

Contents

I. Manufacturing	1
"Humanufacturing—Operator Decision Support in a CIM Environment" Johan Stahre	2
"Social and Managerial Aspects of Group Work in Concurrent Engineering" T. Adachi, L.C. Shih, and T. Enkawa	8
"Cooperation of Distributed Human Scheduler in Cellular Manufacturing Systems" Noboru Nakamura	14
"A Prototyping and Development Environment for Graphical Interactive Telematic Applications" Franco Arcieri, Michelangelo Fossa, and Enrico Nardelli	20
"Psychological Criteria for the Evaluation of Different Forms of Group Work in Advanced Manufacturing Systems" W. Weber and E. Ulich	26
"Implementing Group Work in the Car Manufacturing Industry: The Foreman as a Focal Factor" F. Brodbeck and S. Remdisch	32
"Development and Evaluation of a Productivity Management System for Autonomous Work Groups in Advanced Manufacturing Systems" M. Przygodda and K.-H. Schmidt	38
"Autonomous Group Working Within Integrated Manufacturing: A Longitudinal Investigation of Employee Role Orientations" Sharon Parker, Paul Jackson, and Toby Wall	44
"A Blackboard Architecture for Human-Machine Interface in a Mining Tele- operation" Celestine Ntuen, Eui H. Park, and Sangwon M. Kim	50
"Experiences in the Use and Implementation of Information Technology in the Printing Industry" P. Seppälä and E. Tuominen	56
"Implementing Smart Manufacturing: Some Techniques for Designer/ User Cooperation" Richard Badham	62
"Managing the Human Factors that Affect Change in Manufacturing" J. LaMarsh	68

"Anthropocentric Production Systems—A European Response to the Challenges of Global Markets" Peter Brödner	74
"Workstation Designs for Reliability Centered Maintenance Decision Support" D.G. MacGregor	80
"Interactive Support System for Maintenance and Repair: Diagnosis Strategies" B. Zimolong and U. Konradt	86
"Strategies and Training for Maintenance Personnel: Optimizing Fault Diagnosis Activities" Kh. Sonntag and Niclas Schaper	90
"Production Management Software Suitable for Group Work" K. Mertins, B. Schallock, and M. Carbon	96
"Ergonomics in CAD Systems: A Brazilian Study of Case" Luiza Helena, Boueri Rebello, and Eduardo Romeiro Filho	102
II. Special Applications	108
"Operator Behavior and Supervisory Control Systems in the Chemical Process Industry" H.C.M. Hoonhout and H.J.G. Zwaga	109
"Analysis and Support of Fault Diagnosis Strategies" J.A. Brinkman and T.W. van der Schaaf	115
"How to Survive Process Control Automation: A Case Study of Integral User Participation" L.A.A. Bollen and T.W. van der Schaaf	121
"Developing Process Control Systems: Procedural Requirements in Design" H.J.G. Zwaga	127
"A Tool Set for the Verification and Early Validation of a Control Room Computer-Based Display System for Sizewell 'B' Nuclear Power Station" Paul D. Hollywell and E.M. Hickling	133
"Managing Complexity: Display Design in Process Control" Gina L. Lawton, David L. Morrison, Peter L. Lee	139
"Human Factors Implications of Air Traffic Control Automation" V. David Hopkin	145
"HCI in Multi-Crew Aircraft" Jennifer L. Dyck, David W. Abbott, and John A. Wise	151
"HCI in Space Systems" Frances E. Mount	157

"Developing an Electronic International Network for Space Communication" Elaine M. Hinman-Sweeney	161
"Situational and Informational Constraints Affecting Communications with 1-1000 Second Transmission Delays" Barrett S. Caldwell	167
"Telemanipulation: Master-Controller Design Issues" Steven Wiker	173
"Human-Computer Interaction Issues Involved with Geographic Information Systems" Steven Chrisman, Kevin O'Brien, Benjamin Beberness, and F. Mount	179
"The Effect of Automated Intelligent Advisors on Human Decision Making in Monitoring Complex Mechanical Systems" Kevin O'Brien, Evan M. Feldman, and F. Mount	185
"Remote Coaching Multimedia Research Laboratory Development and Evaluation" Richard Haines and Sherry Chuang	191
"Ergonomics and VDT Design for Space Environments" Joe Hale	196
"Cognitive Model of Human-Computer Interface (HCI) Onboard Space Station Freedom (SSF)" J.M. Loman, D.J. Bennett, and C. Rogers	201
"Virtual Reality for Improved Human-Computer Interaction in Robotics and Medicine" H.-J. Warnecke, T. Flaig, and M. Wapler	207
"Testing the Human Computer Interface for the Telerobotic Assembly of the Space Station" Daniel T. Wick, Nagy M. Shehad, and Ankur R. Hajare	213
"Operational Complexity of Controlling Space Vehicles" Alex Vankov, Yuri Glazkov, Alex Rudchenko, and Alex Vislotsky	219
"A Model of Expressive Machines and Its Application to Human-Robot Interaction" Chihiro Ono, Yoshinobu Yamamoto, and Yuichiro Anzai	225
"The Active Interface for Human Robot Interaction" Takanori Okada, Yoshinobu Yamamoto, and Yuichiro Anzai	231
"FRECS: Interface System for Human-Robot Cooperation" Yasushi Nakauchi, Mitsuru Sato, Yoshinobu Yamamoto, and Yuichiro Anzai	237

"Constraint Processing in Human Computer Interaction with an Emphasis on Intelligent CAD"	243
Walter Hower, Manfred Rosendahl, and Roland Berling	
"Parallel Modeling: Addressing the Issues of Creative Designing in CAD Environments"	249
Andrew Lehane, David Wright, and Edward Lambourne	
"A Method of Communication Between CAD and VR Interfaces"	255
Michio Miwa, Miwa Fukino, Masao Kato, and Takamasa Oyama	
"Elecpapan: An Integrated and Intelligent User Interface System for CAD"	261
Zhou Zhong Yu, Eng Wah Lee, Gray Robert, Jia Ye Wang, and Ding Yuan Liu	
"AUCA: A Tool for Presentation and Analysis of Simulation Results"	267
E. Meyer zu Bexten, D. Heinen, and C. Moraga	
"Automation of Work in Dangerous Environments"	273
Thomas J. Smith	
"Teleoperation of Heavy Equipment: Individual and Environmental Correlates of Operator Performance"	278
Thomas M. Cook	
"Automation in Military Aircraft"	283
John M. Reising, Terry J. Emerson, and Robert C. Munns	
"Operator Interaction with Unmanned Ground Vehicles (UGV)"	289
Thomas Haduch	
"Remote Operations in the Hazardous Environment of Space"	295
Mark A. Stuart, C.E. Sampaio, R.C. Hendrich, T.F. Fleming, and A. Jay Legendre	
"Current Status of Development and Use of Tethered and Autonomous Underwater Vehicles and the Potential for Further Automation"	301
Jim McFarlane	
"Automation of Mobile Equipment in Mining: A Human Factors Perspective"	307
Christopher M. Keran, Robert Randolph, and Thomas J. Smith	
"Quantitative Usability Evaluation—The ESPRIT MUSiC Project"	313
M. Corbett, M. Macleod, and M. Kelly	
"User-driven Software Development: Translator's Workbench—An Exemplar Case Study"	319
Khurshid Ahmad, Paul Holmes-Higgin, Margaret Rogers, Monika Höge, Khai Le Hong, Christine Huwig, Ralf Kese, and Renate Mayer	
"The Hyperface/Interactors User Interface Development Environment"	325
P. Ferrara, C. Luparia, E. Penna, and R. Polillo	

"Modelling Users, Systems and Design Spaces (Esprit Basic Research Action 3066)"	331
Philip J. Barnard	
"JESSI Common Framework JCF—An Open Framework for Integrated CAx-Environments"	337
B. Steinmüller	
III. Case Studies	343
"Human Computer Interaction Within the Criminal Justice System: A Study of the Probation Service"	344
P.J. Baugh and Alan Gillies	
"A Study of Human-Computer Interaction in the Selection of Commercial Pilots for Automated Flight Decks"	350
Ronald E. Clark and William F. Herlehy, III	
"The Effects of New Information Technology on Interorganizational Relations: Electronic Tax Return Lodgement in Australia"	356
Trevor A. Williams	
"The Relationship Between Secretaries' Opinions of Computing and Their Computer Performance Within a United Kingdom Health-Care Setting"	362
John Arthur and Peter Brooks	
"Metalearning and Metaknowledge Strategies to Produce Educational Software"	368
Jaime Sánchez	
"Hypermedia for the In-House Development of Information Systems"	374
Nick Beagley, R.A. Haslam, and K.C. Parsons	
"Toward a Cognitive Ergonomics Evaluation System of Typing Chinese Characters into Computers"	380
Zhang Kan, Guo Sumei, and Zhao Huiling	
"Inferring Pilot Intent and Error as a Basis for Electronic Crew Assistance"	386
T. Wittig and R. Onken	
"A Case Study of Plan Recognition: Command Sequences as Acts"	392
Yoshifumi Inoue and Morio Nagata	
"Dual Design of Computer-Based Air Traffic Control Systems—Examples from European Air Traffic"	398
Bertram Harendt	
"Integrating QFD Into Software Development: A Case Study"	404
Jay Lundell and David Williams	
"Dedicated CAD for Apparel Design"	410
J. McCartney, B.K. Hinds, J. Zhang, and W. Hamilton	

"Assessing Ergonomic Furniture in The Workplace" George J. Boggs, Robert E. Warren, and Daniel R. Lowther	416
"Task-Oriented User Documentation Using the User Action Notation: A Case Study" J.D. Chase, Marie Paretti, H. Rex Hartson, and Deborah Hix	421
"Do Computers Solve the Problem? Telephone vs. Telefax vs. Computers in Home Shopping Systems in Scandinavia" MariAnne Karlsson and Matti Kaulio	427
"Observations on Game Playing" Clark M. Quinn, Matt Boeson, Dana Kedzier, Dan Kelmenson, Rob Moser, and Sebastian Rice	433
"From Risk to Disease: Capturing Knowledge by a Hypertext Approach" Giuliano Franco	438
"The CTP Project: Computerized Textbook of Psychology" Keiko Hatamoto, Shigekazu Ishihara, Haruo Hayashi, Shogo Sakata, Rei Ihara, Atsushi Kawamura, and Akira Yamagami	444
"Testing Acceptance and Usability of Multimedia in Man-Machine Communication: A Case Study and Guidelines" Kaisa Väänänen and Dave Henderson	450
"Using QFD Techniques in User Interface Specification: First Experiences" Pekka Ala-Siuru	456
IV. User Issues	462
"The Influence of Information Processing Strategies on Human-Computer Performance" Kay M. Stanney and Gavriel Salvendy	463
"Metaphor Design and Cultural Diversity in Advanced User Interfaces" Aaron Marcus	469
"Usability Evaluation From Users' Point of View: Three Complementary Measures" Edo M. Houwing, Marion Wiethoff, and Albert G. Arnold	475
"Modeling Multispecialist Decision Making" Michael Lewis and Katia Sycara	481
"Decision Maker's Knowledge Level and the Selection of Decision Strategies in Using a Decision Support System" H.-M. Michael Chung	487
"Use of Seamless Access Protocol to Expand the Human Interface of Next Generation Information Systems and Appliances" G. C. Vanderheiden	492

"Work Possibilities for Visually Impaired: The role of Information Technology" Erland Hjelmquist and Bengst Jansson	498
"Ergonomic Considerations for Communication Technologies for Deaf and Hard of Hearing People" Judy Harkins	504
"A Document Retrieval System for the Personal Computer" Nikki Reynolds and Michal Cutler	510
"Combining Asynchronous and Synchronous Collaborative Systems" Gunnar Teege and Uwe M. Borghoff	516
"The Relationship Between Task Structure and Choice of Navigational Aid in Human Computer Interface Design" Rebecca S. Lipner, Gary W. Strong, and Karen E.O. Strong	522
"Articulating the Design Process: The Effects of Verbalisation Upon Design Strategies" Simon P. Davies	528
"User Participation in Systems Design—Results of a Field Study" Astrid Beck	534
"Collaboration of Line and Staff in Fully Automated VLSI Factory" Yoshimi Gamo, Wataru Susaki, Kouichi Kurokawa, Hirokazu Miyoshi, and Toshio Hori	540
"Providing Plant Design Knowledge to the Operators" Kari Kaarela, Pertti Huuskonen, and Juha Jaako	546
"A Framework for User Customization" Haiying Wang and Mark Green	552
"Evaluation of Communication Methods for User Participation in Data Modelling" Christina Kirsch	558
"User-Centered Guidance for Environmental Management" David R. Eike, Jeffery A. Fox, and Richard Dailey	564
"The Effect of User Characteristics on Interface Choice" R. MacGregor, H. Hasan, and H.T. Liao	570
"Work Analysis—Perspectives on and Requirements for a Methodology" Peter H. Carstensen and Kjeld Schmidt	575
"Formalisms for Cognitive Modeling" Neville Moray	581
"A Framework for Measuring Cognitive Complexity of the Human-Machine Interface" Yan M. Yufik and Thomas B. Sheridan	587

"The Role of Mental Models in Complex Dynamic Environments" Craig P. Speelman, Daniel Boase-Jelinek, and Kim Kirsner	593
"Performance, Mental Models and Background Knowledge in Mastering a Simulated Dynamic System" Eva Carling	599
"On Psychophysiology of Cognitive Complexity" Leo Vekker, John A. Allen, and Yan Yufik	605
V. Methodologies	611
"Quantitative Measures for Evaluating Human-Computer Interfaces" Matthias Rauterberg	612
"The Fatigue Check System for VDT Workers by Measuring CFF" Masaharu Takeda, Yoshio Hayashi, and Kaoru Suzuki	618
"A Code Key-in Time Estimation Method for College Students" Satoshi Kishino and Yoshio Hayashi	624
"Direct Control of the Computer Through Electrodes Placed Around the Eyes" James Gips, Peter Olivieri, and Joseph Tecce	630
"Qualitative and Quantitative Analysis of Human Decision-Making Complexity" Valery F. Venda and Hal Hendrick	636
"Quantitative Evaluation and Performance Prediction" Yan M. Yufik, Thomas B. Sheridan, and Valery F. Venda	642
"Data Chunking and Interface Display Design" Valery F. Venda and Leo Beltracchi	648
"The Quadrigram as a Model for Dynamic HCI Studies and Design" Valery F. Venda, D.R. Strong, and Ian Dromey	654
"Performance of a Usability Assessment Model: A New Zealand Case Study" Sarah V. Burger	660
"Problem Discovery in Usability Studies: A Model Based on the Binomial Probability Formula" James R. Lewis	666
"Modelling Collective User Satisfaction" F.M.T. Brazier and Zsofia Ruttkay	672
"Explanation Evaluation Based on Referential Models" Alain Giboin	678
"From User Interface to the Database Management System: Application to a Geographical Information System" Michel Mainguenaud	684

VI. Longitudinal Studies	690
"Longitudinal Observations of Stress Index Among Software Engineers" Yuko Fujigaki and Kazuko Mori	691
"Finnish Longitudinal Studies of Job Design and VDT Work" Kari Lindström	697
"Mastering the Changes in Information Technology: A Follow-up Study of Insurance Tasks" P. Huuhtanen, T. Leino, T. Niemelä, and K. Ahola	703
"Methodological Aspects of Longitudinal Studies—Experiences from a HCI Study" Christian Korunka, K.H. Huemer, and B. Karetta	709
"A Diary Study of Computer Use and Worker Stress: Preliminary Results" Pascale Carayon and Catherine Hajnal	715
VII. Health Issues	721
"Eye Discomfort and 'VDT' Work" Piccoli Bruno	722
"The Occupational Overuse Syndrome at VDT Work" F.W. Darby	728
"Skin Symptoms and VDT Work" Berndt Stenberg	734
"Is the Outcome of a Woman's Pregnancy Influenced by her Work at a VDU?" Ulf Bergqvist and Bengt Knave	740
"Stress Related Health Effects and VDT Work" Bengt Arnetz	746
"Gaze Direction and Ocular Surface Area in VDT Work" Midori Sotoyama, Shin Saito, Sasitorn Taptagaporn, Toru Suzuki, and Susumu Saito	750
"Characteristics of Vertical Eye Movements in the Workstation Used Flat Panel Display" Shin Saito, Midori Sotoyama, Sasitorn Taptagaporn, Toru Suzuki, and Susumu Saito	756
"An Evaluation of Information Highlighting Methods on Computer Screens Using an Eye Movement Monitor" Reza Pouraghabagher and Douglas Bish	762
"Longitudinal Survey of Ocular Disorders and General Complaints in VDU Operators" G.F. Rubino, G. Maina, G. Piolatto, A. Sonnino, and M. Turbati	768

"Acupressure for Eyestrain Relief in VDT Operators" Yoshinori Horie, Takao Ohkubo, and Olov Östberg	774
"VDT Repetitive Motion Health Concerns in the U.S. Telecommunications Industry" D.E. LeGrande	780
"VDTs in Offices: A Field Study" H. Lu, J. Caylor, and F. Aghazdeh	786
"Of Mice and Pens: Low Risk Healthy Postures for Modern Computing" M.G. Martin	791
"Image Processing of Office Documents—Ergonomic Evaluation of the User Interface of a New System" G. Çakir and A. Çakir	797
VIII. Psychosocial and Stress Issues	803
"Coping with Malfunctions of Computer Aided Equipment from a Stress Perspective" Gunnar Aronsson and A. Strömberg	804
"Disturbances in Production—A Safety Risk or a Chance for Development in the Human-Computer Interaction Context" M. Döös and Tomas Backström	809
"Production Deviations: Opportunities for User-Based Technological Development" Peter Friedrich	815
"Near-Accidents in the Use of Advanced Medical Equipment" Carin Sundström-Frisk	821
"Designing the Human-Computer Interface for a Medical Information Workstation" Neville Stanton	827
"The Simultaneous Attack on Several Work Environment Factors—An Organizational Change Project Inspired of Occupational Health Research Findings" Gunnela Westlander	833
"How the Design of the Premises Supports a New Organizational Structure as Viewed by Full-Time Operators in Large-Scaled Tele-Services" Inger Söderberg	839
"Models of Job Enlargement Tested and Evaluated from the Point of View of Physical Health and Job Satisfaction" B. Cocke, G. Westlander, and E. Åberg	845

"The Outcome of Experimentation with Flexible Working Hours" E. Åberg, B. Cocke, I. Söderberg, and G. Westlander	851
"The Success of an Ambitious Broad QWL Strategy—Our Methods of Evaluation and Interpretation of the Findings" G. Westlander, I. Söderberg, B. Cocke, and E. Åberg	857
"Effect of Job Control on the Design of Jobs and Stress Among Computer Users" Pascale Carayon, Eila Järvenpää, and Catherine Hajnal	863
"Towards a Knowledge Sharing Organization" Gunilla Bradley	869
"A Cross-Cultural Framework for the Study of Stress Among Computer Users: Comparison of the USA and Finland" Eila Järvenpää, Pascale Carayon, Catherine Hajnal, Soo-Yee Lim, and Chien-Lin Yang	874
"An Integrated Approach to Cumulative Trauma Disorders in Computerized Offices: The Role of Psychosocial Work Factors, Psychological Stress and Ergonomic Risk Factors" Soo-Yee Lim and Pascale Carayon	880
"Data-Preparation Clerks in Brazilian Data Processing Centres: The Unskilled and Unhealthy New Jobs" A. Soares	886
"Techno-Stress: Psycho-physiological Consequences of Poor Man-Machine Interface" Bengt B. Arnetz and Mats Berg	891
"Topographic EEG Study of VDT Performance with Special Reference to Frontal Midline Theta Waves (Fm q) and Mental Work" Sakae Yamamoto	897
"Analysis of Uric Properties for Stress Caused by VDT Work and Relationship Among CFF, HRV and VEP" Masaharu Takeda, Yoshio Hayashi, and Kaoru Suzuki	903
"Physiological Indices of Visual Fatigue and Visual Comfort Related to VDT Work" Susumu Saito, Sasitorn Taptagaporn, Shin Saito, Midori Sotoyama, and Toru Suzuki	909
"On a Simple and Effective Method to Analyze Heart Rate Variability" Kaoru Suzuki and Yoshio Hayashi	914
"New Analysis of HRV Through Wavelet Transform" H. Tsuji, H. Mori, T. Numao, and T. Daimon	920
"A Study of Additive and Interactive Effects of Work and Extra-Organizational Factors on Female VDT Workers" Catherine Hajnal and Pascale Carayon	925

"Effects of Computer System Performance and Job Support on Stress Among Office Workers" Chien-Lin Yang and Pascale Carayon	931
"Mental Workload Measurement and Its Application for Prospective System Design" R. Wieland-Eckelmann and Ronald Schwarz	937
"Job Stress, Fatigue, Job Involvement and Satisfaction of Manual and Computerized Bank Employees" A. Khaleque	943
"Women, Gender and Computers" Ewa Gunnarsson	949
"Communication Between People Using a Computer-Mediated Communication System" Erland Hjelmquist	955
"Management Professionalization: Do Computers Matter?" Bengt Abrahamsson	961
"The Ergonomic Design Process—The User Involved in Problem Solving and the Design Evolution" Hans Hayanhjelm	966
"Human Competence, Work Organisation and Knowledge Based System" P. Holm and G. Bradley	970
"Communication—A Key Factor in Implementation of Library Automation" P. Huuhtanen, M. Vattulainen, and I. Laamanen	976
"The Impact of Computer Technology on Job Characteristics and Workers' Health" T. Asakura and Y. Fujigaki	982
"Experiences on Computerization in Different Occupational Groups: A Study in Municipal Workplaces" Pentti K. Seppälä	988
"The Relationship of Working Posture to Performance in a Data Entry Task" Naomi G. Swanson and Steven L. Sauter	994
"Follow-up after Implementation of a New Data System and Health Aspects in an Insurance Company" M. Puhakainen, I. Torstila, and K. Lindström	999
"Follow-up of Job Demands and Strain Symptoms after Implementation of New VDT Applications in an Insurance Company" K. Lindström, T. Leino, and M. Puhakainen	1005

"Electronic Performance Monitoring and Stress: The Role of Feedback and Goal Setting" John R. Aiello and Yan Shao	1011
"Recent Research Findings on Stress and Electronic Performance Monitoring" Pascale Carayon, Soo-Yee Lim, Chien-Lin Yang, Michael J. Smith, Katherine J. Sanders, and David LeGrande	1017
"The Influence of Electronic Performance Monitoring on Speed and Accuracy in a VDT-Based Data-Entry Task" T.L. Galinsky, L.M. Schleifer, and C.S. Pan	1023
"Formal Modelling of the Ergonomicity Level Evaluation of Man-Micro-computer Systems" Leszek Pacholski and Malgorzata Wejman	1029
AUTHOR INDEX	1033
KEYWORD INDEX	1037