

2025 IEEE Conference on Telepresence

**Leiden, Netherlands
8-10 September 2025**

IEEE Catalog Number: CFP25VR3-POD
ISBN: 979-8-3315-8617-1



Copyright © 2025, IEEE

All Rights Reserved

Copyright and Reprint Permissions:

Abstracting is permitted with credit to the source. Libraries are permitted to photocopy beyond the limit of U.S. copyright law for private use of patrons those articles in this volume that carry a code at the bottom of the first page, provided the per-copy fee indicated in the code is paid through Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923.

For other copying, reprint or republication permission, write to IEEE Copyrights Manager, IEEE Service Center, 445 Hoes Lane, Piscataway, NJ 08854. All rights reserved.

*** This is a print representation of what appears in the IEEE Digital Library. Some format issues inherent in the e-media version may also appear in this print version.

IEEE Catalog Number:	CFP25VR3-POD
ISBN (Print-On-Demand):	979-8-3315-8617-1
ISBN (Online):	979-8-3315-8616-4

Additional Copies of This Publication Are Available From:

Curran Associates, Inc
57 Morehouse Lane
Red Hook, NY 12571 USA

Phone:	(845) 758-0400
Fax:	(845) 758-2633
E-mail:	curran@proceedings.com
Web:	www.proceedings.com

TABLE OF CONTENTS

Telepresence in Construction Sites: Usability Study of a VR-Based Environment for Working in Heights	1
<i>Olmo A. Moreno F., Nicholas Cartocci, Antonios E. Gkikakis, Gabriele Giurin, Marco Carega Yonas T. Tefera, Nikhil Deshpande, Francesca M. Fabiani, Darwin G. Caldwell, Jesus Ortiz</i>	
Real Time Haptic Guidance for Obstacle Avoidance in Tele-Interaction	7
<i>Luuk B.L. Lenders, Nils Rublein, Douwe Dresscher</i>	
Evaluating Multi-user Telepresence Robot Interaction in Cybersecurity Education	15
<i>Janika Leoste, Tiina Kasuk, Kristel Marmor, Andres Käver</i>	
Auto-Manual Hybrid Mode for Teleoperation of Active Needles in Tissue Phantoms	21
<i>Siyeon Lee, Seohun Jung, Youngseo Park, Joeun Lee, Sooyeon Kim, Sujin Yu, Seok Chang Ryu</i>	
MiXR-Intent: Intention Prediction for Immersive Remote Encountered-Type Haptics	27
<i>N. B. Takele, D. Delehelle, Y. Kim, S. Anastasi, N. Deshpande, J. Ortiz, D. G. Caldwell, C. Recchiuto Y. T. Tefera</i>	
Mixed Reality Tele-Ultrasound over 750 km: A Feasibility Study	33
<i>Ryan S. Yeung, David Black, Patrick Boyan Chen, Victoria Lessoway, Janice Reid, Sergio Rangel-Suarez Silvia D. Chang, Septimiu E. Salcudean</i>	
Exponential Control Barrier Functions for Enhanced Safety during Safety-Critical Interactions in Telemanipulation	41
<i>Stephan Andreas Schwarz, Ulrike Thomas</i>	
Modified Recurrent Elman NN based Leader Follower Consensus of Nonlinear Multi-agent Systems Under Directed Graphs	47
<i>Simi Raj, Shihabudheen K.V., Jeevamma Jacob</i>	
Sharing but Not Caring: Similar Outcomes for Shared Control and Switching Control in Telepresence-Robot Navigation	53
<i>Juho Kalliokoski, Evan G. Center, Steven M. LaValle, Timo Ojala, Basak Sakcak</i>	
Consistent Conjugated Variables Choice for TDPA Passivated Teleoperation Architectures	61
<i>Camilla Celli, Francesco Porcini, Andrea Bini, Alessandro Filippeschi, Antonio Frisoli</i>	
Towards a Versatile Teleoperation System for Mobile Robots through a Modular Architecture and Scalable Autonomy	69
<i>Sabine Bellmann, Thomas Trapp, Elias Hofele, David Oberacker, Marvin Grosse Besselmann Niklas Spielbauer, Philip Keller, Lennart Puck, Tristan Schnell, Rüdiger Dillmann, Arne Roennau</i>	
Bilateral modeling in teleoperation An example in practice	77
<i>Luc Schoot Uiterkamp, Christophe van der Walt, Alexander A. Wierzb, Gwenn Englebienne Douwe Dresscher, Felix L. Schwenninger</i>	
Foveated Compression for Immersive Telepresence Visualization	83
<i>Max Schwarz, Sven Behnke</i>	
Trialing telepresence robots as part of a volunteer support scheme to encourage social interaction and physical activity*	90
<i>Praminda Caleb-Solly, Kirsty Brown, Richard Solly, Karen Lloyd</i>	

A Review of Control Interfaces for Telepresence Robots: Trends, Challenges, and Opportunities	98
<i>Ghazal Zand, Ahmed Sabbir Arif</i>	
Electrocutaneous Apparent Motion for Telepresence Systems	107
<i>Tom Hueting, Jan van Erp, Robin Liefstink</i>	
Efficient Robot Control with Motion Primitives and Mixed Reality	113
<i>Panomwat Warattaseth, Arsen Abdulali, John Dudley, Fumiya Iida</i>	
Model-Based Analysis and Evaluation of an Origami Encounter-type Wearable Device	119
<i>Monica Malvezzi, Lisheng Kuang, Claudio Pacchierotti, Francesco Chinello</i>	
Haptic-Enhanced Shared Control for Collaborative Dual-Robot Telemanipulation in Large-Scale Object Handling	125
<i>Mohammad Sadeghi, Inderawes Khalil, Konstantina Orlandatou, Thorsten A. Kern</i>	
Sensing Localised Touch with a Soft Robot Skin	131
<i>Gwenn Englebienné, Camille Sallaberry</i>	
Affective assessment of haptic stimuli on a large pneumatic haptic display	137
<i>Irene A. Kuling, Femke E. van Beek</i>	
Safe Bimanual Teleoperation with Language-Guided Collision Avoidance	141
<i>Dionis Totsila, Clemente Donoso Krauss, Enrico Mingo Hoffman, Jean-Baptiste Mouret, Serena Ivaldi</i>	
A method for creating visual cues to improve depth perception in remote machine operation. How much help is needed?	146
<i>Victor Zhidchenko, Egor Startsev, Heikki Handroos</i>	
Occlusion-Safe Shared Micromanipulation in Vision-Constrained Environments	151
<i>Leon Raphalen, Tom Goaldard, Marco Ferro, Paolo Robuffo Giordano, Claudio Pacchierotti</i>	
Inverting the Cross-Modal Experience of a Soft Haptic Display for Virtual Touch Interactions at a Science Festival	155
<i>Femke E. van Beek, Irene A. Kuling</i>	
Towards Universal Shared Control in Teleoperation Without Haptic Feedback*	160
<i>Max Grobbel, Tristan Schneider, Sören Hohmann</i>	
Immersive Teleoperation of Beyond-Human-Scale Robotic Manipulators: Challenges and Future Directions	165
<i>Mahdi Hejrati, Jouni Mattila</i>	
Teleoperated Robotic Mission for Sensor Calibrations in Hazardous Environments	171
<i>Eloise Matheson, Alejandro Diaz Rosales, Jorge Playan Garai, Carlos Veiga Almagro, Hugo Perier</i>	
<i>Francesco Riccardi, Luca Rosario Buonocore, Mario Di Castro</i>	
Wearable Soft Haptic Interface for Tactile Perception of Virtual Rain and Other Environmental Particles	175
<i>Davide Costabile, Alberto Villani, Domenico Prattichizzo</i>	
Toward Immersive Teleoperation with Assistive Force Cues to Guide Users with Obstacle and Target Information	181
<i>Ajithkumar Narayanan Manaparampil, Annika Schmidt, Aaron Pereira, Miguel Neves, Xuwei Wu</i>	
<i>Benedikt Pleintinger, Harsimran Singh, Michael Panzirsch, Thomas Hulin, Neal Y. Lii</i>	

Generative Connectome-Inspired Reservoir Computing for Time-Series Prediction	187
<i>Leone Costi, Dario Izzo</i>	
Deformation of the panoramic sphere into an ellipsoid to induce self-motion in telepresence users	191
<i>Eetu Laukka, Evan G. Center, Timo Ojala, Steven M. LaValle, Matti Pouke</i>	
Conceptual Framework for Teleoperated Robotic Recovery of Large Subsea UXOs	197
<i>Annika Schmidt, Dennis Höhn, Harsimran Singh, Michael Walter, Maximilian Mühlbauer, Eyk-Uwe Pap</i>	
<i>Michael Panzirsch, Bregje Lodewikus, Hubert Van Strien, Siwei Zhang, Armin Dammann</i>	
<i>Fabio Broghammer, Axel Hahn, Thoralf Noack, Neal Y. Lii, Alin Albu-Schäffer, Thomas Hulin</i>	
Generating Haptic Cues from Audio-Visual Content to Enhance Emotional Perception	203
<i>Ivan Semenzi, Tommaso Lisini Baldi, Edoardo Lascalea, Elena Pianigiani, Tiberio Di Pisello</i>	
<i>Domenico Prattichizzo</i>	
Pre-Clinical Latency Characterization of VRxBioRelax: A Real-Time EMG Biofeedback System for Muscle Relaxation in Virtual Reality	209
<i>Melanie Baumgartner, Raphael Weibel, Tobias Hoesli, Aydin Javadov, Rayna Ney, Helen Schwerdt</i>	
<i>Florian Von Wangenheim, Joseph Ollier</i>	
Initial Empirical Evaluation of 5G for Haptic Robotics in Industrial Teleoperation Tasks	213
<i>Omar Al-Buraiki, Jordan Wang, Alexander Warner, William Melek, Oliver Schneider</i>	
Multimodal Analysis of Sensorimotor Learning in an Immersive, Neural Haptic Human-in-the-Loop Interface to Inform Training and Design	219
<i>Laura H. McGann, Rachel S. Jakes, Douglas A. Wajda, Dustin J. Tyler</i>	
TeleSim: A Network-Aware Testbed and Benchmark Dataset for Telerobotic Applications	225
<i>Zexin Deng, Zhenhui Yuan, Longhao Zou</i>	
Enhancing Human-Robot Connection in Space Teleoperation through Shared Mental Model Creation	229
<i>Luisa Mayershofer, Nesrine Batti, Ajithkumar N. Manaparampil, Anne Köpken, Florian S. Lay</i>	
<i>Xiaozhou Luo, Adrian S. Bauer, Rute Luz, Daniel Leidner, Peter Schmaus, Thomas Krüger, Neal Y. Lii</i>	
Multi-Sensory Digital Twin Teleoperation System with Haptic Glove-Based Tactile Feedback for Robotic Grasping	235
<i>Meipeng Huang, Runhui Feng, Kai Hu, Xiongbin Yu, Longhao Zou, Jin Xie, Zexin Deng, Zhenhui Yuan</i>	