

## PUBLICATIONS

### Edited Book Articles

Hamel, William R. Hamel, Chapter 10: "Sensing, Planning, and Control Concepts Necessary for Robust Telerobotics," Control in Robotics and Automation, Edited by B. K. Ghosh, Ning Xi, and T. J. Tarn, to be published by Academic Press 1998. [I]

Babcock, S. M., Dubey, R. V., Euler, J. A., Glassell, R. L., Kress, R. L., and Hamel, W. R., "Telerobotic Control of the Seven-Degree-of-Freedom CESAR Manipulator," *Robots with Redundancy*, edited by A. K. Bejczy, NATO ASI Series, Springer Verlag, NY (to be published). [I]

### Refereed Journal Articles

Scott C. Lenaghan, Yongzhong Wang, Ning Xi, Toshio Fukuda, Tzyhjong Tarn, William R. Hamel, and Mingjun Zhang. Grand Challenges in Bioengineered Nanorobotics for Cancer Therapy. IEEE Transactions on Biomedical Engineering (IF: 2.278), in press, 2013.

Jinliang Yang, Xiaobo Li, William Hamel, Max Q.-H. Meng, and Mingjun Zhang. Chapter 10. Nonlinear Control of Micro/Nano Devices and Systems. Xing Xi, Mingjun Zhang and Guangyong Li (Eds). Modeling and Control for Micro/Nano Devices and Systems, Taylor Publisher, To appear, 2013.

Ruoting Yang, Sharon Bewick, Mingjun Zhang and William Hamel. Adaptive Immune System TH1/TH2 Differentiation Mechanism Inspired Perimeter Patrol Control Strategy, IEEE Transactions on Control System Technology, vol. 19, no. 2, pp. 407-415, 2011.

Sharon Bewick, Mingjun Zhang, and William Hamel. Passive versus Aggressive Strategies: Inspiration from a Game Theoretic Analysis of Military and Immune Defense, IEEE Transactions on Systems, Man, and Cybernetics--Part A: Systems and Humans (IF: 2.123), vol. 41, pp. 583-588, 2011.

Sharon Bewick, Jing Wu, Scott C. Lenaghan, Ruoting Yang, Mingjun Zhang and William Hamel. The R5 to X4 Coreceptor Switch: A Dead-end Path, or a Strategic Maneuver? -- Lessons from a Game Theoretic Analysis, Bulletin of Mathematical Biology, 73 (10), pp. 2339-2356, 2011.

Sharon Bewick, Ruoting Yang, Mingjun Zhang, and W. Hamel. Passive vs. Aggressive Strategies: A Game Theoretic Analysis of Military Defense, Proceedings of the 2009 IEE International Conference on Intelligent Robots and Systems, 2009, St. Louis, MO, USA.

Ruoting Yang, S. Bewick, Mingjun Zhang, W. Hamel, and T-J Tarn. Adaptive Immune System Inspired Perimeter Patrol Control Strategy, Proceedings of the 2009 IEE International Conference on Intelligent Robots and Systems, 2009, St. Louis, MO, USA.

Sharon Bewick, Mingjun Zhang and William R. Hamel. Game Theoretical Formulation of the Immune System and Inspiration for Controlled Drug Delivery Application, Nanomedicine: A Systems Engineering Approach, Mingjun Zhang and Ning Xi (Eds.), Pan Stanford Publishing -- an affiliated company of the World Scientific Publishers, pp. 301-334, 2009.

Sharon Bewick, Mingjun Zhang and William R. Hamel. Fundamental Mathematical Modeling Techniques for Nano Bio-systems, Nanomedicine: A Systems Engineering Approach, Mingjun Zhang and Ning Xi (Eds.), Pan Stanford Publishing -- an affiliated company of the World Scientific Publishers, pp. 39-80, 2009.

Kress, R., Hamel, W., et al., "Control Strategies for Teleoperated Internet Assembly," *IEEE/ASME Transactions on Mechatronics*, Vol. 6, No. 4, December 2002, pp. 410-416.

Hamel, W., et al., "Internet-based Robotics and Remote Systems in Hazardous Environments: Review and Projections," *Advanced Robotics*, Vol. 16, No. 5, pp 399-413, 2002.

Hamel, W., "Panel on Manufacturing Automation in the Era of Information Technology," *IEEE Transactions on Robotics and Automation*, to be published.

Hamel, W. R., et. al, "Intelligent Robotics and Remote Systems for the Nuclear Industry," *Nuclear Engineering and Design* 113, pp. 259-267, 1989.

Weisbin, C. R., Hamel, W. R., et. al, "The Robotics and Intelligent Systems Program at ORNL," *ROBOTICA*. [I] Weisbin, C. R., W. R. Hamel, D. P. Kuban, S. A. Meacham, and F. G. Pin, "The Robotics and Intelligent Systems Program at ORNL," *Robotica* 7, 101–111 (1989).

Herndon, J. N., Hamel, W. R., and Meintel, A. J., "Robotic Systems for NASA Ground-Based Research," *ROBOTICS*, Vol. 4, No. 1, pp. 19-25, March 1988. [I]

Burks, B. L., De Saussure, G., Weisbin, C. R., Jones, J. P., and Hamel, W. R., "Autonomous Navigation, Exploration and Recognition Using the HERMIES-II Robot," *IEEE Expert* 2 (4), pp. 18-27, 1987.

Hamel, W. R., et. al, "Dynamic Modeling and Simulation of Froth Flotation and Vacuum Filtration Units," *ISA Transactions*, Vol. 21, No. 3, pp. 45-53, 1982. [I]

### **Conferences & Articles–Full Paper Review**

Nycz, A. ; Young, M.A. ; Hamel, W.R., "A bio-robotics approach to real-time skeletal joint fluoroscopy during natural movements," 2011 IEEE International Conference on Robotics and Automation, , Page(s): 3376 – 3381

Nycz, Andrzej, Hamel, W. R., "Active Tracking Control between a Bio Robot and a Human Subject," Intelligent Robots and Systems, 2009. IROS 2009. IEEE/RSJ International Conference on Intelligent Robots and Systems, October 10, 2009, pp. 2569-2574

Sharon Bewick, Jing Wu, William Hamel, Mingjun Zhang. Military Defense Strategies: An Inspiration from a Game Theoretic Analysis of the Immune Defense, *Proceedings of the American Control Conference*, June 30, 2010, Baltimore, MD, USA.

Hamel, W. R., Humphreys, H., Nycz, A, and Park, J., "Large Scale Multi-fingered End-Effector Teleoperation," Proceedings of the 2009 IEEE/RSJ International Conference on Intelligent Robots and Systems, 2009, pp. 3304-3310, St. Louis, MO.

Sharon Bewick, Ruoting Yang, Mingjun Zhang, and W. Hamel. Passive vs. Aggressive Strategies: A Game Theoretic Analysis of Military Defense, Proceedings of the 2009 IEEE/RSJ International Conference on Intelligent Robots and Systems, 2009, St. Louis, MO.

Ruoting Yang, S. Bewick, Mingjun Zhang, W. Hamel, and T-J Tarn. "Adaptive Immune System Inspired Perimeter Patrol Control Strategy," Proceedings of the 2009 IEEE/RSJ International Conference on Intelligent Robots and Systems, 2009, St. Louis, MO.

Nycz, A. and Hamel, W. R., "Robot Task Space Analyzer Calibration," 2006 IEEE/RSJ International Conference on Intelligent Robots and Systems, Beijing, China, pp. 1099-1104, October 9-15, 2006

Zhou, R. and Hamel, W. R., "Control of a Prototype Transmission-based Robot Servoactuator Using Realtime Application Interface," 2006 IEEE International Conference on Robotics and Automation, Orlando, FL., pp. 375-380, May 15-19, 2006

Kim, S., Hamel, W. R., Chidambaram, P., and Ananthanarayanan, H. "Error Analysis and Calibration, of Camera/LRF Sensor Head for Telerobotic Systems," 2006 IEEE/RSJ International Conference on Intelligent Robots and Systems, Beijing, China, pp. 5195-5200, October 9-15, 2006

Kim, S. and Hamel, W. R., "Fault Detection of Tool/Load Grasping for Telerobotics Using Neural Networks," Proceedings of the 12<sup>th</sup> International Conference on Advanced Robotics," Munich, Germany, pp. 864-869, June 22-26, 2005

Zhang, Ge and Hamel, W., "Modeling Tooling Interactions of Teleoperation Using Grey System Theory," 2005 IEEE/RSJ International Conference on Intelligent Robots and Systems, Edmonton, Alberta, Canada, August 2005.

Kim, S. and Hamel, W., "Fault Detection of Tool/Load Grasping for Telerobotics Using Neural Networks," 12th International Conference on Advanced Robotics, Seattle, WA., July 2005

Hamel, W. et. al., "Design and Testing of a Prototype Transmission-Based Robot Servoactuator," Proceedings of the 2004 IEEE International Conference on Robotics and Automation, New Orleans, LA, April 2004.

Hamel, W. et. al., "Operational Fault Detection for Telebototic Systems Using Discrete Wavelet Transforms (DWT) and AC Analysis of Position Data," Proceedings of the 2004 IEEE International Conference on Robotics and Automation, pp. 203-213, Taipei, Taiwan, September 2003.

Hamel, W. and Kim, S., "Design of Supervisory Control Scheme for Fault Tolerant Control of Telerobotic System in Operational Space," Proceedings of the 2003 IEEE International Conference on Robotics and Automation, pp. 2880-2885, Leuven, May 2002.

Hamel, W., Kim, S., Zhou, R., and Lumsdaine, A., "Dynamic Modeling and Analysis of a Transmission-based Robot Servoactuator," Proceedings of the 2003 IEEE International Conference on Robotics and Automation, Taipei, Taiwan, September 2003.

Hamel, W., Zhang, G., and Murray, P., "A Real Time Controller for Human Machine Cooperative Telerobotics," Proceedings of the 2002 IEEE International Conference on Robotics and Automation, pp. 2880-2885, Washington, DC, May 2002.

Kim, S. and Hamel, W., "Force Assistance Functions for Human Machine Cooperative Telerobotics using Fuzzy Logic," Proceedings of the 2002 IEEE International Conference on Robotics and Automation, pp. 2165-2170, Washington, DC, May 2002.

Hamel, W. and Kress, R., "Elements of Telerobotics Necessary for Waste Clean Up Automation," Proceedings of the 2001 IEEE International Conference on Robotics and Automation, pp. 393-400, Seoul, Korea, May 2001.

Hamel, W. and Murray, P., "Observations Concerning Internet-based Teleoperations for Hazardous Environments," Proceedings of the 2001 IEEE International Conference on Robotics and Automation, pp. 838-844, Seoul, Korea, October 2001.

Hamel, W. R., e-Maintenance in Hazardous Environments, 2000 IEEE/RSJ International Conference on Intelligent Robots and Systems, pp. 838-844, Takamatsu, Japan, October 2000.

Widner, T. C., and Hamel, W. R., "Control Concepts for Transmission-Based Actuators in Robotics," 1998 IEEE/RSJ International Conference on Intelligent Robots and Systems, Vancouver, British Columbia, October 1998.

Hamel, W. R., and Widner, T. C., "Fundamental Control Concepts for Implementation of Transmission-based Actuators in Robotics and Automation," 1998 IEEE International Conference on Robotics and Automation, Leuven, Belgium, May 1998.

Hamel, W. R., and Widner, T. C., "Transmission-Based Electrical Servoactuators: A Concept for Improving Robot Manipulator Performance," 1997 IEEE International Conference on Robotics and Automation, Albuquerque, NM, April 1997.

Hamel, W. R., and Marland, S., "Model-Based Concept for Telerobotic Control of Decontamination and Dismantlement Tasks," 1997 IEEE International Conference on Robotics and Automation, Albuquerque, NM, April 1997.

Noakes, M.W., Hamel W. R., and Dixon, W. E., "Application of the Selective Equipment Removal System to D&D Tasks," American Nuclear Society Sixth Topical Meeting on Robotics and Remote Handling, Monterey, California, February 5-10, 1995.

Conley, L., Hamel W. R., and Thompson, B.R., "Rosie: A Mobile Worksystem for Decontamination and Dismantlement Operations," American Nuclear Society Sixth Topical Meeting on Robotics and Remote Handling, Monterey, California, February 5-10, 1995.

Wintenberg, A. L., Butler, P. L., Armstrong, G. A., Babcock, S. M., Ericson, M. N., Britton, C. L., and Hamel, W. R., "Sensor-Based Whole-Arm Obstacle Avoidance Utilizing ASIC Technology," Fifth Topical Meeting on Robotics and Remote Handling, Knoxville, Tennessee, April 26-29, 1993.

Kwon, D. S., March-Leuba, S., Babcock, S. M., Burks, B. L., and Hamel, W. R., "Parametric Design Studies of Long-Reach Manipulators," American Nuclear Society Fifth Topical Meeting on Robotics & Remote Handling, Knoxville, Tennessee, 37831, April 26-29, 1993.

Kress, R. L., Babcock, S. M., Bills, K. C., and Hamel, W. R., "Volumetric Reach Comparison of Possible End-Effectors for the Articulated Transporter and Manipulator System", Fourth Topical Meeting on Robotics and Remote Systems, Albuquerque, New Mexico, February 24-28, 1991.

Burks, B. L., Richardson, B. S., Armstrong, G. A., Hamel, W. R., Jansen, J. F., Killough, S. M., Thompson, D. H., and Emery, M. S., "A Demonstration of Remote Survey and Characterization of a Buried Waste Site Using the SRIP Testbed," Fourth Topical Meeting on Robotics and Remote Systems, Albuquerque, New Mexico, February 24-28, 1991.

Jansen, J. F., Kress, R. L., Babcock, S. M., and Hamel, W. R. "Controller Design for a Teleoperator System with Dissimilar Kinematics and Force Feedback," Fourth Topical Meeting on Robotics and Remote Systems, Albuquerque, New Mexico, February 24-28, 1991.

Jansen, J. F., Kress, R. L., Babcock, S. M., and Hamel, W. R. "Controller Design for a Teleoperator System with Dissimilar Kinematics and Force Feedback," 1990 IEEE Conference on Decision and Controls, Honolulu, Hawaii, December 5-7, 1990.

Richardson, B. S., Killough, S. M., Emery, M. S., Herndon, J.N., Hamel, W. R., and Burks, B. L., "Remote Survey and Land Characterization Using the SRIP Vehicle," Unmanned Systems, The Magazine of the Association for Unmanned Vehicle Systems, Volume 8, Number 4, Fall 1990.

Jansen, J. F., Kress, R. L., Babcock, S. M., and Hamel, W. R., "Stiffness Control of Teleoperators with Redundant, Dissimilar Kinematics," IEEE International Conference on Systems Engineering, Pittsburgh, Pennsylvania, August 9-11, 1990.

Hamel, W. R., and Martin, H. L., "Robotics-Related Technology in the Nuclear Industry," Proceedings of SPIE, Vol. 442, pp. 97-107, August, 1989. [I].

Euler, J. A, Dubey, R .V., Babcock, S. M., and Hamel, W. R., "A Comparison of Two Real-Time Control Schemes for Redundant Manipulators with Bounded Joint Velocities," Proceedings of the IEEE International Conference on Robotics and Automation, pp. 106-112, Scottsdale, Arizona, May 1989.

Manges, W. W., Burks, B. L., Einstein, J. R., Hamel, W. R., Feezell, R. R., Killough, S. M., Thompson, D. H., and Weisbin, C. R., "Development of the HERMIES III Mobile Robot Research Testbed at Oak Ridge National Laboratory," Proceedings of the American Nuclear Society Third Topical Meeting on Robotics and Remote Systems, Charleston, South Carolina, March 13-16, 1989.

Babcock, S. M., and Hamel, W. R., "Manipulators, Wrists, and End-Effectors for the Articulated Transporter and Manipulator System," American Nuclear Society Third Topical Meeting on Robotics and Remote Systems, Charleston, South Carolina, March 13-16, 1989.

Killough, S. M., Hamel, W. R., "Sensor Capabilities of the Hermies Experimental Robot," American Nuclear Society Third Topical Meeting on Robotics and Remote Systems, Charleston, South Carolina, March 13-16, 1989.

Costello, H. M., Rowe, J. C., and Hamel, W. R., "A Camera Stabilization Technique for the Ground-Air Telerobotic Systems Teleoperated Vehicles," American Nuclear Society Third Topical Meeting on Robotics and Remote Systems, Charleston, South Carolina, March 13-16, 1989.

Mann, R. C., Hamel, W. R., and Weisbin, C. R., The Development of an Intelligent Nuclear Maintenance Robot, 1988 IEEE International Conference on Robotics and Automation, pp. 621-6275, April 24-29, 1988

Herndon, J. N., Hamel, W. R., and Kuban, D. P., "Traction-Drive Telerobot for Space Manipulation," 1987 IEEE International Conference on Robotics and Automation, pp. 450-455, March 30-April 3, 1987.

Babcock, S. M., Hamel, W. R., and Killough, S. M., "Advanced Manipulation for Autonomous Robots," International Topical Meeting on Remote Systems and Robotics in Hostile Environments, American Nuclear Society, Proceedings of 1987, pp. 290-297, Pasco, Washington, March 29-April 2, 1987.

Hamel, W. R., and Richardson, B. S., "Evaluating Telerobotics for Battlefield Support Operations," International Topical Meeting on Remote Systems and Robotics in Hostile Environment, American Nuclear Society, Proceedings of 1987, pp. 284-289, Pasco, Washington, March 29-April 2, 1987.

Killough, S. M., Martin, H. L., and Hamel, W. R., "Conversion of a Servo-manipulator from Analog to Digital Control," Proceedings of the IEEE International Conference on Robotics and Automation, San Francisco, California, April 14-17, 1986.

Jorgenson, C., Hamel, W. R., and Weisbin, C. R., "Exploring Autonomous Robot Navigation," BYTE, pp. 223-235, January, 1986. [I]

Hamel, W. R., et. al, "Advanced Teleoperations in Nuclear Applications," 21st Space Congress, Cocoa Beach, FL, April, 1984. (Also, 1984 ASME International Computers in Engineering Conference, Las Vegas, Nevada, August, 1984). [I]

Martin, H. L., and Hamel, W. R., "Joining Teleoperation with Robotics for Remote Manipulation in Hostile Environments," Proceedings of Robots 8 Conference, Detroit, Michigan, June, 1984.

Hamel, W. R., and Feldman, M. J., "The Advancement of Remote Technology: Past Perspectives and Future Plans," Proceedings of 1984 National Topical Meeting on Robotics and Remote Handling in Hostile Environments, American Nuclear Society, Gatlinburg, Tennessee, April, 1984. (Also, International Meeting on Fuel Reprocessing and Waste Management, American Nuclear Society,

Jackson, WO, August, 1984; and Canadian Nuclear Society Conference on Robotics and Remote Handling in the Nuclear Industry, Toronto, Canada, September, 1984).

Martin, H. L., Hamel, W. R., et. al, "Control and Electronic Subsystems for the Advanced Servomanipulator," Proceedings of 1984 National Topical Meeting on Robotics and Remote Handling in Hostile Environments, American Nuclear Society, Gatlinburg, Tennessee, April, 1984.

Herndon, J. N., and Hamel, W. R., "Analysis of the Options--Rationale for Servomanipulators in Future Reprocessing Plants," Proceedings of 1984 National Topical Meeting on Robotics and Remote Handling in Hostile Environments, American Nuclear Society, Gatlinburg, Tennessee, April, 1984.

Hamel, W. R., et. al, "Basic Research on Intelligent Robotic Systems Operating in Hostile Environments," Proceedings of 1984 National Topical Meeting on Robotics and Remote Handling in Hostile Environments, American Nuclear Society, Gatlinburg, Tennessee, April, 1984.

### **Conferences--Summary Paper Peer Review**

Hamel, W., Komistek, R., and Dennis, D., "A Tracking Robot Concept for Human Musculoskeletal Diagnostics," The Third International Advanced Robotics Programme Workshop on Technical Challenges for Dependable Robots in Human Environments, Salford University, Manchester, England, September 7-9, 2004 [I].

Hamel, W., "The Harsh Realities of Robotic Waste Clean-Up," 2004 IEEE International Conference on Robotics and Automation, Plenary presentation with honorarium, New Orleans, LA, April 2004 [I].

Hamel, W., "Panel on Manufacturing Automation in the Era of Information Technology" 2001 IEEE International Conference on Robotics and Automation, Panel presentation with honorarium, Seoul, Korea, May 2001 [I].

Hamel, W. R., et al., "Real-Time Modeling, Simulation, and Control System Design of a Dual Hybrid Electric Vehicle," ASME 1999 International Mechanical Engineering Congress & Exposition, Paper DSC-12A-4, Nashville, Tennessee, November 1999.

Hamel, W., "Robot "Dependability" from the Hazardous Environmental Sense," International Advanced Robotics Program, Seoul, Korea, May, 2000 [I].

Hamel, W., "Past & Future Perspectives on Teleoperations Technology," 2001 International Workshop on Bio-Robotics and Teleoperation," Keynote Lecture with honorarium, Beijing, China, May 27-30, 2001.

Hodgson, J. W., Hamel, W. R., et al., "Design of a Low Production Cost Hybrid HMMWV," 17<sup>th</sup> Digital Avionics Systems Conference, Bellevue, WA, October 31-November 6, 1998.

Hamel, W. R., et al., "Robot Task Space Analyzer," ANS Winter Annual Meeting, Albuquerque, New Mexico, November, 1997.

Hamel, W. R., et al., "Robot Task Space Analyzer," DOE Industry Partnerships to Deploy Environmental Technology Conference, Morgantown, West Virginia, October 21-23, 1997.

Hamel, W. R., "Human-Machine Interface Experiences, Issues, and Future Considerations in Remotely-Operated Work Systems," Human/Robot Interactive Systems Workshop, 1997 IEEE International Conference on Robotics and Automation, Albuquerque, NM, April 1997. [I]

Hamel, W. R., "Task-Driven Telerobotics," Workshop on Sensor Referenced Control and Planning: Theory and Applications, 34th IEEE Conference on Decision and Control, New Orleans, Louisiana, December 13-15, 1995. [I]

Hamel, W. R., "Task-Driven Telerobotics in the Real World," Workshop on Task-Driven Telerobotics: Methods and Technologies, 1995 IEEE International Conference on Robotics and Automation, Nagoya, Japan, May 22, 1995. [I]

Hamel, W. R., Haley, D. C., and Dixon, W. E., "Dual-Arm Manipulation Module for Use in Decontamination and Decommissioning Operations, 1994 International Symposium on Decontamination and Decommissioning, Knoxville, Tennessee, April 24-29, 1994.

Hamel, W. R. and Haley, D. C., "Advanced Robotics for Decontamination and Dismantlement," Fifth International Symposium on Robotics and Manufacturing, ISRAM '94, Maui, Hawaii, August 14-17, 1994

Hamel, W. R., "Applied Side Research," Plenary Session of the 1993 IEEE International Conference on Robotics and Automation, Atlanta, Georgia, May 2, 1993. [I]

Wintenberg, A. L., Ericson, M. N., Britton, C. L. Jr., Armstrong, G. A., Babcock, S. M., Butler, P. L., Hamel, W. R., and Newport, D. F., "Whole-Arm Obstacle Avoidance Utilizing ASIC Technology," The Fourth DOE Industry/University/Lab Forum on Robotics for ER&WM—Albuquerque, New Mexico, July 22, 1993.

Wintenberg, A. L., Butler, P. L., Babcock, S. M., Ericson, M. N., Britton, C. L., Jr., Hamel, W. R., "Sensor-Based Whole-Arm Obstacle Avoidance for Unstructured Environments," 1992 ANS/ENS International Meeting, Chicago, Illinois, November 15-20, 1992.

Jansen, J. F., Kress, R. L., Babcock, S. M., and Hamel, W. R., "Bench-Scale Experiments in Long-Reach Manipulation for Waste Storage Tank Remediation," 1992 ANS/ENS International Meeting, Chicago, Illinois, November 15-20, 1992.

Jansen, J. F., Babcock, S. M., Kress, R. L., Burks, B. L., Hamel, W. R., "Long Reach Manipulation for Underground Storage Tank Remediation," 1991 American Society of Mechanical Engineers, Winter Annual Meeting, Atlanta, Georgia, December 1-6, 1991.

Babcock, S. M., Burks, B. L., and Hamel, W. R., " Overview of Telerobotic Systems Development at the Oak Ridge National Laboratory," Robotics and Control Session of the Aerospace Applications of Artificial Intelligence Conference 1990, Dayton, Ohio, October 29-31, 1990.

Jansen, J. F., Kress, R. L., Babcock, S. M., and Hamel, W. R., "Stiffness Control of Teleoperators with Redundant Dissimilar Kinematics," 1990 IEEE International Conference on Systems Engineering, Pittsburgh, Pennsylvania, August 9-11, 1990.



Richardson, B. S., Killough, S. M., Emery, M. S., Herndon, J. N., Hamel, W. R., and Burks, B. L. "Remote Site Survey and Characterization for the National ER&WM Program Using the SRIP Vehicle," 1990 Annual Meeting of the American Nuclear Society, Nashville, Tennessee, June 10-14, 1990.

DePiero, F. W., Manges, W. W., Kress, R. L., Kedl, M. R., and Hamel, W. R., "Architecture for a Human-Robot Symbiotic System," IEEE Twenty-Second Southeastern Symposium of System Theory, Cookeville, Tennessee, March 11-13, 1990.

Babcock, S. M., Dubey, R. V., Euler J. A., Glassell, R. L., Kress, R. L., and Hamel, W. R., "Telerobotic Control of the Seven-Degree-of-Freedom CESAR Manipulator," NATO Advanced Research Workshop, Robots with Redundancy: Design, Sensing, and Control, (NATO ASI Series published by Springer Verlag, New York), June 27-July 1, 1988.

Hamel, W. R., "The Man-Robot Symbiosis Project," 15th Annual WATtec Interdisciplinary Technical Conference and Exhibition, Knoxville, Tennessee, February 16-19, 1988. [I]\*

Hamel, W. R., "Experiments in Autonomous Robotics," published in Proceedings of the Fifth Symposium on Energy Sciences, Argonne National Laboratory, Dallas, Texas, June 17-19, 1987. [I]

Hamel, W. R., and Weisbin, C. R., "Human-Scale Experiments in Mobile Autonomous Robotics," Advanced Robotics Programme Workshop on "Manipulators, Sensors, and Steps towards Mobility," Advanced Robotics Project of the Versailles Economic Summit of 1982, Nuclear Research Center Karlsruhe, Federal Republic of Germany, May 11-13, 1987. [I]

Herndon, J. N., and Hamel, W. R., "Telerobotic Technology for Nuclear and Space Applications," AIAA/NASA/USAF Symposium on Automation, Robotics, and Advanced Computing for the National Space Program, Arlington, Virginia, March 9-11, 1987. [I]

Kuban, D. P., and Hamel, W. R., "Application of a Traction-Drive Seven-Degrees-of-Freedom Telerobot to Space Manipulation," 10th Annual AAS Guidance and Control Conference, American Astronautical Society, Keystone, Colorado, January 31-February 4, 1987. [I]

Hamel, W. R., and Babcock, S. M., "Manipulator Technology: The Critical Element of Useful Autonomous Working Machines," International Congress on Intelligent Autonomous Systems, Amsterdam, Netherlands, December 8-11, 1986.

Hamel, W. R., Babcock, S. M., and Hall, M. C. G., "Autonomous Robots for Hazardous and Unstructured Environments," Proceedings of ROBOTS 10, RI/SME, pp. 5-9 to 5-27, Chicago, Illinois, April 20-24, 1986.

Herndon, J. N., Kring, C. T., Feldman, M. J., Kuban, D. P., Martin, H. L., Rowe, J. C., and Hamel, W. R., "Advanced Remote Handling Developments for High Radiation Applications," Proceedings of the Robots 86 Conference, Robotics International of SME, pp. 5/53-65, Chicago, Illinois, April 20-25, 1986.

Hamel, W. R., "Manipulators in Teleoperation," American Nuclear Society Executive Conference on Remote Operations and Robotics in the Nuclear Industry, Pine Mountain, Georgia, April 21-24, 1985. [I]

Hamel, W. R., "Future Directions in Mobile Teleoperation," Proceedings of the Workshop on Requirements of Mobile Teleoperators for Radiological Emergency Response and Recovery, ANL/EES-TM-291, pp. 105-120, Argonne National Laboratory, Dallas, Texas, June 24-25, 1985. [I]

Hamel, W. R. and Miller, G. N., "Filling the Gap Through Teleoperation," Proceedings of the Artificial Intelligence and Robotics Symposium, U.S. Army TRADOC and Soldier Support Center, Indianapolis, Indiana, September 12-13, 1984.

Barhen, J., Babcock, S. M., Hamel, W. R., Oblow, E. M., Saridis, G. N., de Saussure, G., Solomon, A. D., and Weisbin, C. R., "Basic Research on Intelligent Robotic Systems Operating in Hostile Environments: New Developments at ORNL," American Nuclear Society, pp. 105-116, 1984.

Hamel, W. R., "Robotics," Proceedings of 1984 DOE Nuclear Reactor Safety Conference, CONF-840257 (Vol. 2), pp. 385-412, Rockville, Maryland, February 27-March 1, 1984. [I]

Clarke, M., Hamel, W. R., and Draper, J., V. "Human Factors in Remote Control Engineering," Proceedings of 31st Conference on Remote Systems Technology, American Nuclear Society, Vol. 1, pp. 8-16, 1983.

Canright, G., et. al, "Transient Modeling of Froth Flotation and Vacuum Filtration Processes," Symposium on Instrumentation and Control for Fossil Energy Processes, San Francisco, California, 1981.

Hamel, W. R., and Reid, B., "Remote Systems Technology, Occupational Radiation Exposure, and Light-Water Reactors," Workshop to Delineate the Economic, Technical, and Policy Issues for Remote Maintenance Systems, University of FL, 1981. [I]

Sebesta, H., Hamel, W. R., and Leight, J., "Conditions for Optimal Control of Time-Delay Systems Subject to Inequality Constraints," IEEE 12th Midwest Symposium on Circuit Theory, University of Texas, Austin, Texas, 1969.

## **Technical Reports**

Hamel, W. R. , et al., "Robot Task Space Analyzer Project, Phase I Topical Report", University of Tennessee, June 1998.

Carteret, B., Hamel, W. R., et al., "Needs Assessment for Remote Systems Technology at the Chernobyl Unit 4 Shelter," Pacific Northwest National Laboratory, PNNL-11692, December, 1997.

Kwon, D. S., March-Leuba, S., Babcock, S. M., and Hamel, W. R., "Key Design Requirements for Long-Reach Manipulators," ORNL/TM-12251.

Jansen, J. F., March-Leuba, S., Kwon, D. S., Babcock, S. M., Burks, B. L. , Kress, R. L., and Hamel, W. R., "Long-Reach Manipulation for Waste Storage Tank Remediation FY 1991 Report," ORNL/TM-11999.

Kress, R. L., Babcock, S. M., Bills, K. C., and Hamel, W.R., "Comparison of Possible End-Effectors for the Articulated Transporter and Manipulator System," ORNL/TM-11341, In press.

Costello, H. M., Killough, S. M., Rowe, J. C., and Hamel W. R., "Camera Stabilization Techniques for Ground-Air Teleoperated Vehicles," Oak Ridge National Laboratory Technical Manuscript, ORNL/TM - 10900, November 1988.

Weisbin, C. R., Hamel, W. R., and Barhen, J., "Research and Development Program Plan for the Center for Engineering Advanced Research," ORNL/TM-10232, 1986.

Martin, H. L., Kuban, D. P., Williams, D. M., Herndon, J. N., and Hamel, W. R., "Recommendation for the Next-Generation Space Telerobot System," ORNL/TM-9951, April, 1986.

Canright, G., Allgood, G., Brown, C., and Hamel, W. R., "Dynamic Modeling and Control Analysis of Froth Flotation and Clean Coal Filtration as Applied to Coal Beneficiation," ORNL/TM-8015, 1981.

Hamel, W. R., Jansen, J. M., and Bradley, N., "Instrumentation and Control Development and Design Philosophy for Advanced Fuel Recycle," ORNL/TM-6393, 1978.

Hamel, W. R., and McDuffee, T., "Value Impact of Vault Automation in Special Nuclear Material Storage," ORNL/NUREG-33, 1978.

Hamel, W. R., et. al, "Design Criteria for Vault Automation in Special Nuclear Material Storage," ORNL/NUREG-44, 1978.

Hamel, W. R., and Shappert, L., "Desirability and Feasibility of Vault Automation in Special Nuclear Materials Storage," ORNL/NUREG-20, 1977.

[I] = invited papers and contributions