space station mockup studies is outlined. Mockup lessons from Rockwell spacecraft studies are reviewed. Typical and unique mockup technology applications are illustrated. Potential uses for space station mockups are given along with the areas of concern. Workstation design requirements are given. E.R.

N86-14896# Argonne National Lab., IL. Computing Services.
THE SCIENTIFIC WORKSTATION EVALUATION PROJECT: MULTIDISCIPLINARY EXPERIENCE WITH A SCIENTIFIC WORKSTATION
R. C. RAFFENETTI, G. BIRGERSSON, R. N. BLOMQUIST, J. M. KENNEDY, D. D. KOELLING, A. J. POLICASTRO, and C. M. CARUTHERS, ed. 10 Dec. 1985 97 p refs
(Contract W-31-109-ENG-38)
(ANL-84-100) Avail: NTIS HC A05/MF A01

The objective of this project has been to evaluate a scientific workstation. A workstation is a dedicated computing system that supplies a fixed quantity of computing resource for its user. A workstation's interactive response and its total throughput are limited by the speeds of various components of the workstation hardware and the operating system software. A forerunner of the scientific workstation is the so-called personal desktop computer, itself a kind of workstation. The architecture of the processors used in personal desktop computers cannot meet the needs of heavy-duty scientific computing work. Semiconductor companies are now striving to implement a generation of 32-bit microprocessors and related circuitry. Out of these efforts have appeared the complete computer systems which are capable of scientific computing. Members of the technical staff were invited to help define minimum configuration and minimum workstation capabilities. After the machine was selected and delivered, it was integrated into the Argonne computing environment. Following this integration, for five months of the six month evaluation period, user evaluators had an opportunity to use the workstation to do their scientific computing. Observations and conclusions are discussed in detail. B.W.

N86-14899# Aerospace Medical Research Labs., Wright-Patterson AFB, OH.
TEAM PERFORMANCE WITH LARGE AND SMALL SCREEN DISPLAYS
C. E. BROWN and D. G. LEUPP Jun. 1985 20 p
(AD-A158761; AAMRL-TR-85-033) Avail: NTIS HC A02/MF A01 CSCL 05/8

Large displays are common in modern command centers, yet the rationale for their use is typically weak. A literature search revealed little previous work comparing performance of teams with large group displays versus individual CRT's. The most applicable previous studies used static tasks and photographic projection systems. The study described here used a complex, dynamic task which required extensive interaction between members of three-person teams to achieve best performance. A comparison was made between the performance of three-person teams viewing either one large screen display or three individual CRT's. Results indicate that display size did not strongly affect team performance, although there were differences in the details of task performance that are attributable to display variables. GRA

N86-15164*# Federal Express Corp., Memphis, TN.
MENTORING AS A COMMUNICATION CHANNEL: IMPLICATIONS FOR INNOVATION AND PRODUCTIVITY
L. AVANT and R. W. BOOZER (Memphis State Univ.) *In* NASA. Johnson (Lyndon B.) Space Center R and D Productivity: New Challenges for the US Space Program p 63-72 1985 refs
Avail: NTIS HC A25/MF A01 CSCL 05/1

The impact of a formalized mentoring program as a communication channel for enhancing information distribution, innovation, and productivity is investigated. Formal and informal approaches to mentoring are discussed. Interviews with 11 members of formal mentor-protege teams indicate communications in the mentoring relationship can affect individual and organizational innovation and productivity. Author

N86-15167*# Universities Space Research Association, Huntsville, AL.
PRODUCTIVITY ISSUES AT ORGANIZATIONAL INTERFACES
A. W. HOLLAND *In* NASA. Johnson (Lyndon B.) Space Center R and D Productivity: New Challenges for the US Space Program p 109-119 1985 refs
Avail: NTIS HC A25/MF A01 CSCL 05/1

The need for close interdependence between large numbers of diverse and specialized work groups makes the Space Program extremely vulnerable to loss of productivity at organizational interfaces. Trends within the program also suggest that the number and diversity of interfaces will grow in the near term. Continued maintenance of R&D excellence will require that interface performance issues be included in any future productivity improvement effort. The types and characteristics of organizational interfaces are briefly presented, followed by a review of factors which impact their productivity. Approaches to assessing and improving interface effectiveness are also discussed. Author

N86-15170*# Texas Univ., Arlington.
A CASE STUDY IN R AND D PRODUCTIVITY: HELPING THE PROGRAM MANAGER COPE WITH JOB STRESS AND IMPROVE COMMUNICATION EFFECTIVENESS
W. D. BODENSTEINER and E. A. GERLOFF *In* NASA. Johnson (Lyndon B.) Space Center R and D Productivity: New Challenges for the US Space Program p 142-148 1985 refs
Avail: NTIS HC A25/MF A01 CSCL 05/1

Certain structural changes in the Naval Material Command which resulted from a comparison of its operations to those of selected large-scale private sector companies are described. Central to the change was a reduction in the number of formal reports from systems commands to headquarters, and the provision of Program Management Assistance Teams (at the request of the program manager) to help resolve project problems. It is believed that these changes improved communication and information-processing, reduced program manager stress, and resulted in improved productivity. Author

N86-15171*# McDonnell-Douglas Technical Services Co., Inc., Houston, TX.
TECHNICAL AND MANAGEMENT INFORMATION SYSTEM: THE TOOL FOR PROFESSIONAL PRODUCTIVITY ON THE SPACE STATION PROGRAM
G. MONTOYA and P. BOLDON *In* NASA. Johnson (Lyndon B.) Space Center R and D Productivity: New Challenges for the US Space Program p 149-164 1985 refs
Avail: NTIS HC A25/MF A01 CSCL 05/1

The Space Station Program is highly complex not only in its technological goals and requirements but also in its organizational structure. Eight Contractor teams supporting four NASA centers plus Headquarters must depend on effective exchange of information--the lifeblood of the program. The Technical and Management Information System (TMIS) is the means by which this exchange can take place. Value of the TMIS in increasing productivity comes primarily from its ability to make the right information available to whomever needs it when it is needed. Productivity of the aerospace professional and how it can be enhanced by the use of specifically recommended techniques and procedures for information management using the TMIS are discussed. Author

N86-15182*# Westinghouse Mfg. Systems and Technology Center, Columbia, MD. Socio-Technical Engineering.
SOCIO-TECHNICAL INTEGRATION OF THE WORKPLACE
G. L. CARTER *In* NASA. Johnson (Lyndon B.) Space Center R and D Productivity: New Challenges for the US Space Program p 275-288 1985 refs
Avail: NTIS HC A25/MF A01 CSCL 05/11

The objective of socio-technical theory and design is to provide the best match between the social system and the technical system. The achievement of a best match makes optimal use of the resources of both systems. Implementation of this theory is best served when there is involvement by the user organization. The involvement relative to the introduction of new technology in the organization is extremely significant. Employee involvement is critical to effective participative management. The trends toward participative management and employee involvement have taken various forms. These have included quality circles, semi-autonomous teams and ad hoc action teams. It is noteworthy to point out, as these processes have evolved, the role of a facilitator has become more prevalent. The facilitation of the socio-technical design system in industrial engineering is described. B.W.

N86-15186*# Loyola Univ., Chicago, IL.
GROUP STRUCTURE AND GROUP PROCESS FOR EFFECTIVE SPACE STATION ASTRONAUT TEAMS
J. M. NICHOLAS and R. S. KAGAN *In* NASA. Johnson (Lyndon B.) Space Center R and D Productivity: New Challenges for the US Space Program p 330-339 1985 refs
Avail: NTIS HC A25/MF A01 CSCL 05/1

Space Station crews will encounter new problems, many derived from the social interaction of groups working in space for extended durations. Solutions to these problems must focus on the structure of groups and the interaction of individuals. A model of intervention is proposed to address problems of interpersonal relationships and emotional stress, and improve the morale, cohesiveness, and productivity of astronaut teams. Author

N86-15201*# Martin Marietta Aerospace, New Orleans, LA.
QUALITY CIRCLES: ORGANIZATIONAL ADAPTATIONS, IMPROVEMENTS AND RESULTS
R. TORTORICH *In* NASA. Johnson (Lyndon B.) Space Center R and D Productivity: New Challenges for the US Space Program p 490-494 1985 refs
Avail: NTIS HC A25/MF A01 CSCL 14/4

The effective application in industry and government of quality circles work was demonstrated. The results achieved in quality and productivity improvements and cost savings are impressive. The circle process should be institutionalized within industry and government. The stages of circle program growth, innovations that help achieve circle process institutionalization, and the result achieved at Martin Marietta's Michoud Division and within the National Aeronautics and Space Administration (NASA) are addressed. E.A.K.

N86-19638# Technische Hogeschool, Delft (Netherlands). Dept. of Mechanical Engineering.
DEVELOPMENTS IN QUALITY CONTROL [DE ONTWIKKELING VAN DE KWALITEITSBEHEERSING]
M. A. A. KOOTER 31 Oct. 1983 51 p refs In DUTCH
(REPT-186) Avail: NTIS HC A04/MF A01

Developments of quality control and in particular the role of workers and quality managers in it, were surveyed. An increase in demands for quality from the outside (market shift), preventive quality care efficiency, and employee requests for more responsibility are discerned. A motivation improvement by decentralization, consciousness awakening, participation, and self-(quality)control in the production sector is pursued. Quality section tasks are shifted to the control and support of this self-control. Results are cost reduction and product improvement. Certification as a result of acknowledged quality control consolidates competitivity. Author (ESA)

N86-21421# Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Systems and Logistics.
PARTICIPATIVE DECISION MAKING AND QUALITY CIRCLES: A LOOK AT THEIR RELATIONSHIP IN THREE US GOVERNMENT ORGANIZATIONS M.S. Thesis
J. B. MINCHELLO Sep. 1985 85 p
(AD-A161360; AFIT/GLM/LSB/85S-52) Avail: NTIS HC A05/MF A01 CSCL 05/1

The use of Quality Circles (QCs) as an organizational development intervention, has gained increasing popularity over the past few years in the federal sector. Much of the recent attention concerning QCs has been centered around understanding the organizational and attitudinal variables inherent in the QC process. It is theorized that by understanding these variables, researchers are better able to evaluate the effectiveness of QC interventions. This thesis effort sets out to determine the relationship between one particular attitudinal variable, Paticipative Decision Making (PDM) and the intervention of QCs. QC programs in organizations within the federal sector were studied utilizing a nonequivalent control group design. Statistical tests used to facilitate evaluation of the data included the independent mean and paired difference t-tests and Cronbach's Alpha Reliability Coefficient technique. The evaluation of the data produced mixed results dealing with the relationship between PDM and QCs. A better understanding of the QC process and its effects on organizational and attitudinal variables is needed and evidenced by the shortage of research in these areas. By understanding the QC intervention, researchers will be better able to assess its effectiveness. GRA

N87-22636*# Harvard Univ., Cambridge, MA.
GROUP-LEVEL ISSUES IN THE DESIGN AND TRAINING OF COCKPIT CREWS
J. RICHARD HACKMAN *In* NASA. Ames Research Center Cockpit Resource Management Training p 23-39 May 1987
(Contract NCC2-324)
Avail: NTIS HC A14/MF A01 CSCL 05/8

Cockpit crews always operate in an organizational context, and the transactions between the crew and representatives of that context (e.g., organizational managers, air traffic controllers) are consequential for any crew's performance. For a complete understanding of crew performance a look beyond the traditional focus on individual pilots is provided to see how team- and organization-level factors can enhance (or impede) the ability of even well-trained individuals to work together effectively. This way of thinking about cockpit crews (that is, viewing them as teams that operate in organizations) offers some potentially useful avenues for thinking about next steps in the development of CRM training programs. Those possibilities are explored, emphasizing how they can enrich (not replace) individually-focussed CRM training. Author

N87-22637*# CRM Co.
COCKPIT RESOURCE MANAGEMENT (CRM): A TOOL FOR IMPROVED FLIGHT SAFETY (UNITED AIRLINES CRM TRAINING)
J. E. CARROLL and WILLIAM R. TAGGART *In* NASA. Ames Research Center Cockpit Reource Management Training p 40-46 May 1987
Avail: NTIS HC A14/MF A01 CSCL 01/3

The approach and methodology used in developing cockpit management skills is effective because of the following features: (1) A comparative method of learning is used enabling crewmembers to study different forms of teamwork. (2) The learning comes about as a result of crewmembers learning from one another instead of from an expert instructor. (3) Key elements of cockpit teamwork and effective management are studied so that crewmembers can determine how these elements can improve safety and problem solving. (4) Critique among the crewmembers themselves rather than from outsiders is used as a common focusing point for crews to provide feedback to one another on how each can be a more effective crewmember. (5) The training is continuous in the sense that it becomes part of recurrent, upgrade, and other forms of crewmember training and development. And (6) the training results in sound and genuine insights that come about through solid education as opposed to tutoring, coaching, or telling crewmembers how to behave more effectively. Author

N87-29849# Brookhaven National Lab., Upton, NY.
RESEARCH QUALITY: THE R AND D COMMUNITY RESPONDS QUALITY ASSURANCE FROM A RESEARCHER'S PERSPECTIVE
R. THOMAS 1987 7 p Presented at the 14th Annual National American Society for Quality Control, Las Vegas, Nev., 14 Sep. 1987
(Contract DE-AC02-76CH-00016)
(DE87-012478; BNL-39992; CONF-870950-2) Avail: NTIS HC A02/MF A01

Real basic scientific research principally is individual human expression, with no known proven techniques or procedures to achieve its purpose. For this reason present day quality assurance techniques are only applicable to the myriad of measurements, procedures, constructions, etc., which are carried out in support of basic scientific research, but which are themselves not basic scientific research. DOE

N87-70423# Naval Health Research Center, San Diego, CA.
SLEEP MANAGEMENT FOR MAINTENANCE OF HUMAN PRODUCTIVITY IN CONTINUOUS WORK SCHEDULES Interim Report, FY82 - FY83
PAUL NAITOH and DAVID RYMAN Sep. 1985 14 p
(AD-A177971; NAVHLTHRSCHC-85-43) Avail: NTIS

HIGH-QUALITY PRODUCTIVITY

A84-10027#
HUGHES' SOFTWARE ENGINEERING PROCEDURES IMPROVE QUALITY - DO THEY HELP PRODUCTIVITY?
P. A. MAURO and J. J. DE LEO (Hughes Aircraft Co., Fullerton, CA) IN: Computers in Aerospace Conference, 4th, Hartford, CT, October 24-26, 1983, Collection of Technical Papers. New York, American Institute of Aeronautics and Astronautics, 1983, p. 182-186.
(AIAA PAPER 83-2357)

The development and implementation of a software engineering procedures notebook (SEPN) by the Hughes Aircraft Company Software Engineering Division is discussed in terms of its effects on product quality and personnel productivity. Since 1978, about 15,700 hours have been expended by 93 project supervisors to generate 71 procedures totaling 1500 pages, with further effort necessary to review and update the procedures. Although quantitative measures of quality and productivity are not available, it is concluded that SEPN has a positive effect on quality which, by reducing the number of corrective tasks, more than offsets the productivity costs of generating and maintaining the SEPN and of some personnel resistance to the procedures. The latter problem is considered in detail, and it is recommended that future programs like SEPN aim for sound justification, bottom-up generation, trial implementation, tailorability, conciseness, and frequent updating of the procedures to assure personnel acceptance and implementation. T.K.

A84-10028#
ISSUES AFFECTING SOFTWARE STANDARDS TO ENSURE QUALITY AND PRODUCTIVITY
S. A. STEELE (RCA, Government Systems Div., Moorestown, NJ) IN: Computers in Aerospace Conference, 4th, Hartford, CT, October 24-26, 1983, Collection of Technical Papers. New York, American Institute of Aeronautics and Astronautics, 1983, p. 187-191. refs
(AIAA PAPER 83-2358)

The issues associated with achieving quality with accompanying high productivity in product software development are discussed. Quality and productivity are often opposing factors, and in the real world a compromise is required between quality and productivity. Issues identified relate to management's role, the designer's role, and the tester's role in quality production. In addition, emphasis is placed on the view of the development process itself from the manager's and designer's perspective. Innovative development techniques are discussed, along with an assessment of present standards and present approaches. Heavy emphasis is placed on senior management's view of risk assessment in accomplishing large-scale software development tasks. A matrix indicates items to consider for risk analysis. Author

A84-37523
AUTOMATION OF SMALL-SCALE MACHINE-SHOP PRODUCTION AND THE PRODUCT QUALITY [AVTOMATIZATSIIA MELKOSERIINOGO MASHINOSTROITEL'NOGO PROIZVODSTVA I KACHESTVO PRODUKTSII]
R. I. ADGAMOV, ED. Moscow, Izdatel'stvo Mashinostroenie, 1983, 280 p. In Russian.

Various approaches to the automation of small-scale machine-shop production are analyzed, with the production of aircraft engines used as an example. Particular attention is given to the development of methods for estimating the effect of automation on the product quality and production efficiency. The discussion also covers automatic testing, quality control on the basis of service statistics, service life prediction, cost efficiency, and social aspects of the automation of small-scale production. No individual items are abstracted in this volume V.L.

A85-43176* American Inst. of Aeronautics and Astronautics, New York, NY.
WHITE-COLLAR PRODUCTIVITY AND QUALITY ISSUES; PROCEEDINGS OF THE SYMPOSIUM ON PRODUCTIVITY AND QUALITY: STRATEGIES FOR IMPROVING OPERATIONS IN GOVERNMENT AND INDUSTRY, WASHINGTON, DC, SEPTEMBER 25, 26, 1984
M. GERARD, ED. and P. W. EDWARDS, ED. (AIAA, New York) New York, AIAA, 1985, 252 p. For individual items see A85-43177 to A85-43207.
(Contract NASW-3977)

Techniques for improving the productivity of white-collar workers while maintaining high product quality are examined in reviews and reports. The emphasis is on the application of strategies developed in the private sector to government-agency and aerospace-industry operations. Topics discussed include international competition, organizational attitudes and orientation, management practices, education and training, renewing large organizations, encouraging innovation, national initiatives, employee involvement, management involvement, and applications of new technology. T.K.

A85-43177#
MANAGEMENT PHILOSOPHIES ASSOCIATED WITH LEADING A SUCCESSFUL ORGANIZATION
M. T. STAMPER (Boeing Co., Seattle, WA) IN: White-collar productivity and quality issues; Proceedings of the Symposium on Productivity and Quality: Strategies for Improving Operations in Government and Industry, Washington, DC, September 25, 26, 1984. New York, AIAA, 1985, p. 11-15.

The productivity accomplishments of the U.S. aerospace industry are reviewed, and strategies to further improve productivity are suggested, from the perspective of the president of a large aerospace corporation. Consideration is given to the critical part played by employees on all levels in initiating and implementing improvements; the role of the federal government in promoting international trade and intranational competition, financing R&D efforts, and limiting taxation and regulation; the need to consider environmental, social, and human values in developing management goals; the value of balanced news reporting on aerospace-productivity issues rather than solely negative coverage of waste, mismanagement, and overcharges, thus instilling public trust and support; and the potential benefits of cooperation among military, industry, government, news media, and the general public. T.K.

A85-43179#
UNDERSTANDING CHANGES IN THE U.S. COMPETITIVE POSITION INTERNATIONAL COMPETITIVENESS
R. E. COLE (Michigan, University, Ann Arbor) IN: White-collar productivity and quality issues; Proceedings of the Symposium on Productivity and Quality: Strategies for Improving Operations in Government and Industry, Washington, DC, September 25, 26, 1984. New York, AIAA, 1985, p. 21-23.

Rather than focus on statistics showing the worsening of the American competitive position, the paper stresses problems in our competitive position resulting from shortages of and mode of deployment of engineers in American consumer goods industries. Automotive industry is used as a case in point with specific comparisons between Japanese and U.S. firms reported on ratio of engineers to administrative personnel and utilization of engineers. Role of technical support personnel and role of engineers in employee involvement activities is also considered. Policy implications include the need to train more engineers, to train them more broadly, and to deploy them more effectively. Paper concludes with a discussion of the potential contribution of industrial policy and a call for a more pragmatic approach to formulating policies that will contribute to a restoration of American industrial strength. Author

A85-43180#
CHALLENGES FACING U.S. INDUSTRY
R. W. FOXEN (Rockwell International Corp., Pittsburgh, PA) IN: White-collar productivity and quality issues; Proceedings of the Symposium on Productivity and Quality: Strategies for Improving Operations in Government and Industry, Washington, DC, September 25, 26, 1984. New York, AIAA, 1985, p. 24-29.

The paper discusses five challenges facing U.S. industry: the technological revolution; low economic growth; changing patterns of labor demand; the global population explosion; and the new world financial system. In the context of 'challenge and response', it is argued that our most effective response will be to allow and even encourage enterprises to adapt flexibly to this new environment with a minimum of government intervention except to aid in the inevitable transitions. U.S. industry is said to have important competitive advantages in this contest, including an unmatched pool of science and technology; depth and breadth of industrial infrastructure; flexibility of capital markets; the size and strength of our domestic market; and above all, the entrepreneurial spirit of our people. The most effective way of making use of these resources will not be through an overall industrial policy or through individual protectionist measures but rather through the application of our inherent abilities to compete in the new world market economy. Author

A85-43181#
QUALITY AND COST COMPETITIVENESS
J. A. MANOOGIAN (Ford Motor Co., Dearborn, MI) IN: White-collar productivity and quality issues; Proceedings of the Symposium on Productivity and Quality: Strategies for Improving Operations in Government and Industry, Washington, DC, September 25, 26, 1984. New York, AIAA, 1985, p. 30-33.

Strategies for increasing the quality and cost competitiveness of U.S. industry are discussed on the basis of the recent experience of a major corporation. The strong connections among product, service, and process quality; productivity; and costs are explored. The need for improvements is indicated, and specific measures are suggested. Techniques considered include evaluation of customer needs, long-term commitment of management to quality/productivity goals, promotion of employee training and involvement, defect prevention, management reviews, and inclusion of suppliers and sales/service outlets in the productivity-improvement program. T.K.

A85-43184#
JAPANESE MANAGEMENT IN U.S.
R. A. KRAFT (Matsushita Industrial Co., Franklin Park, IL) IN: White-collar productivity and quality issues; Proceedings of the Symposium on Productivity and Quality: Strategies for Improving Operations in Government and Industry, Washington, DC, September 25, 26, 1984. New York, AIAA, 1985, p. 55-57.

Japanese management practices and their application to increase the productivity and product quality of U.S. firms are discussed by the head of a Japanese electronics-manufacturing operation in the U.S. Techniques examined include focus on product rather than short-term gains, acceptance and support of long-term plans, emphasis on cooperation rather than confrontation with all personnel, attention to detail without inundation in details (which are best analyzed by lower-level employees), willingness to study and learn from all available sources, and adoption of a clearly defined consistent corporate philosophy. T.K.

A85-43186#
QUALITY IN PRACTICE AT IBM
J. B. JACKSON (IBM Corp., Purchase, NY) IN: White-collar productivity and quality issues; Proceedings of the Symposium on Productivity and Quality: Strategies for Improving Operations in Government and Industry, Washington, DC, September 25, 26, 1984. New York, AIAA, 1985, p. 63-70.

The paper discusses the excellence values of IBM and how they were made operational through quality improvement for the decade of the '80s. First, consideration is given to the importance of underlying beliefs of a corporation that brings out the great energies and talents of its people. The most important single factor in corporate success is the faithful adherence to those beliefs. Quality as a productivity driver is examined. The five concepts that IBM uses as a basis for its quality improvement are discussed. Tools and techniques for the removal of 'defects' from nonproduct processes, e.g., accounting, inventory control, distribution, order entry, etc., are reviewed. Specific attention is given to the 'job process' and to complex cross functional processes that every large organization has and must manage in a defect-free manner if it is to be competitive. Author

A85-43187#
APPLYING PRODUCTIVITY PRINCIPLES TO NEW R&D PROGRAMS NASA/TRW GRO PROJECT
R. L. WALQUIST (TRW, Inc., Space and Technology Group, Redondo Beach, CA) IN: White-collar productivity and quality issues; Proceedings of the Symposium on Productivity and Quality: Strategies for Improving Operations in Government and Industry, Washington, DC, September 25, 26, 1984. New York, AIAA, 1985, p. 71-74.

Techniques for improving the productivity of aerospace R&D programs are discussed on the basis of experience gained in the development of the NASA Gamma-Ray Observatory (GRO) by TRW. Measures examined include the introduction of CAD/CAM hardware and procedures, office automation, improved communication between TRW and NASA Goddard (PC networks and video conferencing), flexible computerized PERT networks permitting off-line evaluation of alternative structures, subcontractor involvement in the productivity program, motivation of individual employees, and the productivity-effectiveness-modification clause (providing additional contractor earnings for real productivity increases) in the NASA-TRW contract for GRO. T.K.

A85-43188#
PRODUCTIVITY IMPROVEMENT IN THE ACQUISITION ENVIRONMENT
J. A. MITTINO (U.S. Department of Defense, Office of the Secretary of Defense, Washington, DC) IN: White-collar productivity and quality issues; Proceedings of the Symposium on Productivity and Quality: Strategies for Improving Operations in Government and Industry, Washington, DC, September 25, 26, 1984. New York, AIAA, 1985, p. 75-84.

The paper discusses DOD efforts to improve defense contractor productivity as a way to reduce acquisition costs. It provides a perspective on the magnitude of the challenge and examines the unique aspects of the environment that exists. The paper surveys and describes the broad range of initiatives, programs and activities under way aimed at fostering productivity improvement in the acquisition environment. Author

A85-43189#
NEW TECHNOLOGY IMPLICATIONS ON THE WORK FORCE
F. W. GARRY (General Electric Co., Fairfield, CT) IN: White-collar productivity and quality issues; Proceedings of the Symposium on Productivity and Quality: Strategies for Improving Operations in Government and Industry, Washington, DC, September 25, 26, 1984. New York, AIAA, 1985, p. 87-90.

The introduction of automation and advanced technology into manufacturing plants is discussed from a management perspective, drawing on recent experience at GE. The gradual nature of technological change is considered; the role of international competition in forcing productivity increases and product improvements is indicated; case histories illustrating successful and unsuccessful implementation of productivity-raising measures and/or new technology in existing plants are presented; and strategies for managers are proposed. Recommendations offered include clear definition of actual needs, preliminary analysis of the organizational environment, selection of implementation teams, realistic implementation planning, training and informing workers well in advance, and close cooperation with technology suppliers. T.K.

A85-43190#
MODERNIZATION IN AEROSPACE
H. F. ROGERS (General Dynamics Corp., Fort Worth, TX) IN: White-collar productivity and quality issues; Proceedings of the Symposium on Productivity and Quality: Strategies for Improving Operations in Government and Industry, Washington, DC, September 25, 26, 1984. New York, AIAA, 1985, p. 91-94.

The implementation of technological innovations to increase productivity in the development and manufacture of aircraft is discussed using examples from the F-16 program. It is pointed out that the number of man-hours required to produce an F-16 has decreased from 110,000 in 1979 to less than 30,000 in 1983, with a concomitant increase in the proportion of defect-free aircraft (from 39 to over 50 percent) and substantial savings for both manufacturer and DOD. Specific measures examined include involvement of subcontractors in the technology-modernization program initiated by the Air Force, introduction of the electrical-harness data system, implementation of robotics, office automation, increased use of CAD/CAM, improved computer communications between engineering departments and factory floor, and installation of material-requirements and manufacturing-resource planning programs. T.K.

A85-43203#
SONY KEEPS HIGH QUALITY AND PRODUCTIVITY IN THE UNITED STATES
S. WADA (Sony Corporation of America, New York, NY) IN: White-collar productivity and quality issues; Proceedings of the Symposium on Productivity and Quality: Strategies for Improving Operations in Government and Industry, Washington, DC, September 25, 26, 1984. New York, AIAA, 1985, p. 183-186.

A86-15944#
ENSURING SPACE STATION HUMAN PRODUCTIVITY
K. H. MILLER (Boeing Aerospace Co., Seattle, WA) IAF, International Astronautical Congress, 36th, Stockholm, Sweden, Oct. 7-12, 1985. 8 p. refs
(IAF PAPER 85-500)

The 'human productivity' aspect of the current NASA Space Station Program is discussed. The early development of the concept is reviewed, and its implications are considered. The approach and results of a recently completed study on human productivity are addressed. The elements that affect productivity are identified, and management plans to deal with them, including crew composition and organization, individual autonomy and privacy, and physical amenities of the station, are briefly addressed. C.D.

A86-23503
HEALTH MAINTENANCE AND HUMAN PRODUCTIVITY IN THE SPACE STATION ERA
R. M. FARRELL AIAA, SAE, ASME, AIChE, and ASMA, Intersociety Conference on Environmental Systems, 15th, San Francisco, CA, July 15-17, 1985. 7 p. refs
(SAE PAPER 851312)

Health maintenance points for extended stays in space are presented, with emphasis on efectively and efficiently minimizing cardiovascular and musculoskeletal adaptations to weightlessness while maximizing the individual's productivity. Simulation of 1-g forces as provided by the Soviet 'penguin' constant-loading suit does not prevent the cardiovascular deconditining resulting from the shift of blood and lymph from the lower to the upper half of the body. Alleviation of such a shift of fluids is accomplished by the lower body negative pressure (LBNP) apparatus used for this purpose aboard Skylab. An ambulator LBNP suite is being developed to enable multiple use of the astronaut's time. Examples are given of devices for cardiovascular conditioning (the zero-g bicycle ergometer and the zero-g treadmill) and for larger muscle group conditioning (skiing and climbing simulators) for projected Space Station design. To minimize boredom as a negative psychological factor in conditioning, the development of zero-g sports using existing equipment is envisioned. A comprehensive diagram on Space Station elements affecting productivity is included. R.R.

A86-23717
PRODUCTIVITY AND DIFFICULTY AS NEW CRITERIA FOR VALIDATING AVIATOR SELECTION TESTS
B. D. SHIPLEY, JR. (U.S. Army, Research Institute, Fort Rucker, AL) IN: Human Factors Society, Annual Meeting, 28th, San Antonio, TX, October 22-26, 1984, Proceedings. Volume 1. Santa Monica, CA, Human Factors Society, 1984, p. 366-369. refs

The U.S. Army Research Institute is conducting research to improve the quality of the Army's aviator selection testing program. The research is motivated by increasing costs of training and by changing aviator ability requirements due to advanced aircraft and modern tactics. This paper describes the development of a new criterion variable to support the testing improvement research. Author

A86-30165
WHEAT FARMING IN A LUNAR BASE
F. B. SALISBURY and B. G. BUGBEE (Utah State University of Agriculture and Applied Science, Logan) IN: Lunar bases and space activities of the 21st century. Houston, TX, Lunar and Planetary Institute, 1985, p. 635-645. refs

An analysis of the parameters involved in the efficient operation of a lunar based wheat farm is presented along with recommendations on this operation. Wheat, with its vertical leaf orientation and excellent growth under continuous light, has been studied in the context of a bioregenerative life support system. Theoretical photosynthetic efficiencies suggest a maximum dry matter yield of 195 g/sq m/day when plants are irradiated with 1000 micromol photons/s/sq m, an irradiance high-pressure sodium lamps can readily achieve. In practice, yields may be affected by the harvest index, biomass digestibility, and lamp efficiency. Based on these factors, each person requires a minimum of 6 sq m of growing area and 3.55 kW of electrical energy. However, based on currently achieved yields, these minimum figures are 24 sq m and 13.4 kW/person. If these numbers are then doubled to provide a safety margin, a lunar farm could theoretically support 100 people in a 5000 sq m area. In addition, yields may be increased by manipulating temperature, humidity, nutrients, carbon dioxide and radiation; and by breeding suitable cultivars. K.K.

A86-33813* National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
HUMAN PRODUCTIVITY OF SPACE STATION
K. F. WILLSHIRE (NASA, Langley Research Center, Hampton,

VA) IN: Human Factors Society, Annual Meeting, 29th, Baltimore, MD, September 29-October 3, 1985, Proceedings. Volume 2. Santa Monica, CA, Human Factors Society, 1985, p. 843-845.

The objectives of NASA's Space Station Human Productivity Program are examined. The design and functions of the Space Station are described. The effects of the interior architecture, crew support, crew activities, intravehicular activity (IVA) systems, and extravehicular/IVA interfaces on the productivity of the Space Station are investigated. It is estimated that crew productivity should be sustained for a 90-day tour at levels above 90 percent of the initial mission performance level. I.F.

A86-34951
SPACE AND SOCIETY - PROGRESS AND PROMISE; PROCEEDINGS OF THE TWENTY-SECOND SPACE CONGRESS, COCOA BEACH, FL, APRIL 23-26, 1985
Congress sponsored by the Canaveral Council of Technical Societies. Cape Canaveral, FL, Canaveral Council of Technical Societies, 1985, 411 p. For individual items see A86-34952 to A86-34989.

A collection of papers is presented which examines improvements in space systems operations, new initiatives in the procurement process for space technology, and technological developments supporting future initiatives. The reporting of mission results and plans for the future by worldwide sources is addressed. The general topics covered include: operational efficiency in STS, remote operation in space and robotics, contracting and management, space systems technology, Spacelab mission results, advanced missions and transportation, Space Station technology, international programs, productivity in space activities, Getaway spacial program, and energy. C.D.

A86-34980
SPACE STATION HUMAN PRODUCTIVITY STUDY
W. R. GONZALEZ (Lockheed Missiles and Space Co., Inc., Sunnyvale, CA) IN: Space and society - Progress and promise; Proceedings of the Twenty-second Space Congress, Cocoa Beach, FL, April 23-26, 1985. Cape Canaveral, FL, Canaveral Council of Technical Societies, 1985, p. 9-7 to 9-10.

A study which is to develop design and operation requirements that will maximize the productiveness of crew performance in space is described. The analysis procedures utilized in this study are examined. Space Station designs and operations that could affect crew performance include: interior architecture, crew support, crew activities, and IVA/EVA interface. The development of a data base and management plans for establishing requirements is discussed. I.F.

A86-35437
THE CONSIDERATION OF PILOT FACTORS IN DEVELOPMENT OF FUTURE COLLISION AVOIDANCE SYSTEMS
G. P. BOUCEK, JR., W. D. SMITH, and T. A. PFAFF (Boeing Commercial Airplane Co., Seattle, WA) IN: Aerospace Behavioral Engineering Technology Conference, 4th, Long Beach, CA, October 14-17, 1985, Proceedings. Warrendale, PA, Society of Automotive Engineers, Inc., 1985, p. 93-102. refs
(SAE PAPER 851807)

Pilot factors affecting the development of collision avoidance systems are studied. The requirements and functions of a collision avoidance system are described. The need to design the avionics system to transmit relevant operational information to the crew is examined. The integration of the controls and displays of the system into the flight deck and the development of a pilot/machine interface are analyzed. The evaluation of the system considering pilot factors and the certification process are discussed. I.F.

A86-41641
THE NEED FOR NDE EDUCATION FOR ENGINEERS
W. D. RUMMEL (Martin Marietta Corp., Denver, CO) IN: Review of progress in quantitative nondestructive evaluation. Volume 4B - Proceedings of the Eleventh Annual Review, San Diego, CA, July 8-13, 1984. New York, Plenum Press, 1985, p. 1343-1348. refs

Procedures which would, if followed, bring NDE engineering to the status of other engineering specialties in education are outlined. The recommended steps are made with account taken of the needs of the U.S. and the current and prospective applications of NDE. The need for certified NDE professionals is underscored by the growing inadequacy of existing inspection and sampling standards, which are usually substituted for real quality control in manufacturing by management. The NDE curriculum would need to cover the physics of flaws, the applicability of a particular type of inspection technique, the inspection materials, equipment and processes, and human factors. Actions which will be necessary to develop undergraduate and graduate level NDE programs in universities are discussed, with emphasis on the cooperation which is necessary between industry and the educational institutions. M.S.K.

A87-21331
DOES QUALITY MANAGEMENT EXIST FOR LARGE PROGRAMS? [Y-A-T-IL UNE QUALITE DU 'MANAGEMENT' DE GRANDS PROGRAMMES?]
A. DE CACQUERAY (Matra, S.A., Toulouse, France) IN: Quality, components and electronic technology; International Space Technology Course, Toulouse, France, March 10-21, 1986, Proceedings. Toulouse, Cepadues-Editions, 1986, p. 97-114. In French.

A project leader with technical expertise may not necessarily be an expert at management. Many management duties subsequently fall to an Assistant Project Manager, and the work is managed by two groups, one possessing technical expertise and a second which defines objectives, subtasks and corrective actions and organizes the groups who will achieve the goals. The characteristics of the human and industrial environments in which a project is carried out are explored and several generalized rules are defined for carrying out management tasks in such environments. The development of a satellite is used as a sample program, noting the need to ensure that the Project Manager has timely access to technical documentation and Project Engineers to track progress on the project. M.S.K.

A87-21332
QUALITY ASSURANCE MANAGEMENT FOR SATELLITE PROJECTS [GESTION ASSURANCE QUALITE DES PROJETS DE SATELLITES]
J. M. BASQUIN (CNES, Toulouse, France) IN: Quality, components and electronic technology; International Space Technology Course, Toulouse, France, March 10-21, 1986, Proceedings. Toulouse, Cepadues-Editions, 1986, p. 115-179. In French.

The quality assurance management (QAM) tools and methods used during development of the Telecom I satellite are described, along with results of analysis of quality control data obtained during the project. QAM was effected separately for the materials, technologies and components during the design, manufacture, integration and launch and operation of the spacecraft. The distribution of QAM control points for inspections is summarized, as are procedures followed during test programs, corrective actions, and to accommodate on-station failures. Sample documentation is provided from tracking design changes, deficiencies and corrections. The QAM data discussed is limited to failures and integration nonconformities. M.S.K.

A87-27925
ORGANIZATIONAL STRUCTURE, INFORMATION TECHNOLOGY, AND R&D PRODUCTIVITY
THOMAS J. ALLEN (MIT, Cambridge, MA) IEEE Transactions on Engineering Management (ISSN 0018-9391), vol. EM-33, Nov. 1986, p. 212-217. refs

To improve R&D productivity and performance, two types of communication must be managed properly. First, there is communication which is required to coordinate the many complex tasks and subsystem interrelations that exist on an R&D project. Second, there is communication which insures that the technical staff of the project remain current. Organizational structure can be employed to achieve either of these goals. Since different

structures are needed for the two, it is important to consider the situations in which one or the other dominates. A tradeoff is necessary. Project organization facilitates task and subsystem coordination. Functional organization connects engineers more effectively to the technologies upon which they draw. The manager must determine the situations in which one or the other goal dominates and employ the organizational structure appropriate to that goal. The present paper provides three parameters which can be used to characterize project situations and guide the decision on organizational form. In addition, there is the possibility that improvements in information technology will be able to substitute for one of the two organizational forms and allow greater use of the other, thereby easing the organizational tradeoff.
Author

A87-38724* McDonnell-Douglas Astronautics Co., Huntington Beach, CA.
ANALYSIS OF CREW FUNCTIONS AS AN AID IN SPACE STATION INTERIOR LAYOUT
A. L. STEINBERG, THOMAS S. TULLIS, and BARBRA BIED (McDonnell Douglas Astronautics Co., Huntington Beach, CA) IN: Aerospace environmental systems; Proceedings of the Sixteenth Intersociety Conference on Environmental Systems, San Diego, CA, July 14-16, 1986. Warrendale, PA, Society of Automotive Engineers, Inc., 1986, p. 215-224. refs
(Contract NAS2-11723)
(SAE PAPER 860934)

The Space Station must be designed to facilitate all of the functions that its crew will perform, both on-duty and off-duty, as efficiently and comfortably as possible. This paper examines the functions to be performed by the Space Station crew in order to make inferences about the design of an interior layout that optimizes crew productivity. Twenty-seven crew functions were defined, as well as five criteria for assessing relationships among all pairs of those functions. Hierarchical clustering and multidimensional scaling techniques were used to visually summarize the relationships. A key result was the identification of two dimensions for describing the configuration of crew functions: 'Private-Public' and 'Group-Individual'. Seven specific recommendations for Space Station interior layout were derived from the analyses.
Author

A88-10401
BUILDING HIGH PERFORMING ENGINEERING PROJECT TEAMS
HANS J. THAMHAIN (Bentley College, Waltham, MA) and DAVID L. WILEMON (Syracuse University, NY) IEEE Transactions on Engineering Management (ISSN 0018-9391), vol. EM-34, Aug. 1987, p. 130-137. refs

This article summarizes four years of research into the drivers and barriers of effective teambuilding in engineering work environments. A simple input-output model is presented for organizing and analyzing the various factors which influence team performance. The field survey results supported by correlation analysis indicate that team performance is primarily associated with six driving forces and six barriers which are related to: leadership, job content, personal needs, and general work environment. Specific recommendations are made. Author

A88-15283
TECHNOLOGY ADVANCEMENTS TO IMPROVE CREW PRODUCTIVITY IN SPACE
MELANIE M. MANKAMYER (McDonnell Douglas Astronautics Co., Huntington Beach, CA) IN: Space Congress, 24th, Cocoa Beach, FL, Apr. 21-24, 1987, Proceedings. Cape Canaveral, FL, Canaveral Council of Technical Societies, 1987, 7 p.

Advances in technologies that will improve crew productivity and comfort on the Space Station are reviewed. These technologies include the development of computer tools to optimize the crew work place in the Space Station (e.g., solid modeling and interior layout evaluation programs) as well as advances in Station equipment to minimize or eliminate tedious and/or time-intensive tasks. These latter advances include automated inventory management and equipment controls, galley oven, housekeeping and trash compactor technologies, and personal hygiene improvements in the waste management system and full body shower. A third area of advancement is the development of job aids and procedural improvements for the everyday operation and maintenance of Station equipment and experiments. These advances include EVA space suit and glove design and procedural aids such as an operations and maintenance information system.
B.J.

A88-15348
SMALL GROUPS IN ORBIT - GROUP INTERACTION AND CREW PERFORMANCE ON SPACE STATION
JOHN M. NICHOLAS (Loyola University, Chicago, IL) Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol. 58, Oct. 1987, p. 1009-1013. Research supported by the James A. Kemper Foundation. refs

Orbiting space stations raise unprecendented demands on crew performance and group interaction. Previously, Antarctic studies revealed evidence of deterioration in social relationships and work effectiveness, particularly during the long winter; a decline was observed in compatibility, group pride, teamwork, and group efficiency, and groups with the greatest decline had the lowest morale and experienced most difficulty in keeping essential equipment operating. These findings are consistent with reports from Soviet Salyut missions. It is noted that, in spite of these reports, the interpersonal criterion is virtually ignored in the current Space Station planning. Directions for possible training and team development are suggested. I.S.

N84-15790# Hawaii Univ., Manoa.
INFLUENCES ON GROUP PRODUCTIVITY. 2: FACTORS INHERENT IN THE PERSON. A BIBLIOGRAPHIC SYNOPSIS Interim Report
S. OSATO, P. E. CAMPOS, N. GOODMAN (St. Peters College), and D. LANDIS (Indiana Univ. - Purdue Univ.) 15 Jul. 1983 62 p refs
(Contract N00014-83-K-0021)
(AD-A131015; CARE-83-3) Avail: NTIS HC A04/MF A01 CSCL 05/10

The present summary examines the effects of heterogeneity on a group's productivity. Heterogeneity has been defined on many different dimensions without much consistency between workers. For the sake of clarity, we have grouped the studies by the type of variable used to define heterogeneity: personality variables or sociodemographic variables. In all the studies surveyed, these different variables have served as the independent dimension.
GRA

N84-16066# University of Southern California, Los Angeles. Center for Effective Organizations.
ORGANIZATIONAL OUTCOMES OF CREATIVITY
M. A. VONGLINOW and S. KERR Jun. 1983 21 p
(Contract N00014-81-K-0048)
(AD-A132825; G-83-11-(42); 13) Avail: NTIS HC A02/MF A01 CSCL 05/1

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

N84-16801# Naval Personnel Research and Development Center, San Diego, CA.
PRODUCTIVITY IMPROVEMENT IN A PURCHASE DIVISION: EVALUATION OF A PERFORMANCE CONTINGENT REWARD SYSTEM (PCRS) Final Report, 1979 - 1981
D. M. NEBEKER, B. M. NEUBERGER, and V. N. HULTON Sep. 1983 76 p

(AD-A133589; NPRDC-TR-83-34) Avail: NTIS HC A05/MF A01 CSCL 05/9

Performance contingent reward systems (PCRSs) were developed for small purchase buyers and supply clerks in a purchase division of a naval shipyard supply department. The rewards were financial incentives provided to individual civil service employees performing above standard. Description of the system and an evaluation of its effectiveness in increasing productivity and saving costs are provided. Results showed that systems increased productivity substantially and were cost effective.

GRA

N84-17601# Council for Scientific and Industrial Research, Pretoria (South Africa).

QUALITY MANAGEMENT IN PROCUREMENT

T. D. ZEEDERBERG (Lyttleton Engineering Works (Pty) Ltd.) *In its* Mini-Seminar on Quality Assurance 4 p Nov. 1982

Avail: NTIS HC A04/MF A01

Quality control and procurement in financial management are discussed. Some required skills are outlined: manufacturing technology, backed up by process design and manufacturing planning; procurement capability; product support; and economically viable methods to satisfy the needs. E.A.K.

N84-17602# South African Bureau of Standards, Pretoria. Mechanical Engineering Dept.

MANAGEMENT INPUT IN QUALITY

In CSIR Mini-Seminar on Quality Assurance 11 p Nov. 1983 refs

Avail: NTIS HC A04/MF A01

Quality assurance, its importance and meaning to management are outlined. It is suggested that motivation of management to accept quality assurance programs and to understand them is to accept that these systems do also start with management.

E.A.K.

N84-17605# GEC Machines Proptietary Ltd., Foundry (England).

MEASURING QUALITY ACHIEVEMENTS

D. A. HYND *In* CSIR Mini-Seminar on Quality Assurance 16 p Nov. 1982 refs

Avail: NTIS HC A04/MF A01

The effectiveness of a quality within an organization must be capable to be measured in a consistent manner, to provide evidence of improvement is outlined. Areas of weakness in the organization which will benefit most from the application of corrective measures are indicated. Quality costing and product quality are two techniques which may provide the necessary data to indicate to management the progress. The basis for future quality planning strategy are outlined. E.A.K.

N85-28392# Lawrence Livermore National Lab., CA.

INTEGRATING QUALITY ASSURANCE AND RESEARCH AND DEVELOPMENT

J. J. DRONKERS 15 Feb. 1985 5 p refs Presented at the 16th ASQC Ann. Calif. Quality Week Conf., San Jose, Calif., 22 Mar. 1985

(Contract W-7405-ENG-48)

(DE85-007974; UCRL-92210; CONF-8503107-1) Avail: NTIS HC A02/MF A01

Quality assurance programs cannot be transferred from one organization to another without attention to existing cultures and traditions. Introduction of quality assurance programs constitutes a significant change and represents a significant impact on the organizational structure and operational mode. Quality assurance professionals are change agents, but do not know how to be effective ones. Quality assurance as a body of knowledge and experience can only become accepted when its practitioners become familiar with their role as change agents. DOE

N86-15158*# McDonnell-Douglas Astronautics Co., Houston, TX.

IMPLEMENTING QUALITY/PRODUCTIVITY IMPROVEMENT INITIATIVES IN AN ENGINEERING ENVIRONMENT

R. R. RUDA *In* NASA. Johnson (Lyndon B.) Space Center R and D Productivity: New Challenges for the US Space Program p 1-9 1985 refs

Avail: NTIS HC A25/MF A01 CSCL 05/1

Quality/Productivity Improvement (QPI) initiatives in the engineering environment at McDonnell Douglas-Houston include several different, distinct activities, each having its own application, yet all targeted toward one common goal - making continuous improvement a way of life. The chief executive and the next two levels of management demonstrate their commitment to QPI with hands-on involvement in several activities. Each is a member of a QPI Council which consists of six panels - Participative Management, Communications, Training, Performance/Productivity, Human Resources Management and Strategic Management. In addition, each manager conducts Workplace Visits and Bosstalks, to enhance communications with employees and to provide a forum for the identification of problems - both real and perceived. Quality Circles and Project Teams are well established within McConnel Douglas as useful and desirable employee involvement teams. The continued growth of voluntary membership in the circles program is strong evidence of the employee interest and management support that have developed within the organization.

Author

N86-15168*# Purdue Univ., West Lafayette, IN.

EFFICIENCY AND INNOVATION: STEPS TOWARD COLLABORATIVE INTERACTIONS

C. A. LENGNICK-HALL and D. C. KING *In* NASA. Johnson (Lyndon B.) Space Center R and D Productivity: New Challenges for the US Space Program p 121-131 1985 refs

Avail: NTIS HC A25/MF A01 CSCL 05/1

Research and development units are faced with the challenging objective of being cost effective while developing high quality, innovative products. Advanced technology is only part of the solution. It is increasingly clear that organization structures and managerial processes must also be designed and structured to meet the dual objectives of quality and efficiency. The results of an empirical case analysis of a large R & D division which is attempting to meet this challenge is presented. Author

N86-15178*# Rockwell International Corp., Canoga Park, CA.

PRODUCTIVITY IMPROVEMENT IN ENGINEERING AT ROCKETDYNE

R. M. NORDLUND, S. T. VOGT, and A. K. WOO *In* NASA. Johnson (Lyndon B.) Space Center R and D Productivity: New Challenges for the US Space Program p 231-238 1985

Avail: NTIS HC A25/MF A01 CSCL 05/1

The Rocketdyne Division of Rockwell International has embarked on a productivity improvement program in engineering. This effort included participation in the White Collar Productivity Improvement (WCPI) project sponsored by the American Productivity Center. A number of things have been learned through this project. It seems that any productivity improvement project should be employee driven. The Rocketdyne project was essentially started as a result of a grassroots effort to remove some particular hindrances, and employee enthusiasm was a prime factor in the continuing progress of the effort. A significant result was that awareness of problems at all levels increased. Many issues surfaced in the diagnostic phase, and were then noted and discussed. This process added legitimacy to issues that had previously been merely unspoken concerns. The initial feelings of many members of the pilot group was that significant changes would occur relatively quickly. It is now recognized that this will have to be an ongoing, long-term effort. Author

N86-15187*# McDonnell-Douglas Astronautics Co., Huntington Beach, CA. Man-Machine Systems.

SPACE CREW PRODUCTIVITY: A DRIVING FACTOR IN SPACE STATION DESIGN

H. L. WOLBERS *In* NASA. Johnson (Lyndon B.) Space Center R and D Productivity: New Challenges for the US Space Program p 340-350 1985 refs

Avail: NTIS HC A25/MF A01 CSCL 05/1

The criteria of performance, cost, and mission success probability (program confidence) are the principal factors that program or project managers and system engineers use in selecting the optimum design approach for meeting mission objectives. A frame of reference is discussed in which the interrelationships of these pertinent parameters can be made visible, and from which rational or informed decisions can be derived regarding the potential impact of adjustments in crew productivity on total Space Station System effectiveness. Author

N87-12166*# Lockheed Engineering and Management Services Co., Inc., Houston, TX.
THE SPACE STATION: HUMAN FACTORS AND PRODUCTIVITY
D. J. GILLAN, M. J. BURNS, C. L. NICODEMUS, and R. L. SMITH 1986 9 p
(Contract NAS9-15800)
(NASA-CR-179905; NAS 1.26:179905) Avail: NTIS HC A02/MF A01 CSCL 05/8

Human factor researchers and engineers are making inputs into the early stages of the design of the Space Station to improve both the quality of life and work on-orbit. Effective integration of the human factors information related to various Intravehicular Activity (IVA), Extravehicular Activity (EVA), and teletobotics systems during the Space Station design will result in increased productivity, increased flexibility of the Space Stations systems, lower cost of operations, improved reliability, and increased safety for the crew onboard the Space Station. The major features of productivity examined include the cognitive and physical effort involved in work, the accuracy of worker output and ability to maintain performance at a high level of accuracy, the speed and temporal efficiency with which a worker performs, crewmember satisfaction with their work environment, and the relation between performance and cost. B.G.

N88-19986# Joint Publications Research Service, Arlington, VA.
EFFICIENCY OF HUMAN WORKERS AND MEANS TO INCREASE IT Abstract Only
V. A. BODROV *In its* JPRS Report: Science and Technology. USSR: Life Sciences p 53 26 Feb. 1988 Transl. into ENGLISH from Psikhologicheskiy Zhurnal (Moscow, USSR), v. 8, no. 3, May - Jun. 1987 p 107-117
Avail: NTIS HC A04/MF A01

Work efficiency may be improved by periodic medical and psychological reviews, optimization of working conditions and direct action by regulation of the worker's professional activities, recreation, and physical preparation, psychogenic, physiological-hygenic, electrophysiological, pharmacological and physical means may be used to improve performance. Autogenic training has been used in relaxation training. Electrostimulation of nerves and muscles is recommended to to reduce discomfort during prolonged activity, and can be used to increase intellectual capacity. Available pharmaceuticals can improve work efficiency. Author

N88-24983*# United Technologies Corp., East Hartford, CT.
QUALITY AND PRODUCTIVITY DRIVE INNOVATION AND IMPROVEMENT AT UNITED TECHNOLOGIES AEROSPACE OPERATIONS, INC.
L. G. JAMAR 24 Nov. 1986 19 p Submitted for publication
(Contract NAS8-36300)
(NASA-CR-182944; NAS 1.26:182944) Avail: NTIS HC A03/MF A01 CSCL 14/4

Quality and innovation are the hallmarks of the national space program. In programs that preceded the Shuttle Program the emphasis was on meeting the risks and technical challenges of space with safety, quality, reliability, and success. At United Technologies Aerospace Operations, Inc. (UTAO), the battle has developed along four primary fronts. These fronts include programs to motivate and reward people, development and construction of optimized processes and facilities, implementation of specifically tailored management systems, and the application of appropriate measurement and control systems. Each of these initiatives is described. However, to put this quality and productivity program in perspective, UTAO and its role in the Shuttle Program are described first. B.G.

APPROACHES, METHODS, AND TECHNIQUES

A84-11669
RELIABILITY OF CERAMICS FOR HEAT ENGINE APPLICATIONS
S. BORTZ (IIT Research Institute, Chicago, IL) IN: Ceramics for high-performance applications III: Reliability. New York, Plenum Press, 1983, p. 445-473. refs

An assessment is made of recent demonstrations of ceramic heat engine component applications, with a view to the general state of this technology's development and the definition of problems that remain to be solved. These problems collectively constitute the need for reliability levels sufficiently high to warrant a commitment to manufacturing. Reliability improvements must be sought in design methodology, materials processing, component fabrication, materials development, quality assurance, and testing procedures. Iterative testing and development programs must be instituted which not only integrate all relevant technology areas, but involve effective feedback loops among them. O.C.

A84-15301
MANAGEMENT OF LARGE SPACE PROJECTS; COURSE ON SPACE TECHNOLOGY, TOULOUSE, FRANCE, MAY 3-14, 1982, PROCEEDINGS [LA GESTION DES GRANDS PROJETS SPATIAUX; COURS DE TECHNOLOGIE SPATIALE, TOULOUSE, FRANCE, MAY 3-14, 1982, EXPOSES]
Course sponsored by the Centre National d'Etudes Spatiales. Toulouse, Cepadues-Editions, 1983, 872 p. In French and English.

Topics discussed in an 11-day course on space technology sponsored by CNES to characterize the management techniques involved in the development of large space projects are presented, with attention focused on the production of the Ariane launch vehicle. Consideration is devoted to management of the day-to-day progress of a project that involved ESA, CNES, and European industries. Note is taken of contract features which distributed authority for various management and manufacturing tasks, established production and delivery schedules, specified performances, and characterized interface components. Scheduling techniques included setting margins for delivery dates in order to ameliorate the effects of the delay of delivery of any one subsystem on the project as a whole. Examples are cited from the Ariane, SPOT, and Spacelab projects. M.S.K.

A84-15327
COURSE ON PROJECT MANAGEMENT - THE SPOT CASE [COURS DE GESTION DE PROJET - LE CAS SPOT]
P. COUILLARD (Centre National d'Etudes Spatiales, Toulouse, France) IN: Management of large space projects; Course on Space Technology, Toulouse, France, May 3-14, 1982, Proceedings. Toulouse, Cepadues-Editions, 1983, p. 865-872. In French.

The development of the French-Belgian-Swedish remote-sensing satellite SPOT is surveyed, with an emphasis on management techniques. The design requirements and early developmental history of the satellite are reviewed, noting the many innovative features which require extensive development efforts. The project evolved in four main phases: preliminary design and feasibility studies, definition, development, and realization. It is pointed out that the decision to proceed is ideally made after the first phase, but that realistic cost estimates are available only after the second; an early decision, which necessarily involves risk, is recommended. The organizational structure is described, with detailed discussion of the management of delays, costs, and

configuration. Strict adherence to established management rules is found to be absolutely essential for undertakings of this scale.
T.K.

A84-18250#
MEASURING TEST PRODUCTIVITY - THE ELUSIVE DREAM
D. T. WARD and E. J. CROSS, JR. (Texas A & M University, College Station, TX) AIAA, AHS, IES, SETP, SFTE, and DGLR, Flight Testing Conference, 2nd, Las Vegas, NV, Nov. 16-18, 1983. 11 p. refs
(AIAA PAPER 83-2716)

The paper summarizes definitions and terminology relating to measurement of Test and Evaluation productivity before settling on the appropriate criteria for such a measurement model. A productivity measurement scheme suited for use by Test and Evaluation organizations is suggested. This mathematical model is a simplified version of one proposed by the American Productivity Center and applied to an aircraft maintenance facility by Fletcher. It includes only four primary variables: safety, schedule, cost, and deficiencies reported with varying degrees of objectivity and subjectivity involved in quantifying them. A hypothetical example of a fighter aircraft flight test program is used to illustrate the application of the productivity measurement model. The proposed model is intended to serve as a first iteration procedure and should be tested against real test programs to verify and refine it.
Author

A84-24448
SOFTWARE ENGINEERING ECONOMICS
B. W. BOEHM (TRW, Inc., Software Information, Systems Div., Redondo Beach, CA) IEEE Transactions on Software Engineering (ISSN 0098-5589), vol. SE-10, Jan. 1984, p. 4-21. refs

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

A84-24449
SOFTWARE DEVELOPMENT MANAGEMENT PLANNING
J. COOPER (CACI, Inc., Arlington, VA) IEEE Transactions on Software Engineering (ISSN 0098-5589), vol. SE-10, Jan. 1984, p. 22-26.

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

A84-24637#
ENVIRONMENTAL CONTROL AND LIFE SUPPORT (ECLS) DESIGN OPTIMIZATION APPROACH
H. F. BROSE (United Technologies Corp., Hamilton Standard Div., Windsor Locks, CT) IN: Space station: Policy, planning and utilization; Proceedings of the Symposium, Arlington, VA, July 18-20, 1983. New York, American Institute of Aeronautics and Astronautics, 1983, p. 189-194.

The design of environmental-control and life-support (ECLS) systems for the proposed space station is discussed. Design constraints imposed by the overall station concept include crew size and tour of duty, evolutionary vs. integral development, power concept, orbit-keeping and ACS concept, and EVA requirements. The design process involves selecting the station scenario or range of scenarios to be realized, setting the ECLS standards, reviewing concepts capable of meeting these standards, performing payback analysis, and selecting the technologies using specific criteria. Basic, intermediate, and growth versions of a station ECLS system are presented in block diagrams and characterized. A flexible design approach applicable to different scenarios is recommended.
T.K.

A84-30574* National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
OPERATIONAL AWARENESS IN FUTURE SPACE TRANSPORTATION SYSTEM CONCEPTS AND TECHNOLOGY SELECTIONS
D. G. EIDE and W. D. MORRIS (NASA, Langley Research Center, Space Systems Div., Hampton, VA) IN: Astrodynamics 1983; Proceedings of the Conference, Lake Placid, NY, August 22-25, 1983. Part 2. San Diego, CA, Univelt, Inc., 1984, p. 831-852. refs
(AAS PAPER 83-382)

An analysis of operations for a two-stage, fully reusable future space transportation system has been performed, and the results are discussed. The value of conducting an analysis of operations in the conceptual design phase to produce a highly productive system was demonstrated by obtaining estimated reductions in resources and ground turnaround time and comparing them with estimated mature Shuttle program requirements. Cooperative efforts by users, future vehicle designers, and operations analysts during the conceptual design phase are shown to produce an efficient vehicle design with broad market potential. The synergistic effects of vehicle design configuration, subsystems, and procedures can enhance productivity of the transportation system as measured by flexibility, availability, and viability. Advanced technologies and subsystems beneficial to such a system are identified. C.D.

A84-35922#
METHODS AND OPERATIONAL MEANS FOR PROJECT MANAGEMENT [METHODEN UND ARBEITSMITTEL FUER DAS PROJEKTMANAGEMENT]
W.-D. PILZ (Messerschmitt-Boelkow-Blohm GmbH, Munich, West Germany) Verein Deutscher Ingenieure and Gesellschaft Energietechnik, Jahrestagung, Universitaet Essen - Gesamthochschule, Essen, West Germany, Feb. 27, 28, 1984, Paper. 21 p. In German.
(MBB-UR-673-84-OE)

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

A84-35924
COMPUTER APPLICATIONS IN PRODUCTION AND ENGINEERING; PROCEEDINGS OF THE FIRST INTERNATIONAL CONFERENCE, AMSTERDAM, NETHERLANDS, APRIL 25-28, 1983
E. A. WARMAN, ED. Conference sponsored by the International Federation for Information Processing. Amsterdam, North-Holland Publishing Co., 1983, 1168 p.

Various topics on computer applications in production and engineering are addressed. The general topics considered include: the state of the art, socioeconomic aspects and human interfaces, fundamentals, information processing techniques, industrial techniques and applications, and future trends. No individual items are abstracted in this volume C.D.

A84-42760
PLANNING THE USE OF ROBOTS
L. BERNIER (Bernier and Associates, Inc., Topsfield, MA), L. SHPINER (CfC, Inc., Dayton, OH), and L. WARREN (LMS Warren, Inc., Olympia Fields, IL) IN: National Technical Conference, 15th, Cincinnati, OH, October 4-6, 1983, Proceedings. Azusa, CA, Society for the Advancement of Material and Process Engineering, 1983, p. 419-430. refs

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

A84-42782
THE USE OF INTERACTIVE COMPUTER-AIDED DESIGN IN THE DEVELOPMENT OF SPACE HARDWARE
D. L. FULTON and O. J. WOLLA (Rockwell International Corp., Rocketdyne Div., Canoga Park, CA) IN: National Technical Conference, 15th, Cincinnati, OH, October 4-6, 1983, Proceedings. Azusa, CA, Society for the Advancement of Material and Process Engineering, 1983, p. 742-744.

The 1980s have seen a revolutionary growth in the application of computer technology in product development. Initial efforts have been primarily in the drafting or 2D area with limited use of 3D modeling. This presentation reviews what has been accomplished, what is being done today, and a look into the near future. Discussion covers integration of this technology with Design, Analysis, Manufacturing and Quality Assurance, with special emphasis on use of 3D modeling in the Systems Integration function. The ability to integrate data among these disciplines within a company as well as between companies presents one of the major challenges in moving toward the 'paperless' factory. Author

A85-23197*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
A SYSTEM-LEVEL APPROACH TO AUTOMATION RESEARCH
F. W. HARRISON and N. E. ORLANDO (NASA, Langley Research Center, Flight Dynamics and Control Div., Hampton, VA) University of Alabama in Huntsville and University of Alabama in Birmingham, Annual Robotics Conference, 4th, University of Alabama, Huntsville, AL, Apr. 26, 1984, Paper. 17 p. refs

Automation is the application of self-regulating mechanical and electronic devices to processes that can be accomplished with the human organs of perception, decision, and actuation. The successful application of automation to a system process should reduce man/system interaction and the perceived complexity of the system, or should increase affordability, productivity, quality control, and safety. The expense, time constraints, and risk factors associated with extravehicular activities have led the Automation Technology Branch (ATB), as part of the NASA Automation Research and Technology Program, to investigate the use of robots and teleoperators as automation aids in the context of space operations. The ATB program addresses three major areas: (1) basic research in autonomous operations, (2) human factors research on man-machine interfaces with remote systems, and (3) the integration and analysis of automated systems. This paper reviews the current ATB research in the area of robotics and teleoperators. Author

A86-14435#
INFLUENCE OF COMPUTER AIDS ON ENGINEERING PRODUCTIVITY
D. E. PALMER (Ford Aerospace and Communications Corp., Palo Alto, CA) AIAA, AHS, and ASEE, Aircraft Design Systems and Operations Meeting, Colorado Springs, CO, Oct. 14-16, 1985. 4 p. (AIAA PAPER 85-3099)

This paper discusses two different methodologies of improving productivity in an environment of satellite design for communications and weather observation. Ford Aerospace and Communications Western Development Laboratories in Palo Alto, California has a Space Systems Operation which designs and manufactures commercial satellites. In the last 5 years, much attention has been put on improving the productivity of the engineering and support functions of the Space Systems Operation. The result of this attention was the development of the two methodologies discussed. Both of these have proven that computer aids can significantly improve productivity in the area of engineering design and engineering support tasks. Author

A86-14850
EXPERT SYSTEMS AND THE 'MYTH' OF SYMBOLIC REASONING
J. DOYLE (Carnegie-Mellon University, Pittsburgh, PA) IEEE Transactions on Software Engineering (ISSN 0098-5589), vol. SE-11, Nov. 1985, p. 1386-1390. refs
(Contract F33615-81-K-1539)

Elements of the artificial intelligence approach to expert systems offer great productivity advantages over traditional approaches to application systems development, even though the end result may be a program employing no AI techniques. These productivity advantages are the hidden truths behind the 'myth' that symbolic reasoning programs are better than ordinary ones. Author

A86-17472
QUALITY CONTROL, RELIABILITY, AND ENGINEERING DESIGN
B. S. DHILLON (Ottawa, University, Canada) New York, Marcel Dekker, Inc. (Industrial Engineering. Volume 10), 1985, 308 p. refs

An introductory test on quality control, reliability, and engineering design is presented. The topics discussed include: basic mathematical concepts, economic considerations, introduction to quality control, management for quality control, quality costs and procurement quality control, statistical quality control, applied quality control, introduction to reliability, design for reliability, time-dependent reliability models, and reliability estimation. Also addressed are: introduction to engineering design, the design process, engineering design reviews, reliability and maintainability in systems design, human factors in engineering design, and design optimization methods. C.D.

A86-17672
IDENTIFYING TECHNICAL INNOVATIONS
R. MUESER (AT&T Bell Laboratories, Short Hills, NJ) IEEE Transactions on Engineering Management (ISSN 0018-9391), vol. EM-32, Nov. 1985, p. 158-176. refs

Technical innovation is a concept proposed by economist Joseph Schumpeter almost 50 years ago. Initially ignored, it is now considered the key to improving high-tech productivity. Most writers agree on a definition which identifies the start as a novel creative step, and the end as the time of commercial availability or general use. There appear to be two basic categories of technical innovation: the first stems from research or exploration, starts with some kind of breakthrough, and requires a long period to bring to market. The second is the result of a new planned effort and usually reaches the market in a fraction of the time required for a research innovation. Author

A86-19524* Jet Propulsion Lab., California Inst. of Tech., Pasadena.
SCIENCE OPERATIONS MANAGEMENT
G. F. SQUIBB (California Institute of Technology, Jet Propulsion Laboratory, Pasadena) IN: The National Symposium and Workshop on Optical Platforms, Huntsville, AL, June 12-14, 1984, Proceedings. Bellingham, WA, SPIE - The International Society

for Optical Engineering, 1984, p. 4-9. NASA-supported research. refs

The operation teams engaged in the IR Astronomical Satellite (IRAS) project included scientists from the IRAS International Science Team. The detailed involvement of these scientists in the design, testing, validation, and operations phases of the IRAS mission contributed to the success of this project. The Project Management Group spent a substantial amount of time discussing science-related issues, because science team coleaders were members from the outset. A single scientific point-of-contact for the Management Group enhanced the depth and continuity of agreement reached in decision-making. O.C.

A86-24116

ENTREPRENEURIAL SPIRIT COMBINES WITH HARD-HEADED BUSINESS SENSE

R. G. OLONE Commercial Space (ISSN 8756-4831), vol. 1, Fall 1985, p. 37-39.

The difficulties encountered by small companies in their development and completion of space projects are examined. The lack of adequate capital to complete the intended projects is analyzed. The inexperience of the personnel, the selection of improper projects, and improper calculation of the time required to complete the projects are all factors which contributed to the failure of many companies. The assembly of experienced and competent management teams is discussed. The possible need for private entrepreneurs to join with large aerospace firms in order to complete space projects is investigated. Examples of companies which have tried and failed to complete space projects are presented. I.F.

A86-25090

AIRCRAFT DESIGN AT KINGSTON POLYTECHNIC

R. WHITFORD (Kingston Polytechnic, Kingston-upon-Thames, England) Aircraft Engineering (ISSN 0002-2667), vol. 57, Dec. 1985, p. 10-12.

The aeronautical engineering group design project at Kingston Polytechnic is described. The role of the project supervisor and the establishment of design teams are discussed. The utilization of computer packages which will provide specific aircraft information to the students in tabular or graphical form is examined. The interaction between the team members and related industries is analyzed. The organization of the data by the project coordinator in order to produce the final design report is discussed. I.F.

A86-28304

SOME CURRENT PROBLEMS IN RELIABILITY [O NEKOTORYKH AKTUAL'NYKH PROBLEMAKH NADEZHNOSTI]

E. IU. BARZILOVICH and B. V. GNEDENKO IN: Problems in aircraft reliability. Moscow, Izdatel'stvo Mashinostroenie, 1985, p. 4-9. In Russian.

The general aspects of the theory of reliability of structures are examined, with particular attention given to the problems that remain unsolved or have been studied insufficiently. Such problem include the study of the man-machine system, the development of methods for predicting failures, the evaluation of the quality of products produced in small batches, and the organization of the maintenance and repair of a stock of similar machines. V.L.

A86-34963* National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, AL.

MOTIVATIONAL CONTRACTING IN SPACE PROGRAMS - GOVERNMENT AND INDUSTRY PROSPECTIVES

D. R. CLOUGH (NASA, Marshall Space Flight Center, Huntsville, AL) IN: Space and society - Progress and promise; Proceedings of the Twenty-second Space Congress, Cocoa Beach, FL, April 23-26, 1985. Cape Canaveral, FL, Canaveral Council of Technical Societies, 1985, p. 3-5 to 3-20.

NASA's Marshall Space Flight Center has used incentive-free policies in contracting for Apollo's Saturn Launch vehicle hardware, as well as award-fee contracts for major development and early production programs in the case of the Space Shuttle Program. These programs have evolved to a point at which multiple incentive fees are useful in motivating cost reductions and assuring timely achievement of delivery requirements and flight mission goals. An examination is presently conducted of the relative success of these motivation-oriented techniques, drawing on the comments of both government and industry personnel. O.C.

A86-39983

THE ECONOMICS OF THE AIRCRAFT INDUSTRY (2ND REVISED AND ENLARGED EDITION) [EKONOMIKA AVIATSIONNOI PROMYSHLENNOSTI /2ND REVISED AND ENLARGED EDITION/]

S. A. SARKISIAN and D. E. STARIK Moscow, Izdatel'stvo Vysshaia Shkola, 1985, 320 p. In Russian. refs

Aspects of aircraft-industry economics in the Soviet Union are reviewed, with emphasis on economic analysis and planning methods. Particular attention is given to ways to intensify production, increase productivity, improve work quality, and enhance cost effectiveness and resource utilization. B.J.

A87-15832*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, AL.

NASA'S ROBOTIC SERVICING ROLE FOR SPACE STATION

L. POWELL, R. GOSS (NASA, Marshall Space Flight Center, Huntsville, AL), and R. SPENCER (Martin Marietta Corp., Denver, CO) IAF, International Astronautical Congress, 37th, Innsbruck, Austria, Oct. 4-11, 1986. 8 p. refs

(IAF PAPER 86-47)

Attention is given to evaluations of the relative impacts on and benefits to the Space Station Program of various levels of robotics devices for space servicing operations. The leading robotic candidate concept for the IOC Space Station, the Smart Front End, uses a small, stiff and highly dexterous work effector controlled by a human-in-the-loop from a remote control station. This configuration offers both a quality multifunctional performance capability at the work site as well as technology transparency through the ground teleoperation control mode. K.K.

A87-17711

ORGANIZATION, PLANNING, AND MANAGEMENT OF AVIATION ORGANIZATIONS DEALING WITH SCIENTIFIC RESEARCH AND PRODUCTION [ORGANIZATSIIA, PLANIROVANIE I UPRAVLENIE AVIATSIONNYMI NAUCHNO-PROIZVODSTVENNYMI ORGANIZATSIIAMI]

I. F. BAIDIUK, V. V. BOIKO, A. D. DONETS, V. I. KIRIANOV, V. I. KOZLOVSKII et al. Moscow, Izdatel'stvo Mashinostroenie, 1985, 344 p. In Russian. refs

This work considers systems and methods for organizing, planning, and managing aviation organizations dealing with aircraft R&D, design, and production. Particular attention is given to the organization of the production process and the structuring of research institutes and research-production conglomerates. Questions of quality control, performance evaluation, and economic analysis are addressed. B.J.

A87-17892#

PERSONAL COMPUTER UTILIZATION FOR ASSOCIATE CONTRACTOR MANAGEMENT VISIBILITY AND PRODUCTIVITY ENHANCEMENT

J. R. LOREN (Boeing Mojave Test Center, Edwards AFB, CA) AIAA, AHS, and ASEE, Aircraft Systems, Design and Technology Meeting, Dayton, OH, Oct. 20-22, 1986. 11 p.

(AIAA PAPER 86-2633)

A87-19235

LOGISTICS/ENGINEERING COMMUNITY COOPERATION - A CASE STUDY

C. LUCHUN, P. H. RENSON (Avco Lycoming Textron, Stratford, CT), J. P. DEMASE, and C. E. LANGSTON, JR. (United Technologies Corp., Pratt and Whitney, West Palm Beach, FL) IN: American Helicopter Society, Annual Forum, 42nd, Washington, DC, June 2-4, 1986, Proceedings. Volume 1. Alexandria, VA, American Helicopter Society, 1986, p. 409-412.

With the increased recognition of Life Cycle Cost in today's market place, it has become evident that a new approach to doing business is required. Many companies are teaming together to consolidate their resources in order to provide the best available products. Such is the case for two industry leaders, AVCO Lycoming and Pratt and Whitney, who have teamed to develop the T800-APW-800 engine for the U.S. Army's LHX helicopter. Their innovative approach to incorporating Reliability, Availability, Maintainability/Integrated Logistics Support/Manpower Personnel Integration (RAM/ILS/MANPRINT) characteristics early in the design phase will insure an end product that meets the customer's requirements. Author

A87-19603* National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.
ARTIFICIAL INTELLIGENCE FOR SPACE STATION AUTOMATION: CREW SAFETY, PRODUCTIVITY, AUTONOMY, AUGMENTED CAPABILITY
O. FIRSCHEIN, M. P. GEORGEFF, W. PARK, P. C. CHEESEMAN, J. GELDBERG (NASA, Advanced Technology Advisory Committee, Houston, TX; SRI International, Menlo Park, CA) et al. Research sponsored by NASA. Park Ridge, NJ, Noyes Publications, 1986, 400 p. refs

Artificial intelligence (AI) R&D projects for the successful and efficient operation of the Space Station are described. The book explores the most advanced AI-based technologies, reviews the results of concept design studies to determine required AI capabilities, details demonstrations that would indicate the existence of these capabilities, and develops an R&D plan leading to such demonstrations. Particular attention is given to teleoperation and robotics, sensors, expert systems, computers, planning, and man-machine interface. K.K.

A87-44064
AVIATION SAFETY AND THE FAA'S QUALITY ASSURANCE PROGRAM
ALAN ARMSTRONG Air Law (ISSN 0165-2079), vol. 12, April 1987, p. 58-67. refs

The FAA Quality Assurance Program (QAP) aimed at identifying problems in the national airspace system is examined. The implementation and operation of the Snitch program, conflict alert software connected to ATC computers to signal aircraft deviation from ATC clearance or if separation between aircraft is less than a percentage of the prescribed criteria, are described. Recent changes by the FAA in the QAP/Snitch program and pilot certificate actions related to pilot deviations detected by Snitch are identified and analyzed. I.F.

A87-44749
COMPOSITE MATERIALS AND THE CHALLENGE OF BUSINESS RENEWAL
H. J. SEIGEL and R. J. JUERGENS (McDonnell Aircraft Co., St. Louis, MO) IN: Materials in aerospace; Proceedings of the First International Conference, London, England, Apr. 2-4, 1986. Volume 2. London, Royal Aeronautical Society, 1986, p. 424-439.

A general characterization is made of the opportunities for expansion in composite materials-related industries, and of the managerial and human resources factors that can be marshalled for maximization of that growth. Attention is also given to factors of quality control and comparative productivity. The considerations suggested to be central to the strategic management of the composites industry encompass factory automation, computer-aided curing, improved processing science, and more sophisticated resin characterization. O.C.

A87-48603#
LESSONS LEARNED FROM PAST PROGRAMS - AIR TRAFFIC CONTROL
B. N. ETHERIDGE and R. W. PEAK, JR. (Martin Marietta Corp., Air Traffic Control Div., Washington, DC) AIAA and NASA, International Symposium on Space Information Systems in the Space Station Era, Washington, DC, June 22, 23, 1987. 10 p. (AIAA PAPER 87-2222)

The application of system engineering management to the modernization of large systems, in particular to the National Airspace System (NAS), is examined. The classical approach to system engineering, and the four-level scheme for the design of the NAS are discussed. Consideration is given to system and subsystem requirements, design, and integration, and system verification, deployment, and activation. I.F.

A87-49199
MANAGEMENT OF UNITED STATES AIR FORCE (USAF) OPERATIONAL TEST AND EVALUATION (OT&E) FLIGHT TEST PROGRAMS
STEPHEN P. HERRLINGER (USAF, Edwards AFB, CA) IN: Society of Flight Test Engineers, Annual Symposium, 17th, Washington, DC, Aug. 10-14, 1986, Proceedings. Lancaster, CA, Society of Flight Test Engineers, 1986, p. 1.1-1 to 1.1-5.

USAF Operational Test and Evaluation (OT&E) objectives during flight test are similar, yet distinctively different from Developmental Test and Evaluation (DT&E) objectives. The interactions and relationships required between DT&E and OT&E teams in accomplishing their respective charters will be highlighted. Specifically, inputs from the 31st Test and Evaluation Squadron (TES), Strategic Air Command (SAC), to various OT&E projects at Edwards AFB, CA, will be reviewed to illustrate the interaction between the Systems Program Office (SPO), the Air Force Operational Test and Evaluation Center (AFOTEC), the Combined Test Force (CTF), the Air Force Flight Test Center (AFFTC), and contractors. Author

A87-53058
AAAIC '86 - AEROSPACE APPLICATIONS OF ARTIFICIAL INTELLIGENCE; PROCEEDINGS OF THE SECOND ANNUAL CONFERENCE, DAYTON, OH, OCT. 14-17, 1986. VOLUME I
Conference sponsored by Systran Corp., Honeywell, Inc., McDonnell-Douglas Corp., et al. Dayton, OH, AAAIC Conference Secretariat, 1986, 272 p. For individual items see A87-53059 to A87-53075.

The present conference on aerospace applications of emerging AI technologies considers topics in spacecraft systems, man/machine interfaces, image analysis and recognition, aircrew aids, personnel training, design automation, command/control/communications applications, AI-based manufacturing and planning, and speculations on AI development trends. Attention is given to AI-based satellite and Space Station autonomy, problems met in the integration of AI into crew systems, AI in diagnostics, real-time pilot-in-the-loop AI, principles of parallel programming, design automation software tools, mission-planning problems, biologically motivated AI, architecture-based machine intelligence, and AI in aerospace factory applications. O.C.

A87-53567
ASSURANCE OF QUALITY AND RELIABILITY FOR EUROPEAN SPACE FLIGHT PROJECTS [SICHERUNG VON QUALITAET AND ZUVERLAESSIGKEIT FUER EUROPAEISCHE RAUMFAHRTPROJEKTE]
JUERGEN BECK (DFVLR, Oberpfaffenhofen and Cologne, West Germany) and HELMUT A. SCHUETZ (DFVLR, Cologne, West Germany) DFVLR-Nachrichten (ISSN 0011-4901), June 1987, p. 24-26. In German.

Steps currently being taken to assure the quality and reliability of future European space flights are reviewed. The different steps that must be taken to assure the quality of a given project are stated, and the tests that need to be carried out are indicated. European committees that oversee the quality of the components of space systems are mentioned, and their work is discussed. Recommendations are made to improve the present situation. C.D.

A88-15872*# National Aeronautics and Space Administration, Washington, DC.
EVOLUTIONARY SPACE STATION INFRASTRUCTURE
ALPHONSO V. DIAZ and BARBARA S. ASKINS (NASA, Office of Space Station, Washington, DC) IAF, International Astronautical

Congress, 38th, Brighton, England, Oct. 10-17, 1987. 8 p.
(IAF PAPER 87-103)

This paper discusses the approach to Space Station evolution planning and the preliminary analysis of options for the evolution of the infrastructure. The approach emphasizes the analysis of evolution paths, driven by specific user requirements, and evolution modes, i.e., the infrastructure required to support the evolution paths. The objective is to determine the near-term actions that must be taken to protect the future options. These include the identification of evolution 'hooks and scars' on the baseline Space Station and the establishment of an evolution advanced development program. The near term emphasis of the evolution planning is on methods of increasing the efficiency and productivity of the Space Station and on requirements to support new initiatives currently being studied by NASA. Author

A88-16918
THE DESIGN AGENT PROCESS AS A STRATEGY FOR FUTURE AVIONICS COMPETITION ENHANCEMENT AND QUALITY ASSURANCE
WILLIAM J. DELANEY (Charles Stark Draper Laboratory, Inc., Cambridge, MA) IN: Avionics in conceptual system planning; Proceedings of the Eighth Annual IEEE Symposium, Dayton, OH, Dec. 3, 1986. New York, Institute of Electrical and Electronics Engineers, Inc., 1986, p. 53-58.

The design agent concept of acquisition management is examined with particular reference to future avionics acquisition requirements. The activities, responsibilities, and competition enhancing benefits of the design agent approach to acquisition management are discussed and illustrated by several different application examples. It is claimed that the design agent's ability to uniquely establish and control multiple contractors for competition enhancement purposes has direct relevance to the need for improved acquisition strategies on select 6.3 programs. V.L.

A88-23868
EXPERIENCES OF PROGRAMME PLANNING AND MANAGEMENT FROM THE CUSTOMER'S VIEWPOINT
C. J. U. ROBERTS (Ministry of Defence Procurement Executive, London, England) IN: Development time scales: Their estimation and control; Proceedings of the Symposium, London, England, Feb. 12, 1987. London, Royal Aeronautical Society, 1987, p. 134-139.

The methodology of Technology Demonstrator Programs (TDPs) is presently suggested to be capable of making major contributions to controlling the costs and time-scales associated with high technology, defense-related projects. TDPs yield a quantity and quality of knowledge, and an infrastructural resource, that can help in the formation of effective design and management teams when the same technology is applied in subsequent weapon system development projects. It is noted that if a TDP is launched too early, the technology used may not be relevant to subsequent projects; if too late, the technology development effort involved may prove irrelevant. O.C.

A88-24807
ENGINEERING MANAGEMENT: CONCEPTS, PROCEDURES AND MODELS
B. S. DHILLON (Ottawa, University, Canada) Lancaster, PA, Technomic Publishing Co., Inc., 1987, 373 p. refs

Engineering management (EM) techniques are examined in an introductory text intended for undergraduate and graduate engineering and EM students. Chapters are devoted to organizing, the human element in EM, creativity, manpower planning and control, selecting engineering projects, project management, EM of technical proposals and specifications, EM of contracts, and techniques for making better EM decisions. Consideration is given to mathematical models of EM decision making, product development and costing, EM of design and drawings, value engineering and configuration management, EM of product assurance sciences, EM of maintenance, marketing, product warranties and liabilities, and work study. Diagrams, tables, and exercises are provided. T.K.

A88-26175* National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.
EUROPEAN/U.S. COOPERATIVE FLIGHT TESTING - SOME FOOD FOR THOUGHT
RONALD M. GERDES (NASA, Ames Research Center, Moffett Field, CA) Cockpit (ISSN 0742-1508), July-Sept. 1987, p. 4-9.

Increasing numbers of flight test teams are participating in cooperative European/U.S. flight test programs due to the growth in international aircraft R&D. Preparing for and participating in these overseas assignments can be complicated by such factors as language barriers, unfamiliar flight test procedures, lack of adequate flight experience and unexpected weather trends. A visiting test pilot's checklist is presented which outlines the tasks of the various phases (i.e., concept, planning, preparation, execution, analysis, and data presentation). K.K.

A88-32710
PRODUCTIVITY STRATEGIES - PHILOSOPHY AND EUROPEAN ACTIVITY [PRODUCTIQUE - PHILOSPHIE ET ACTIONS EUROPEENNES]
J. AUDY (Aerospatiale, Paris, France) L'Aeronautique et l'Astronautique (ISSN 0001-9275), no. 128, 1988, p. 10-17. In French.

Methods for coordinating the simultaneous enhancement of the productivity, quality, and flexibility of an industrial enterprise are discussed, with emphasis on aerospace activities. Using tools such as data bases, networks, and expert systems, and numerical methods such as computer simulation, strategies are developed both with respect to a particular stage of production (for various types of products) and to a particular product (for the various stages of production). The integration of production activities takes into account such aspects as analysis methods, information systems, the man/machine interface, and communications networks. The application of the SET (Standard d'Echange et de Transfert) production strategy to the A 320, Ariane 5, and Hermes programs is discussed. R.R.

A88-32712
FLEXIBLE TECHNOLOGY AND PERFORMANCE [TECHNOLOGIES FLEXIBLES ET PERFORMANCES]
JEAN-CLAUDE TARONDEAU (Paris X, Universite, Nanterre; Ecole Superieure des Sciences Economiques et Commerciales, Paris, France) L'Aeronautique et l'Astronautique (ISSN 0001-9275), no. 128, 1988, p. 32-38. In French. refs

A model has been developed to assess the effect of the introduction of flexible technologies on the degree of automation, the system flexibility, the organizational structure, and performance factors such as productivity, equipment life, and production delays. For the case of production activities with only a limited degree of automation, the introduction of flexible technology is found to result in a significant increase in automation which may be accompanied by a loss in flexibility. For the case of highly automated production systems, the introduction of flexible technology is shown to result in a strong increase in flexibility but only a moderate increase in the degree of automation. R.R.

A88-35077
COMPETITION AND COOPERATION IN INTERNATIONAL JOINT PROJECTS
BRENDA FORMAN (Lockheed Corp., Calabasas, CA) IN: Aerospace century XXI: Space missions and policy; Proceedings of the Thirty-third Annual AAS International Conference, Boulder, CO, Oct. 26-29, 1986. San Diego, CA, Univelt, Inc., 1987, p. 455-462.
(AAS PAPER 86-342)

An analysis is undertaken of the tension between cooperation and competition in joint endeavors, beginning with the company-to-company teaming arrangement, through large-scale R&D consortia formed under the National Cooperative Research Act of 1984, to major international undertakings such as the U.S.

Space Station. Examples are discussed of various techniques used to protect proprietary information while furthering the goals of the joint undertaking. Author

A88-39660
PERSPECTIVES ON PROJECT MANAGEMENT
R. N. G. BURBRIDGE, ED. (Central Electricity Generating Board, London, England) London, Peter Peregrinus, Ltd. (IEE Management of Technology Series. Volume 7), 1988, 167 p. No individual items are abstracted in this volume.
The fundamental principles of engineering project management (PM) are examined, with an emphasis on UK practice, in chapters contributed by leading experts. Topics addressed include historical and contemporary perspectives, a client's view of PM, the project and the community, high-budget projects, joint-venture projects, and contract strategy. Consideration is given to turnkey vs multicontract projects, quality assurance and PM, computer applications to PM, and the essential features of PM. T.K.

A88-43349#
R&M QUALITY TEAM CONCEPT: A NEW R&M 2000 INITIATIVE
JAMES F. GUZZI (USAF, Wright-Patterson AFB, OH) IN: Annual Reliability and Maintainability Symposium, Los Angeles, CA, Jan. 26-28, 1988, Proceedings. New York, Institute of Electrical and Electronics Engineers, Inc., 1988, p. 277-279. refs
The Aeronautical Systems Division's C-17 System Program Office has introduced a project management initiative designed to improve the effectivenss of a company's design organization, and to recognize and manage the reliability and maintainability (R&M) program in day-to-day design activities. The initiative, which is called the R&M Quality Team Concept, uses R&M quality teams and a review council, integrated with a structured approach, to focus on system level R&M issues. I.E.

A88-46506
INFORMATION SYSTEMS: FAILURE ANALYSIS; PROCEEDINGS OF THE NATO ADVANCED RESEARCH WORKSHOP, BAD WINDSHEIM, FEDERAL REPUBLIC OF GERMANY, AUG. 18-22, 1986
JOHN A. WISE, ED. (Westinghouse Research and Development Center, Pittsburgh, PA) and ANTHONY DEBONS, ED. (Pittsburgh, University, PA) Workshop sponsored by NATO, Aluminum Company of America, and U.S. Army. Berlin and New York, Springer-Verlag (NATO ASI Series. Volume F32), 1987, 352 p. For individual items see A88-46507 to A88-46514.
Topics discussed include the systemic aspects of information system failure, investigative methods for the analysis of information system failure, and human and technological issues in failure analysis. Particular papers are presented on system failure as a result of design inadequacy, the investigative techniques used by the Presidential Commission on the Spacce Shuttle Challenger Accident, the use of expert systems in information systems, aviation accidents as due to failures of information management, and AI techniques for the distribution of critical information. B.J.

A88-51978#
WRIGHT BROTHERS LECTURESHIP IN AERONAUTICS: THE SKUNK WORKS' MANAGEMENT STYLE - IT'S NO SECRET
BEN R. RICH (Lockheed Aeronautical Systems Co., Burbank, CA) AIAA, AHS, and ASEE, Aircraft Design, Systems and Operations Meeting, Atlanta, GA, Sept. 7-9, 1988. 10 p.
(AIAA PAPER 88-4516)
An historical development and organizational-principles account is presented for the 'Skunk Works' management philosophy created at the Lockheed Aeronautical Systems Company by Clarence 'Kelly' Johnson, beginning in 1943, in order to tightly organize and expedite small, highly-classified advanced aircraft design and prototype construction projects. This management philosophy has produced such aircraft as the U-2 and SR-71 spy aircraft and the P-80 and F-104 fighters. The 14 management principles formulated by Johnson are presented and discussed. O.C.

A88-54365#
THE CFM56 ENGINE FAMILY - AN INTERNAL DEVELOPMENT
L. M. SPENCE (CFM International, Inc., Cincinnati, OH) and GEORGES SANGIS (CFM International, S.A., Paris, France) ASME, Gas Turbine and Aeroengine Congress and Exposition, Amsterdam, Netherlands, June 6-9, 1988. 7 p.
(ASME PAPER 88-GT-296)
The joint effort by General Electric of the United States and Societe Nationale d'Etude et de Construction de Moteurs d'Aviation (SNEGMA) of France to develop the CFM56 turbofan engine family is described. In particular, attention is given to the organization of the joint company, CFM International, current status of the CFM56 program, and commercial and military product support. The discussion also covers quality assurance, component improvement program, and configuration management. V.L.

N84-10351# Joint Publications Research Service, Arlington, VA.
EFFECTS OF SCIENCE, TECHNOLOGY ON STRUCTURE OF PRODUCTION PROCESS
Y. A. SKOBLIKOV *In its* USSR Rept.: Sci. and Technol., No. 19 (JPRS-84497) p 13-31 7 Oct. 1983 refs Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Ser. Ekon. (Moscow), no. 3, 1983 p 40-52
Avail: NTIS HC A06
The structure of the production process, patterns in its organization and the classification of production processes are considered. On the basis of an analysis of the dialectrical interconnection among stages of the production process - preparation and direct production - and the singling out of the type of production systems and the stages of their development, the organizational content of the scientific and technical revolution is determined. Practical recommendations are given for improving the organizational structure of industry. Author

N84-13012# Young (Arthur) and Co., Washington, DC.
OFFICE AUTOMATION MANAGEMENT GUIDE Final Report, Apr. - May 1983
May 1983 49 p
(Contract MDA903-79-C-0690)
(AD-A131770) Avail: NTIS HCA03/MFA01 CSCL 05/2
The Guide outlines planning, acquisition, implementation and post implementation evaluation considerations for information managers who are responsible for establishing office automation programs. This Guide was developed by Arthur Young & Company for the Information Resources Management Directorate, OASD(C). The Guide is intended to assist the Department in realizing the opportunities to increase the productivity and effectiveness of professional, administrative, and clerical personnel that are presented by office automation technologies. Author (GRA)

N84-13014# Pacific Northwest Labs., Richland, WA.
MANAGEMENT OF QA IN AN R AND D ORGANIZATION
D. E. RYDER Jun. 1983 7 p refs Presented at the 37th Ann. Am. Soc. for Quality Control Congr., Boston, 24-26 May 1983
(Contract DE-AC06-76RL-01830)
(DE83-016924; PNL-SA-10382; CONF-830535-3) Avail: NTIS HC A02/MF A01
Application of more formal QA-system principles and practices are slowly but surely becoming a fact of life for many of the nation's R and D organizations. As an example, the US Department of Energy (DOE) in 1981 issued an order to its field offices that involved requirements for the assurance of quality achievement in DOE programs. This paper will provide useful information based upon actual experience in the development and implementation of an R and D QA Program at a national laboratory. It will include a discussion of the R and D product (data), primary QA concerns, management of the QA program and QA organization, QA planning, and contributions that QA personnel can make to the R and D effort. DOE

N84-17064# ESDU International Ltd., London (England).
THE EVALUATION/VALIDATION PROCESS: PRACTICAL CONSIDERATIONS AND METHODOLOGY FOR THE EVALUATION OF PHENOMENOLOGICAL DATA
A. J. BARRETT *In* AGARD Develop. and Use of Numerical and Factual Data Bases 14 p Oct. 1983 refs
Avail: NTIS HC A06/MF A01

Scientists and engineers strive to ensure that their work is based upon objective principles and that it is repeatable to close tolerances. The factual and numerical data resources which are available to them, however, do not always assist this intention particularly where data are being used as a basis of decision in the engineering design process which is directed at the realization of a practical product goal. Subjective influences, related to imparted or acquired skills and experience, often apply in such cases. These have to be taken into account during the construction of numerical and factual data bases. The practical consequences of inadequately refined data are reflected in unnecessary costs and uncompetitive product performance. Careful management of data refinement is always needed and seen to be increasingly important as a greater proportion of data is stored electronically or becomes embedded in computer aided engineering and design systems. Author

N84-17065# Dow Chemical Co., Midland, MI. Thermal Group.
THE EVALUATION/VALIDATION PROCESS: DATA FROM DISCIPLINES RESTING ON GOOD THEORETICAL FOUNDATIONS
M. W. CHASE *In* AGARD Develop. and Use of Numerical and Factual Data Bases 9 p Oct. 1983 refs
Avail: NTIS HC A06/MF A01

Experimental and theoretical techniques are used to solve problems efficiently. To this end, however, the techniques must be used with a well defined plan in mind. A literature survey is first required to reveal available information which relates to the problem. The meshing of this information and any other soon to be released data is an important second step. The experiments and/or theoretical calculations must then be coordinated to reduce time and expense and to provide maximum data at minimum expense. From experience in developing the JANAF Thermochemical Tables, examples will be given where calculations were of sufficient accuracy to reduce the need for experimentation as in the thermodynamic properties of some chemical species. Comparisons and trends in data are also valuable to extend or replace data. Four thermodynamic studies are used to illustrate the value of theoretical efforts. Author

N84-18448# National Productivity Inst., Pretoria (South Africa).
PRODUCTIVITY AND THE FORGING INDUSTRY
A. STOCKING *In* South African Inst. for Production Engineering Fourth Seminar on Efficient Metal Forming and Machining 30 p 1982
Avail: NTIS HC A11/MF A01

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

N84-18449# AECI Ltd., North Rand (South Africa). Maintenance and Industrial Engineering.
PRODUCTIVITY IMPROVEMENT IN A JOBBING SHOP
P. J. J. DUPREEZ *In* South African Inst. for Production Engineering Fourth Seminar on Efficient Metal Forming and Machining 7 p 1982
Avail: NTIS HC A11/MF A01

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

N84-18955# RAND Corp., Santa Monica, CA.
STRATEGIES OF COOPERATION IN DISTRIBUTED PROBLEM SOLVING Interim Report
S. CAMMARATA, D. MCARTHUR, and R. STEEB Oct. 1983 31 p
(Contract MDA903-82-C-0061; ARPA ORDER 3460)
(AD-A136527; AD-F300360; RAND/N-2031-ARPA) Avail: NTIS HC A03/MF A01 CSCL 06/4

Distributed artificial intelligence is concerned with problem solving that is done by groups of agents. This note describes strategies of cooperation that groups require to solve shared tasks effectively. We discuss such strategies first in a domain independent fashion, and then in the context of a specific group problem solving application: collision avoidance in air traffic control. We begin by contrasting the methodologies, difficulties, and opportunities of distributed and centralized problem solving. From this analysis, we infer a set of requirements on the information gathering and organizational policies of group problem solving agents. We then discuss a set of distributed problem solvers that we have developed in the domain of air traffic control and describe some experimental findings with the cooperative strategies used. In particular, we note large task dependent differences in processing times, communication loads, and system errors between the several cooperative strategies. Author (GRA)

N84-19183# Civil Aeronautics Board, Washington, DC.
ECONOMIC CASES OF THE CIVIL AERONAUTICS BOARD, VOLUME 101, APRIL 1983 TO MAY 1983
1983 934 p
(PB84-127695) Avail: NTIS HC A99/MF A01 CSCL 05/3

Fitness investigations, services, and employee protection programs are considered. The argument presented by the contesting parties and the case rulings are included. GRA

N84-20165# Yale Univ., New Haven, CT. School of Organization and Management.
A NORMATIVE MODEL OF WORK TEAM EFFECTIVENESS Interim Report
J. R. HACKMAN Nov. 1983 74 p
(Contract N00014-80-C-0555)
(AD-A136398; AD-E000556; SOM-TR-2) Avail: NTIS HC A04/MF A01 CSCL 05/1

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

N84-20774# North Carolina State Univ., Raleigh. Office of Productivity Research and Extension Program.
ELECTRONICS/ELECTRICAL MANUFACTURING INDUSTRY RESEARCH NEEDS Interim Technical Report, Dec. 1982 - Apr. 1983
W. A. SMITH, JR. and R. L. EDWARDS May 1983 85 p
(Contract NSF MEA-82-16463)
(PB84-122969; CAM-83-2; NSF/MEA-83015) Avail: NTIS HC A05/MF A01 CSCL 13/8

A panel established a reference base of current activity for electronics manufacturing research by reviewing conventional and microelectronics state-of-the-art; education regarding technology and management; and cooperative efforts being developed. The Department of Defense Electronics Computer-Aided Manufacturing (ECAM) program, the Computer-Aided Manufacturing-International (CAM-I) Electronics Automation Project, and the Microelectronics Center of North Carolina received special attention. Participants were divided into three separate work sessions to identify gaps and issues in technology or operations which limit manufacturing performance in the areas: Logistics and Control Systems; Automation and Assembly; and Quality and Test. The list of priority research issues will be used as the basis to assess the capabilities for responding to needs. GRA

N84-21104# Human Engineering Labs., Aberdeen Proving Ground, MD.
HUMAN ENGINEERING GUIDELINES FOR MANAGEMENT INFORMATION SYSTEMS. CHANGE 1
D. E. HENDRICKS, P. W. KILDUFF, P. BROOKS, R. MARSHAK, and B. DOYLE 9 Jun. 1983 164 p
(AD-A137808; AD-E900298) Avail: NTIS HC A08/MF A01 CSCL 05/5

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

N84-21408*# National Aeronautics and Space Administration. John F. Kennedy Space Center, Cocoa Beach, FL.
INTERCENTER PROBLEM REPORTING AND CORRECTIVE ACTION SYSTEM (PRACAS)
G. H. BROCK and J. J. PALEY *In* NASA. Kennedy Space Center NASA Admin. Data Base Management Systems, 1983 p 31-54 Apr. 1984 refs Prepared in cooperation with Computer Sciences Corp., Orlando, Fla.
Avail: NTIS HC A08/MF A01 CSCL 05/2

The Kennedy Space Center is transforming the PRACA bath automatic data processing (ADP) system of today into a fully integrated data base with on-line update and retrieval capabilities. The present manual system of reporting (Datafax, mail, and telephone) to the off-site design and engineering organizations is to be replaced by direct access to the most current information as it accrues at KSC or VAFB. Two major goals of the Intercenter PRACA are to provide a single data depository for both launch sites and to fully integrate the problem data with engineering data as well as other relevant information. The resulting ADP system can provide a closed loop system for problem reporting, corrective action and recurrence control that should serve the engineering community as well as reliability and quality assurance at the launch sites, KSC and VAFB, and at the design centers, JSC and MSFC. A.R.H.

N84-21765# New England Apparel Manufacturers' Association, Inc., Fall River, MA.
MANUAL FOR IMPLEMENTING A SHARED TIME ENGINEERING PROGRAM (STEP) SEPTEMBER 1980 THROUGH SEPTEMBER 1983
H. I. ARONOFF, J. J. LESLIE, A. N. MITTLEMAN, and S. HOLT (Public Administration Inst., N.Y.) Nov. 1983 143 p Sponsored in part by US Dept. of Commerce, Washington, D.C.
(PB84-144260) Avail: NTIS HC A07/MF A01 CSCL 13/8

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

N84-23318# Office of the Under Secretary of Defense for Research and Engineering, Washington, DC.
THE INDUSTRIAL MODERNIZATION INCENTIVES PROGRAM: AN EXPERIMENTAL EFFORT TO IMPROVE DEFENSE CONTRACTOR PRODUCTIVITY Final Report
A. D. REEVES *In* AF Business Research Management Center Proc. of the Fed. Acquisition Res. Symp. with Theme p 135-142 1983
(AD-P002771) Avail: NTIS HC A24/MF A01 CSCL 15/5

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

N84-23327# Naval Air Systems Command, Washington, DC.
MULTI-YEAR PROCUREMENT A 'TEAM APPROACH' Final Report
H. S. FROMER and J. L. SWEENEY *In* AF Business Research Management Center Proc. of the Fed. Acquisition Res. Symp. with Theme p 188-192 1983
(AD-P002780) Avail: NTIS HC A24/MF A01 CSCL 15/5

Teamwork, as demonstrated by Congressional actions to alter the laws, DoD's management and policy initiatives, the services requirements and funding planning and contractors and subcontractors productivity and risk assumption efforts has yielded better than expected results in the application of the Multi-Year Procurement Initiative Government, while recognizing that multi-year does not fit all programs, is realizing better than projected savings on the programs that have been selected for multi-year. Industry has found that an aggressive multi-year approach can stabilize employment, aid in their modernization programs and increase the efficiency of their existing operations. Everyone has found that the rewards have far exceeded the risks and it remains for Congress to determine whether it can overcome its penchant for year to year adjustments and take a long term view of defense procurement so that the scope of the multi-year application can grow beyond its present foothold. Meanwhile, Multi-Year Procurement, the 1980's version, is providing all the expected benefits by driving unit costs down, while improving our defense industrial base and putting people back to work, truly a initiative for our times. GRA

N84-23336# Defense Systems Management School, Fort Belvoir, VA.
MANAGING FOR SUCCESS IN DEFENSE SYSTEMS ACQUISITION Final Report
J. S. BAUMGARTNER, C. BROWN, and P. KELLEY *In* AF Business Research Management Center Proc. of the Fed. Acquisition Res. Symp. with Theme p 233-238 1983
(AD-P002789) Avail: NTIS HC A24/MF A01 CSCL 15/5

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

N84-23361# Air Force Logistics Command, Wright-Patterson AFB, OH.
QUALITY ASSURANCE - AIR FORCE LOGISTICS COMMAND Final Report
P. BROWN *In* AF Business Research Management Center Proc. of the Fed. Acquisition Res. Symp. with Theme p 409-410 1983
(AD-P002816) Avail: NTIS HC A24/MF A01 CSCL 15/5

This paper examines the scope of the Air Force Logistics Command's (AFLC) mission and focuses on current management indicators and initiatives related to Quality Assurance. The Quality Assurance discipline within AFLC is tasked with the responsibility of corporate oversight of the quality of workmanship of the commands' products, goods, and services. Since fiscal year 1976, adverse trends have been noted in frequency of customer reported defects on these weapon systems, and several innovative and dramatic steps have been taken to reverse the decline in the technical competence of our work. In February 1981, the command established a Maintenance Industrial Quality Study Group that was chartered to examine the entire spectrum of quality, with special emphasis on five major categories. The five categories were: Policy Guidance; People Programs; Technology; Investment Benefits; and Management Systems. The ultimate goal of the study was to formulate a quality effort which placed maximum emphasis on defect prevention rather than defect correction. GRA

N84-23363# Defense Contract Administration Services, Cleveland, OH.
QUALITY AT THE CROSSROADS Final Report
C. R. HENRY and J. C. ALBINI *In* AF Business Research Management Center Proc. of the Fed. Acquisition Res. Symp. with Theme p 416-418 1983
(AD-P002818) Avail: NTIS HC A24/MF A01 CSCL 05/1

In the coming years, American product quality will continue to be severely challenged in the world market place. We have lost much business and many jobs to foreign suppliers. Our nation's industry has suffered excessive loss of profits due to waste of materials and resources. Although foreign suppliers at one time held a substantial price advantage, this is no longer true in many instances. We are losing markets because of quality and reliability deficiencies. For the most part, American management has not fully grasped the impact of this quality challenge. They fail to recognize that effective quality control and assurance systems contribute significantly to profits, along with a product that conforms to specifications. Certain tasks are clearly defined for American industry and the military establishment; high quality performance is essential. This paper is concluded with what is needed if we are to regain our position of leadership in the world marketplace. Author (GRA)

N84-23364# Defense Logistics Agency, Alexandria, VA.
INCENTIVES FOR PRODUCT QUALITY NEED CONTRACT, COST, PRODUCTION AND FIELD CO-OPERATION Final Report
E. THEEDE *In* AF Business Research Management Center Proc. of the Fed. Acquisition Res. Symp. with Theme p 419-424 1983
(AD-P002819) Avail: NTIS HC A24/MF A01 CSCL 05/1

The quality of a deliverable item be it hardware or software, is dependent upon the controls in place and the adherence to those controls. Military procurement generally requires an inspection system (MIL-I-45208a) and a quality system (MIL-Q-9858a) to assure product quality. Monetary incentives must be available to the individual complying with the controls that produce the characteristics. Material inspection via statistical means only provides a clue as to how many defective units may be in the lot. Statistical sampling is obviously advantageous to a contractor since the government accepts the probability of receiving a defective product. All topics presented today are trying to help the government get the most for its money. The negative cost effects of material review boards, standard fixes (shop arrangements and field activities), statistical quality control, surplus parts procurement and contractor field service are usually figured in overhead and are not carefully examined and/or controlled. This paper will point out experiences in these areas and leave to your imagination how the heavy manhour involvement and costs associated with these areas could be minimized if quality incentives are provided at the point of manufacturing. Author (GRA)

N84-23365# Aeronautical Systems Div., Wright-Patterson AFB, OH.
A QUALITY IMPROVEMENT STRATEGY FOR SYSTEMS ACQUISITION Final Report
G. J. THIELEN *In* AF Business Research Management Center Proc. of the Fed. Acquisition Res. Symp. with Theme p 425-429 1983
(AD-P002820) Avail: NTIS HC A24/MF A01 CSCL 05/1

Affordability and readiness are among the most prominent concerns in the defense establishment today--to say nothing about the Congress and the media. Any number of techniques, procedures and controls have been established to improve management of systems acquisition and to minimize cost growth, the perennial nemesis of large, complex human endeavors. Cost/schedule control systems and reporting, for example, are now standard practice. No one technique, or combination of techniques, has yet been found to provide a satisfactory solution for today's acquisition managers. It is our purpose to portray quality in systems acquisition from this commercially-oriented perspective. An improvement strategy which is relevant to both readiness and affordability is outlined. It treats quality in its broadest, multifunctional sense. The bottom line is that if quality/productivity improvement is important to us in defense, then we must manage to get it. The strategy to be discussed is not a one-shot program or a quick fix. Rather, it is a basic shift in how we approach our work and is based on application of successful commercial practice to the system acquisition environment. GRA

N84-23376# Army Procurement Research Office, Fort Lee, VA.
A SURVEY OF CONTRACTOR PRODUCTIVITY MEASUREMENT PRACTICES Final Report
M. G. NORTON and W. V. ZABEL *In* AF Business Research Management Center Proc. of the Fed. Acquisition Res. Symp. with Theme p 501-505 1983
(AD-P002831) Avail: NTIS HC A24/MF A01 CSCL 15/5

This paper is extracted from an interim APRO report describing the results of a survey of contractor productivity measurement practices. Respondents ranking organizational performance evaluation factors listed productivity fifth in importance behind profitability, effectiveness, quality, and efficiency. Problems encountered in measuring productivity were usually due to the complexities of quantifying and relating various input and output factors involved. Although no evidence was found from the survey that an integrated total factor productivity measurement system has been implemented, production cost and productivity information is available and currently being tracked with varying success by defense contractors. The most popular indices used are value added/employee and comparison of standard hours to actual hours. Author (GRA)

N84-23389# Joint Publications Research Service, Arlington, VA.
USE OF ECONOMIC MECHANISMS IN MANAGING SCIENTIFIC AND TECHNICAL PROGRESS
P. POGUDIN and Y. OSATYUK *In its* USSR Rept.: Sci. and Technol. Policy (JPRS-UST-84-004) p 15-24 23 Feb. 1984 Transl. into ENGLISH from Planovoye Khozyaystvo (USSR), no. 11, Nov. 1983 p 72-78
Avail: NTIS HC A04

The use of economic incentives as a means of stimulating scientific and technical progress is discussed. Research and development in the chemical industry is used as an example for analysis and economic modeling. The economic effect of these incentives on scientific organizations and the resulting research is examined with added suggestions for future incentive funds included. M.A.C.

N84-23393# Joint Publications Research Service, Arlington, VA.
RESEARCH IN MAN-MACHINE INTERACTION DISCUSSED
D. BALAGEZYAN *In its* USSR Rept.: Sci. and Technol. Policy (JPRS-UST-84-007) p 64-66 28 Feb. 1984 Transl. into ENGLISH from Kommunist (USSR), 20 Sep. 1983 p 2
Avail: NTIS HC A05

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

N84-23401*# Arinc Research Corp., Annapolis, MD.
ASSESSMENT OF THE NASA FLIGHT ASSURANCE REVIEW PROGRAM
J. HOLMES and G. PRUITT Aug. 1983 172 p refs
(Contract NASW-3787)
(NASA-CR-173418; NAS 1.26:173418; ARINC-RES-PUBL-3104-01-TR-3100) Avail: NTIS HC A08/MF A01 CSCL 05/2

The NASA flight assurance review program to develop minimum standard guidelines for flight assurance reviews was assessed. Documents from NASA centers and NASA headquarters to determine current design review practices and procedures were evaluated. Six reviews were identified for the recommended minimum. The practices and procedures used at the different centers to incorporate the most effective ones into the minimum standard review guidelines were analyzed and guidelines for procedures, personnel and responsibilies, review items/data checklist, and feedback and closeout were defined. The six recommended reviews and the minimum standards guidelines developed for flight assurance reviews are presented. Observations and conclusions for further improving the NASA review and quality assurance process are outlined. E.A.K.

N84-24493# Texas A&M Univ., College Station. Dept. of Management.
THE NATURE AND USE OF FORMAL CONTROL SYSTEMS FOR MANAGEMENT CONTROL AND STRATEGY IMPLEMENTATION
R. L. DAFT and N. B. MACINTOSH Feb. 1984 63 p
(Contract N00014-83-C-0025)
(AD-A139083; TR-ONR-DG-06) Avail: NTIS HC A04/MF A01 CSCL 05/1

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

N84-26429* National Aeronautics and Space Administration, Washington, DC.
MANAGEMENT. A CONTINUING BIBLIOGRAPHY FOR NASA MANAGERS, WITH INDEXES
Mar. 1984 150 p
(NASA-SP-7500(18); NAS 1.21:7500(18)) Avail: NTIS HC $16.00 CSCL 05/1

This bibliography lists 594 reports, articles and other documents introduced into the NASA scientific and technical information system in 1983. Author

N84-28424# Washington Univ., Seattle.
PHYSICAL PERFORMANCE TESTS AS PREDICTORS OF TASK PERFORMANCE
T. L. DOOLITTLE, O. L. SPURLIN, and M. P. SCONTRINO *In* AF Academy Proc. of the 9th Symp. on Psychol. in the DOD p 105-109 Apr. 1984
(AD-P003257) Avail: NTIS HC A99/MF A01 CSCL 05/10

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

N84-28431# Anacapa Sciences, Inc., Santa Barbara, CA.
HABITABILITY AND HUMAN PRODUCTIVITY ISSUES CONFRONTING THE AIR FORCE SPACE COMMAND
J. STUSTER *In* AF Academy Proc. of the 9th Symp. on Psychol. in the DOD p 153-157 Apr. 1984
(AD-P003266) Avail: NTIS HC A99/MF A01 CSCL 05/10

There are four areas of planned and proposed DoD space activity in which habitability issues play an important role. These are: (1) long-duration space missions, (2) short-duration space missions, (3) extended-duration STS missions, and (4) terrestrial space operations center(s). The purpose of this paper is to identify some of the missions within each of these areas and to explore the associated behavioral, psychological, and sociological issues. These include: sleep, clothing, exercise, medical support, personal hygiene, food preparation, group interaction, habitat aesthetics, outside communications, recreational opportunities, privacy and personal space, and waste disposal and management. Author (GRA)

N84-35125# Paris V Univ. (France). Inst. de Psychologie.
MANAGERIAL AND ORGANIZATIONAL DETERMINANTS OF EFFICIENCY IN RESEARCH TEAMS (SOCIAL SCIENCES) Final Report
C. LEVY-LEBOYER May 1984 107 p In ENGLISH and FRENCH
(Contract DAJA37-81-C-0286; DA PROJ. 2Q1-61102-B-74-D)
(AD-A144153; ARI-RN-84-75) Avail: NTIS HC A06/MF A01 CSCL 05/1

This research explores the generalizability of the conclusions reached in a previous survey on biomedical research. Various possibilities for a success index in Social Sciences are discussed. The diversity of the heuristic processes in the Social Sciences are described as well as the variety of leadership styles.
Author (GRA)

N85-11898# Duke Univ., Durham, NC. School of Business.
DECISION PROCESS MODELS OF CONTRACTOR BEHAVIOR: THE DEVELOPMENT OF EFFECTIVE CONTRACT INCENTIVES Final Report, 17 Feb. 1981 - 11 Jun. 1984
A. Y. LEWIN, K. J. COHEN, and R. C. MOREY 11 Jun. 1984 74 p
(Contract F33615-81-C-5034)
(AD-A145524; BRMC-81-5034) Avail: NTIS HC A04/MF A01 CSCL 05/1

An objective of this research was to develop a capability to model the potential impact of various incentive schemes on the performance of defense contracts. It was necessary to develop a computer simulation model such basic elements as DOD project goals, DOD incentive mechanisms, contractor goals, and contractor organizational response mechanisms. Each of these elements, which collectively determine the behavioral pattern of the decision process model (DPM), are decoupled and parameterized to facilitate analysis of different incentive schemes and/or behavioral assumptions. The objective of this contract was to validate the DPM simulation and its application to developing and testing alternative incentive schemes. The major practical use of building a DPM type simulation is its ultimate application in answering what if type policy questions involving the design parameters of the contractual relationship between the DOD and defense contractors. For example, the simulation results indicated that increasing the contractor's fee improves cost control performance. The DPM simulation results suggest that the higher the weight (including those assigned to the quality of the proposal) the better the cost control performance and social efficiency. A simulation model of this type has other uses in the training or education of policy makers and or DOD project managers. In business education similar simulation models have been designed as management games. Such games, which can be extremely complex, are used as laboratories for training students to apply analytical tools and integrate functional area knowledge (marketing, production, accounting, financial planning, etc.) within a competitive decision making environment.
GRA

N85-12772# Air Command and Staff Coll., Maxwell AFB, AL.
MATRIX ORGANIZATIONS: OVERCOMING THE DISADVANTAGES
H. E. BERG Apr. 1984 44 p
(AD-A145318; ACSC-84-0225) Avail: NTIS HC A03/MF A01 CSCL 05/1

This paper is a background on the matrix management organizational structure. The author identifies typical disadvantages of the matrix organization with the focus on project and functional managers, functional experts, and project teams. Various techniques to counteract these disadvantages are examined and evaluated for potential application in matrix organizations. GRA

N85-13257# Centre National d'Etudes Spatiales, Toulouse (France). Direction des Lanceurs.
QUALITY ORGANIZATION [L'ORGANISATION DE LA QUALITE]
C. PETITDEMANGE Apr. 1983 139 p refs In FRENCH; ENGLISH summary
(CNES-NT-106) Avail: NTIS HC A07/MF A01

The goals, means and organization of quality control are discussed. Quality manuals, corrective and preventive actions, control planning, and quality audits are described. Author (ESA)

N85-26439* National Aeronautics and Space Administration, Washington, DC.
MANAGEMENT: A BIBLIOGRAPHY FOR NASA MANAGERS
Mar. 1985 183 p
(NASA-SP-7500(19); NAS 1.21:7500(19)) Avail: NTIS HC A08 CSCL 05/1

This bibliography lists 706 reports, articles, and other documents introduced into the NASA scientific and technical information system in 1984. Entries, which include abstracts, are arranged in the following categories: human factors and personnel issues; management theory and techniques; industrial management and manufacturing; robotics and expert systems; computers and information management; research and development; economics, costs, and markets; logistics and operations management; reliability and quality control; and legality, legislation, and policy. Subject, personal author, corporate source, contract number, report number, and accession number indexes are included. A.R.H.

N85-27746# Texas A&M Univ., College Station. Coll. of Business Administration.
MANAGEMENT CONTROL SYSTEMS AND INTERDEPENDENCIES: AN EMPIRICAL STUDY
N. B. MACINTOSH and R. L. DAFT Mar. 1985 33 p
(Contract N00014-83-C-0025)
(AD-A152280; TR-ONR-DG-13) Avail: NTIS HC A03/MF A01 CSCL 05/1

Two themes in behavioral accounting research suggest that management accounting system characteristics are related to characteristics of the larger organization and that the management accounting system is one element in a control system package. The research reported here investigates the relationship between departmental interdependencies and the design and use of three management control systems - the operating budget, periodic statistical reports, and standard operating policies and procedures. The findings support the idea that interdependency between departments influences the emphasis placed on specific management control systems. Standard operating procedures are an important control device when interdependence is moderate. When interdependence between departments is high, the role of all three control systems diminish. The findings support the themes that accounting based systems are one device in the organizational control package and that control systems are employed differently according to organizational characteristics. Author (GRA)

N85-35817# Air Command and Staff Coll., Maxwell AFB, AL.
AERONAUTICAL SYSTEMS DIVISION MANUFACTURING/QUALITY ASSURANCE ORIENTATION
W. F. LAESSIG and A. LAIRD Apr. 1985 61 p
(AD-A156128; ACSC-85-1535) Avail: NTIS HC A04/MF A01 CSCL 13/8

Aeronautical Systems Division (ASD) Manufacturing/Quality Assurance (Mfg/QA) Orientation (videotape) includes ASD organization, program management team concept, matrix management, generic acquisition milestones with associated Mfg/QA inputs, and general sources of expertise. Intended as an overview to enhance big picture understanding of new Mfg/QA managers. Mfg/QA Orientation for the Mfg/QA Managers (sound-on-slide) expands explanation of Mfg/QA inputs to the request for proposal (RFP), source selection participation, pre/post-award contact reviews and audits, and more specific on additional help. Intended to start the new Mfg/QA manager working. Mfg/QA Orientation for Program Managers (sound-on-slide) provides an overview covering Mfg/QA requirements, expected participation, and potential sources of help covering RFP preparation, source selection, and reviews and audits. GRA

N86-10779# Office of Naval Research, Arlington, VA. Psychological Sciences Div.
PSYCHOLOGICAL SCIENCES DIVISION 1984 PROGRAMS Annual Report, 1 Jan. - 1 Dec. 1984
M. A. TOLCOTT 1 Dec. 1984 184 p
(AD-A156631; REPT-442-4) Avail: NTIS HC A09/MF A01 CSCL 05/10

This booklet describes research carried out under the Psychological Sciences Division of ONR during Fiscal Year 1984. The booklet is divided into three programmatic research area:

Engineering Psychology; Personnel and Training; and Organizational Effectiveness - the last area will be re-named Group Psychology in Fiscal Year 1985. Specific study areas are: Man-Machine System Interfaces, Perception, Decision Making, Distributed Tactical Decision Making, Special Projects. Man-Machine Systems Technology, Defense Small Business Advanced Technology Program, Effective Heterogeneous Groups, personnel Turnover and Retention, Productivity in Organizations, Manpower R&D Programs, Theory-Based Personnel Assessment, Information-Processing Abilities, Attention and Action, Instructional Theory and Methods, Cognitive Processes. Each report within these sections gives specific objectives, approach, progress, potential applications. GRA

N86-15160*# McDonnell-Douglas Astronautics Co., Huntington Beach, CA.
SELF-RENEWAL: A STRATEGY FOR QUALITY AND PRODUCTIVITY IMPROVEMENT
D. H. HUTCHINSON *In* NASA. Johnson (Lyndon B.) Space Center R and D Productivity: New Challenges for the US Space Program p 18-31 1985 refs
Avail: NTIS HC A25/MF A01 CSCL 14/4

Productivity improvement is discussed. The concept of productivity improvement is supplemented with two additional concepts of productivity improvement: effectiveness and innovation. Case studies are provided to illustrate concepts. R.J.F.

N86-15179*# Motorola, Inc., Schaumburg, IL.
IMPROVING ENGINEERING EFFECTIVENESS
J. D. FIERO *In* NASA. Johnson (Lyndon B.) Space Center R and D Productivity: New Challenges for the US Space Program p 239-248 1985
Avail: NTIS HC A25/MF A01 CSCL 05/1

Methodologies to improve engineering productivity were investigated. The rocky road to improving engineering effectiveness is reviewed utilizing a specific semiconductor engineering organization as a case study. The organization had a performance problem regarding new product introductions. With the help of this consultant as a change agent the engineering team used a systems approach to through variables that were effecting their output significantly. Critical factors for improving this engineering organization's effectiveness and the roles/responsibilities of management, the individual engineers and the internal consultant are discussed. B.W.

N86-15203*# Lockheed Engineering and Management Services Co., Inc., Houston, TX.
RESULTS OF INNOVATIVE COMMUNICATION PROCESSES ON PRODUCTIVITY GAINS IN A HIGH TECHNOLOGY ENVIRONMENT
B. J. KELLY *In* NASA. Johnson (Lyndon B.) Space Center R and D Productivity: New Challenges for the US Space Program p 506-515 1985
Avail: NTIS HC A25/MF A01 CSCL 05/1

The technology which resulted in performance breakthroughs at engineering and management services is discussed. As a result of the innovative approaches of communicating productivity concepts to the employees, specific outcomes can now be pinpointed at all levels of the organization such as: (1) employee-headed program; (2) performance feedback processes; and (3) an investigative approach to creating leadership. The Lockheed Corporation began the innovative trend in 1974 when they became the first company to introduce quality circles in America. Although some of Lockheed-EMSCO's processes may sound different from traditional improvement processes, the context out of which those to be presented evolved has sustained more than 10 years of positive results through employee involvement activities. E.A.K.

N86-16149# Maryland Univ., College Park. Center for Productivity and Quality of Working Life.
FIELD TEST OF THE METHODOLOGY FOR GENERATING EFFICIENCY AND EFFECTIVENESS MEASURES Final Report, 1 Jul. 1981 - 31 May 1983
T. C. TUTTLE, R. E. WILKINSON, and M. D. MATTHEWS Aug. 1985 57 p
(Contract F33615-79-C-0019)
(AD-A158183; AFHRL-TP-84-54) Avail: NTIS HC A04/MF A01 CSCL 14/2

A field test in 24 Air Force organizations, eight each from Administration, Propulsion Maintenance, and Weather, of the methodology for generating efficiency and effectiveness measures (MGEEM) was conducted to evaluate: (1) the number and types of measures developed, (2) the acceptability of the process and its results to participants (e.g., unit commanders), (3) the cost effectiveness of measures in terms of their use of existing data, and (4) the extent to which independent application of the methodology in similar organizations produces similar sets of measures. For each organization, key results areas (KRAs) - categories of intended accomplishments - and quantitative efficiency and effectiveness indicators were developed for each KRA. Results showed that the MGEEM led to a usable number of indicators for each organization; however, there was a much larger percentage of effectiveness (86 to 95 percent) as opposed to efficiency indicators. The MGEEM process and its results were judged very acceptable to participants. The indicators generated were judged cost-effective to implement since approximately 80 - 90 percent made use of existing data. Finally, the indicators were found to have relatively low consistency from organization-to-organization within the three functional areas. Modifications of the MGEEM process are suggested to improve the consistency from site-to-site and to better set the stage for participants. Author (GRA)

N86-27108* National Aeronautics and Space Administration, Washington, DC.
MANAGEMENT: A BIBLIOGRAPHY FOR NASA MANAGERS
Apr. 1986 169 p
(NASA-SP-7500(20); NAS 1.21:7500(20)) Avail: NTIS HC A08 CSCL 05/1

This bibliography lists 707 reports, articles and other documents introduced into the NASA scientific and technology information system in 1985. Items are selected and grouped according to their usefulness to the manager as manager. Citations are grouped into ten subject categories: human factors and personnel issues; management theory and techniques; industrial management and manufacturing; robotics and expert systems; computers and information management; research and development; economics, costs, and markets; logistics and operations management; reliability and quality control; and legality, legislation, and policy. Author

N86-29269# Societe Nationale Industrielle Aerospatiale, Paris (France).
QUALITY IN THE YEAR 2000: A LINE DIVIDING CALCULATED RISK AND ERROR [LA QUALITE A L'HORIZON 2000: UNE LIGNE DE PARTAGE ENTRE LE RISQUE CALCULE ET L'ERREUR]
G. SERTOUR 1986 19 p In FRENCH Presented at 7th AFCIQ Congress on Gestion par la Qualite, Paris, France, 1985
(SNIAS-861-551-102; DCQ-2/85; ETN-86-97177) Avail: NTIS HC A02/MF A01

The quality concepts necessary to the organization and efficiency of an industry are discussed. The construction of quality using available human and knowledge resources; the orientation of investment to provide for higher levels of quality potential; and the control of quality management are considered. Examples from the aerospace industry are given. ESA

N86-31412*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.
EVALUATING SPACE STATION APPLICATIONS OF AUTOMATION AND ROBOTICS TECHNOLOGIES FROM A HUMAN PRODUCTIVITY POINT OF VIEW
J. F. BARD *In its* NASA/American Society for Engineering Education (ASEE) Summer Faculty Fellowship Program, 1985 46 p Jul. 1986
Avail: NTIS HC A99/MF E03 CSCL 05/8

The role that automation, robotics, and artificial intelligence will play in Space Station operations is now beginning to take shape. Although there is only limited data on the precise nature of the payoffs that these technologies are likely to afford there is a general consensus that, at a minimum, the following benefits will be realized: increased responsiveness to innovation, lower operating costs, and reduction of exposure to hazards. Nevertheless, the question arises as to how much automation can be justified with the technical and economic constraints of the program? The purpose of this paper is to present a methodology which can be used to evaluate and rank different approaches to automating the functions and tasks planned for the Space Station. Special attention is given to the impact of advanced automation on human productivity. The methodology employed is based on the Analytic Hierarchy Process. This permits the introduction of individual judgements to resolve the confict that normally arises when incomparable criteria underly the selection process. Because of the large number of factors involved in the model, the overall problem is decomposed into four subproblems individually focusing on human productivity, economics, design, and operations, respectively. The results from each are then combined to yield the final rankings. To demonstrate the methodology, an example is developed based on the selection of an on-orbit assembly system. Five alternatives for performing this task are identified, ranging from an astronaut working in space, to a dexterous manipulator with sensory feedback. Computational results are presented along with their implications. A final parametric analysis shows that the outcome is locally insensitive to all but complete reversals in preference. Author

N87-16749*# Alabama Univ., Huntsville. Dept. of Industrial Engineering.
OPERATIONS PLANNING AND ANALYSIS HANDBOOK FOR NASA/MSFC PHASE B DEVELOPMENT PROJECTS
ROBERT C. BATSON *In* NASA. Marshall Space Flight Center Research Reports: 1986 NASA/ASEE Summer FAculty Fellowship Program 26 p Nov. 1986
Avail: NTIS HC A99/MF E04 CSCL 05/1

Current operations planning and analysis practices on NASA/MSFC Phase B projects were investigated with the objectives of (1) formalizing these practices into a handbook and (2) suggesting improvements. The study focused on how Science and Engineering (S&E) Operational Personnel support Program Development (PD) Task Teams. The intimate relationship between systems engineering and operations analysis was examined. Methods identified for use by operations analysts during Phase B include functional analysis, interface analysis methods to calculate/allocate such criteria as reliability, Maintainability, and operations and support cost. Author

N87-20833* National Aeronautics and Space Administration, Washington, DC.
MANAGEMENT: A BIBLIOGRAPHY FOR NASA MANAGERS (SUPPLEMENT 21)
Apr. 1987 70 p
(NASA-SP-7500(21); NAS 1.21:7500(21)) Avail: NTIS HC A04 CSCL 05/1

This bibliography lists 664 reports, articles and other documents introduced into the NASA scientific and technical information system in 1986. Items are selected and grouped according to their usefulness to the manager as manager. Citations are grouped into ten subject categories: human factors and personnel issues; management theory and techniques; industrial management and manufacturing; robotics and expert systems; computers and information management; research and development; economics, costs, and markets; logistics and operations management; reliability and quality control; and legality, legislation, and policy. Author

N87-24233# Oak Ridge National Lab., TN.
THE SUCCESS OR FAILURE OF MANAGEMENT INFORMATION SYSTEMS: A THEORETICAL APPROACH
T. R. CURLEE and B. T. TONN Mar. 1987 29 p
(Contract DE-AC05-84OR-21400)
(DE87-007802; ORNL/TM-10320) Avail: NTIS HC A03/MF A01

Work has been done by various disciplines to address the reasons why modern, computerized management information systems either succeed or fail. However, the studies are not based on a well-defined conceptual framework and the focus has been narrow. This report presents a comprehensive conceptual framework of how an information system is used within an organization. This framework not only suggests how the use of an information system may translate into productivity improvements for the implementing organization but also helps to identify why a system may succeed or fail. A major aspect of the model is its distinction between the objectives of the organization in its decision to implement an information system and the objectives of the individual employees who are to use the system. A divergence between these objectives can lead to system under-utilization or misuse at the expense of the organization's overall productivity. DOE

N87-24705# Lawrence Livermore National Lab., CA.
ORGANIZING FOR QUALITY: A STRUCTURAL PERSPECTIVE
J. J. DRONKERS Jan. 1987 23 p Presented at the 41st Annual Quality Conference, Minneapolis, Minn., 4 May 1987
(Contract W-7405-ENG-48)
(DE87-004356; UCRL-95891; CONF-870544-3) Avail: NTIS HC A02/MF A01

This paper discusses an aspect of QA program implementation that often has been overlooked: existing organizational structures. The paper's premise is that existing organizational structures have a great deal to do with an organization's culture and therefore must be considered when implementing QA programs. The paper reviews major quality assurance program descriptions as found in several standards and in the writings of Crosby, Feigenbaum, and Juran. The review shows that quality assurance programs are concerned with both quality achievement and demonstrability of that achievement. Next, a review of organizational structures is considered. Two traditional ones: hierarchical and matrix structures, and an emerging one, parallel structure. Characteristic traits of each and their importance are discussed. The paper concludes by suggesting a method for implementing QA programs to existing structures. The method contemplated places the QA professional in the role of change agent. The method's basis is a critical review of what is needed in a QA program, and what already exists in the structure. DOE

N88-11377# Rockwell International Corp., Golden, CO.
PERSONAL COMPUTERS: A POWERFUL TOOL FOR PROJECT MANAGEMENT
T. A. HUGHES 1987 11 p Presented at the Instrument Society of America International Conference and Exhibit, Anaheim, Calif., 5 Oct. 1987
(Contract DE-AC04-76DP-03533)
(DE87-013381; RFP-4104; CONF-871028-4) Avail: NTIS HC A03/MF A01

Availability of low cost hardware and software within the past few years has made the Personal Computer a powerful tool for Project Management. Project managers very effectively apply word processing, cost accounting spreadsheets, and data management software to make their jobs easier. An important aspect of personal computers lies in their ability to improve productivity of the project design team. Project information can now be gathered, stored, and presented in a more useful form. Direct benefits are the detecting of cost overruns and scheduling problems through improved data analysis. This paper will discuss the use of Personal Computers in cost analysis, planning, tracking, and controlling instrumentation projects. Practical applications will be discussed and the advantages and disadvantages of available software will be reviewed. DOE

N88-11571# Center for Social and Economic Issues, Ann Arbor, MI.
IMPLEMENTING AND MANAGING CHANGE: A GUIDE FOR ASSESSING INFORMATION TECHNOLOGY
J. A. MORELL, R. GRYDER, and M. FLEISCHER Aug. 1987 100 p Prepared in cooperation with ORNL, Tenn.
(Contract DE-AC05-84OR-21400)
(DE88-000035; ORNL/TM-10520) Avail: NTIS HC A05/MF A01

Assessing the impact of office automation (OA) requires expertise in the generic aspects of evaluation and innovation adoption, combined with specialized knowledge of OA. There is an extensive literature on the two generic subjects, but no companion literature concerning the application of the knowledge to the unique case of OA. By providing that specialized information, this report assists the implementors of OA in two ways: it shows them how to monitor implementation efforts, thus providing feedback to facilitate adoption of OA technology; and it provides guidance for measuring OA's impact on people and organizations. The report assumes an immediate impact of OA on the work groups where the technology is implemented, and a continually spreading effect from that locus of immediate use. Included in the report are discussions of: sources of data, methods of data collection, factors which affect implementation, and measures of impact. Special attention is given to measuring productivity changes that may result from the use of OA. A detailed appendix supplies a variety of examples which show how the variables discussed in the report were actually measured in applied settings. DOE

N88-16898# Aerospace Medical Research Labs., Wright-Patterson AFB, OH.
TEAM PROBLEM SOLVING: EFFECTS OF COMMUNICATION AND FUNCTION OVERLAP Final Report, 15 Jun. 1985 - 15 Jun. 1986
ERHARD O. EIMER Mar. 1987 49 p
(AD-A187010; AAMRL-TR-87-037) Avail: NTIS HC A03/MF A01 CSCL 05/5

A theoretical framework is developed to assess factors that affect crew productivity in problem solving tasks. A taxonomic analysis is expanded to consider interrelations between categories of factors, namely characteristics of resources, of the task, and of the group. Experimental results are presented to examine the effect of degree of communication and of function overlap on problem solving by two-person crews. The data suggest that communication facilitates problem solving when there is no function overlap; when communication is restricted, problem solving is impeded when there is partial overlap of function. The findings are discussed with a focus on the concept that crew behavior is not a simple aggregation of the contributions made by individual crew members. GRA

N88-20197# Barry (Theodore) and Associates, Los Angeles, CA.
PEOPLE, PROCEDURES, PERFORMANCE: THE KEYS TO IMPROVING THE DEVELOPMENT ENVIRONMENT
CHARLES D. SCALES *In* AGARD. Flight Vehicle Development Time and Cost Reduction 13 p Sep. 1987
Avail: NTIS HC A14/MF A01

A growing management issue over the past 20 years in the U.S. Aerospace and Defense industry is the ever-increasing percentage of total product labor cost attributable to the professional work force. Therefore, the challenge of improving the performance and productivity of these workers, especially in a development environment, is now and will remain a most critical element in a firm's overall profitability. The paper begins with an overview of white collar productivity, its growing importance in the Aerospace and Defense industry, its resistance to the more traditional approaches to productivity improvement, and the challenges facing managers who try to attack it. The author explodes some of the popular myths surrounding the issue, and then sets forth a model to help managers understand and thus control the elements comprising white collar productivity. The paper then recounts a case study in which the model was used with great success by a major aerospace manufacturer. The paper concludes with a list of techniques for successful implementation of white collar productivity improvement programs. Author

N88-21867* National Aeronautics and Space Administration, Washington, DC.
MANAGEMENT: A BIBLIOGRAPHY FOR NASA MANAGERS
Apr. 1988 158 p
(NASA-SP-7500(22); NAS 1.21:7500(22)) Avail: NTIS HC A08 CSCL 05/1

This bibliography lists 653 reports, articles and other documents introduced into the NASA scientific and technical information system in 1987. Items are selected and grouped according to their usefulness to the manager as manager. Citiations are grouped into ten subject categories; human factors and personnel issues; management theory and techniques; industrial management and manufacturing; robotics and expert systems; computers and information management; research and development; economics, costs and markets; logistics and operations management, reliability and quality control; and legality, legislation, and policy. Author

N88-24977# Oak Ridge Gaseous Diffusion Plant, TN.
A QUALITY PHILOSOPHY FOR RESEARCH AND DEVELOPMENT
G. J. KIDD, JR. Feb. 1988 17 p
(Contract DE-AC05-84OT-21400)
(DE88-006512; K/QT-178) Avail: NTIS HC A03/MF A01

The application of traditional quality assurance techniques to research and development (R and D) has not been successful. This report presents some of the features that distinguish R and D from other industrial enterprises and suggests an approach for adapting existing standards to R and D. DOE

N88-24978# Chemical Research and Development Center, Aberdeen Proving Ground, MD.
PROPOSED QUALITY ASSURANCE/QUALITY CONTROL PLAN Special Publication Oct. 1984 - Apr. 1985
SUSAN F. HALLOWELL, EMORY W. SARVER, and DENNIS J. REUTTER Dec. 1987 27 p
(AD-A191490; CRDEC-SP-88007) Avail: NTIS HC A03/MF A01 CSCL 13/8

Preparation of this report is a result of a mandate by Dr. Richardson, U.S. Army Chemical Research, Development and Engineering Center (CRDEC) Technical Director. The need to develop a quality assurance program for CRDEC was underscored by a review of the body protection group within the Physical Protection Directorate. This review indicated that there was a significant need to incorporate documented quality control (QC) and quality assurance (QA) procedures in the development and testing of individual protection items. This plan was our initial attempt to organize a QA mechanism into the infrastructure of CRDEC without interrupting mission objectives. It describes a 3-yr plan, which would ultimately result in the creation of a QA Office directly under the Commander with a QA/QC mechanism in place. All major portions of this plan were accepted with some modifications. An Agency Testing Task Force (ATTF) has been developed. The mission concerns the use and handling of chemical agents only. It has resulted in the formation of a program for users of Standard Analytical Reference Materials (SARMs) for the chemical agents (CASARMs). Also notable has been the formation of a subcommittee to develop user Standard Reference Material (SRMs) and the development of a standardized format for the documentation of Analytical Test Methodology. Two training courses in the areas of QC in the laboratory and experimental design strategy have been sponsored by the ATTF. GRA

N88-28819 Methodologos, Bischheim (France).
VALUE ANALYSIS [L'ANALYSE DE LA VALEUR]
M. LOUIS CHALLIER *In* CNES, Management of Large Space Projects p 397-416 Mar. 1988 In FRENCH

Avail: CEPADUES-Editions, 111 Rue Nicolas-Vauquelin, 31100 Toulouse, France

The causes of high costs and bad functioning of organizations are reviewed. Value analysis methods and bases are outlined. The introduction of value analysis into a company is considered.
ESA

N84-70110# Hanford Engineering Development Lab., Richland, WA.

QUALITY ASSURANCE FOR GEOLOGIC INVESTIGATIONS

W. L. DELVIN and L. D. GUSTAFSON 31 Jan. 1983 10 p refs Presented at Waste Manage. Conf., Tucson, Ariz., 27 Feb. 1983

(Contract DE-AC06-76FF-02170)

(DE83-012164; HEDL-SA-2760-FP; CONF-830205-30)

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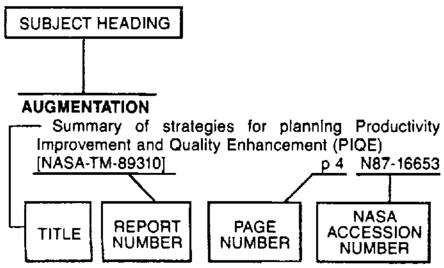

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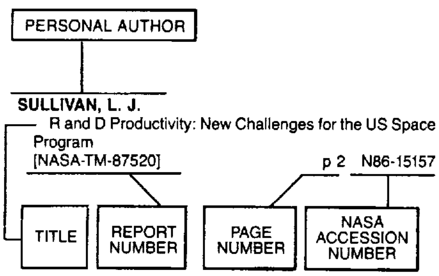

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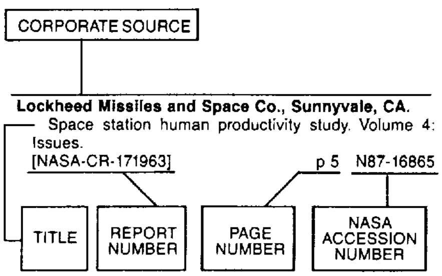

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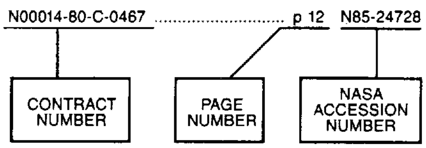

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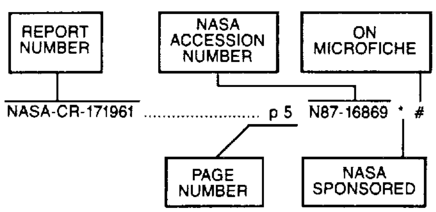

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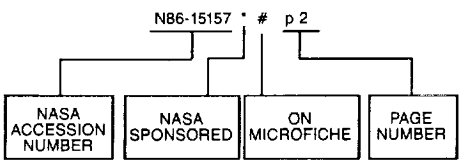

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