

# **2015 IEEE Symposium on 3D User Interfaces**

**(3DUI 2015)**

**Arles, France  
23-24 March 2015**



**IEEE Catalog Number: CFP15DUI-POD  
ISBN: 978-1-4673-6887-2**

# Contents

Symposium Chair Message.....	vii
IEEE Visualization and Graphics Technical Committee (VGTC) .....	viii
Organizing Committee .....	ix
Program Committee .....	ix
Steering Committee .....	ix
Paper Reviewers.....	x
Keynote Speaker: Mark Billinghurst.....	xi

## Papers & Technotes

### Session: Locomotion

Session Chair: Bernd Froehlich

Comparing the Performance of Natural, Semi-Natural, and Non-Natural Locomotion Techniques in Virtual Reality ....	3
Mahdi Nabyouni, Ayshwarya Saktheeswaran, Doug Bowman, Ambika Karanth	
[Technote] Design and Evaluation of a Visual Acclimation Aid for a Semi-Natural Locomotion Device .....	11
Mahdi Nabyouni, Siroberto Scerbo, Vincent DeVito, Stefan Smolen, Patrick Starrin, Doug Bowman	
[Technote] March-and-Reach: A Realistic Ladder Climbing Technique.....	15
Chengyuan Lai, Ryan McMahan, James Hall	

### Session: Applications

Session Chair: Evan Suma

Bema: A Multimodal Interface for Expert Experiential Analysis of Political Assemblies at the Pnyx in Ancient Greece.....	19
Kyungyoon Kim, Bret Jackson, Ioannis Karamouzas, Moses Adeagbo, Stephen Guy, Richard Graff, Daniel Keefe	
[Technote] 3D Visualization to Mitigate Weather Hazards in the Flight Deck: Findings from a User Study .....	27
Catherine Letondal, Cédric Zimmermann, Jean-Luc Vinot, Stéphane Conversy	
[Technote] Practical Chirocentric 3DUI Platforms for Immersive Environments .....	31
Charilaos Papadopoulos, Ho Jin Choi, Joydeep Sinha, Kiwon Yun, Arie E. Kaufman, Dimitris Samaras, Bireswar Laha	
[Technote] Creating an Impression of Virtual Liquid by Modeling Japanese Sake Bottle Vibrations .....	35
Sakiko Ikeno, Ryuta Okazaki, Taku Hachisu, Hiroyuki Kajimoto	
[Technote] A Virtual Reality Simulator for Training Endodontics Procedures Using Manual Files .....	39
Tales Bogoni, Roberta Scarparo, Marcio Pinho	

### Session: Navigation

Session Chair: Takuji Narumi

LazyNav: 3D Ground Navigation with Non-Critical Body Parts .....	43
Emilie Guy, Parinya Punpongsanon, Daisuke Iwai, Kosuke Sato, Tamy Boubekeur	
A Spatial Partitioning Heuristic for Automatic Adjustment of the 3D Navigation Speed in Multiscale Virtual Environments.....	51
Henrique Taunay, Vinícius Rodrigues, Rodrigo Braga, Pablo Elias, Luciano Reis, Alberto Raposo	
Evaluation of 3D Virtual Cursor Offset Techniques for Navigation tasks in a Multi-Display Virtual Environment.....	59

Jialei Li, Isaac Cho, Zachary Wartell

### Session: Stereoscopic Vision & Calibration

Session Chair: Martin Hachet

Characterizing Embodied Interaction in First and Third Person Perspective Viewpoints .....	67
Henrique Galvan Debarba, Eray Molla, Bruno Herbelin, Ronan Boulic	
Dealing with Frame Cancellation for Stereoscopic Displays in 3D User Interfaces .....	73
Jérémy Lacochem, Morgan Le Chénéchal, Sébastien Chalmé, Jérôme Royan, Thierry Duval, Valerie Gouranton, Eric Maisel, Bruno Arnaldi	
Evaluating Stereo Vision and User Tracking in Mixed Reality Tasks .....	81
Andrea Albarelli, Augusto Celentano, Luca Cosmo	
Volumetric Calibration and Registration of Multiple RGBD-Sensors into a Joint Coordinate System .....	89
Stephan Beck, Bernd Fröhlich	

### Session: Fingers & Touch

Session Chair: Christoph Borst

Carryover Effects of Calibration to Visual and Proprioceptive Information on Near Field Distance Judgments in 3D User Interaction .....	97
Elham Ebrahimi, Bliss M. Altenhoff, Christopher C. Pagano, Sabarish V. Babu	
[Technote] Comparing Indirect and Direct Touch in a Stereoscopic Interaction Task .....	105
Adalberto Simeone, Hans Gellersen	
Finger-Based Manipulation in Immersive Spaces and the Real World .....	109
Emmanuelle Chapoulie, Theophanis Tsandilas, Lora Oehlberg, Wendy Mackay, George Drettakis	
[Technote] 3D Virtual Hand Pointing with EMS and Vibration Feedback .....	117
Max Pfeiffer, Wolfgang Stuerzlinger	

### Session: Selection & Manipulation

Session Chair: Doug Bowman

IDS: The Intent Driven Selection Method for Natural User Interfaces .....	121
Frol Periverzov, Horea Ilies	
[Technote] Handymenu: Integrating Menu Selection into a Multi-Function Smartphone-based VR Controller .....	129
Nicholas Lipari, Christoph Borst	
[Technote] Evaluation of a Bimanual Simultaneous 7DOF Interaction Technique in Virtual Environments .....	133
Isaac Cho, Zachary Wartell	
[Technote] A Robust Inside-Out Approach for 3D Interaction with Large Displays .....	137
David Scherfgen, Rainer Herpers, Timur Saitov	

## Posters

Utilization of Variation in Stereoscopic Depth for Encoding Aspects of Non-spatial Data .....	143
Ragaad AlTarawneh, Shah Rukh Humayoun, Achim Ebert	
Methods to Reduce Cybersickness and Enhance Presence for In-Place Navigation Techniques .....	145
Jose L. Dorado, Pablo A. Figueroa	
Conflict Resolution Models on Usefulness within Multi-user Collaborative Virtual Environments .....	147
Aida Erfanian, Yaoping Hu	
Haptic ChairIO: A System to Study the Effect of Wind and Floor Vibration Feedback on Spatial Orientation in VEs .....	149
Mi Feng, Robert W. Lindeman, Hazem Abdel-Moati, Jacob C. Lindeman	
Towards Interactive Authoring Tools for Composing Spatialization .....	151

Jérémie Garcia, Jean Bresson, Thibaut Carpentier

Framework for Remote Collaborative Interaction in Virtual Environments Based on Proximity.....	153
Mar Gonzalez-Franco, Mark Hall, Devon Hansen, Karl Jones, Paul Hannah, Pablo Bermell-Garcia	
Hacking HTML5 Canvas to Create a Stereo 3D Renderer.....	155
Diego González-Zúñiga, Jordi Carrabina	
Aughanded Virtuality - The Hands in the Virtual Environment .....	157
Tobias Günther, Ingmar S. Franke, Rainer Groh	
Freehand vs. Micro Gestures in the Car: Driving Performance and User Experience .....	159
Renate H uslschmid, Benjamin Menrad, Andreas Butz	
Tangible Virtual Kitchen for the Rehabilitation of Alzheimer’s Patients .....	161
Thuong Hoang, Déborah Foloppe, Paul Richard	
Learning from Rehabilitation: a Bi-manual Interface Approach.....	163
S. Hoermann, J. Collins, H. Regenbrecht	
INSPECT: Extending Plane-Casting for 6-DOF Control.....	165
Nicholas Katzakis, Robert Teather, Kiyoshi Kiyokawa, Haruo Takemura	
VisuaLift Studio: Study on Motion Platform using Elevator.....	167
Masahiro Koge, Taku Hachisu, Hiroyuki Kajimoto	
Penetra3D: A Penetrable, Interactive, 360-degree Viewable Display.....	169
Praneeth Kumar, Pattie Maes	
Mapping 2D User Input to Multi-Projector Spatial Augmented Reality Environments.....	171
Michael R. Marner, Ross T. Smith, Bruce H. Thomas	
Distance Perception During Cooperative Virtual Locomotion.....	173
William E. Marsh, Jean-Rémy Chardonnet, Frédéric Mérienne	
A Novel 3D User Interface for the Immersive Design Review.....	175
Andrea Martini, Lucio Colizzi, Francesco Chionna, Francesco Argese, Mauro Bellone, Piero Cirillo, Vito Palmieri	
Immersive ROS-Integrated Framework for Robot Teleoperation .....	177
Lorenzo Peppoloni, Filippo Brizzi, Carlo Alberto Avizzano, Emanuele Ruffaldi	
Encountered Haptic Augmented Reality Interface for Remote Examination .....	179
Emanuele Ruffaldi, Alessandro Filippeschi, Filippo Brizzi, Juan Manuel Jacinto, Carlo Alberto Avizzano	
An Interactive Web-Based Tool for Breast Reduction Surgery Simulation .....	181
Pedro Salgueiro, Salvador Abreu, José Rolo, Stéphane Clain	
Buyers Satisfaction in A Virtual Fitting Room Scenario Based on Realism of Avatar.....	183
Qi Sun, Seyedkoosha Mirhosseini, Ievgeniia Gutenko, Ji Hwan Park, Charilaos Papadopoulos, Bireswar Laha, Arie Kaufman	
Exact Interactions Executed with New Technique Estimating Positions of Virtual Objects by Using Human Body Movements .....	185
Masahiro Suzuki, Hiroshi Unno, Kazutake Uehira	
Integrated View-Input Interaction Method for Mobile AR.....	187
Tomohiro Tanikawa, Hidenori Uzuka, Takuji Narumi, Michitaka Hirose	
Impact of Annotation Dimensionality under Variable Task Complexity in Remote Guidance.....	189
Philipp Tiefenbacher, Tobias Gehrllich, Gerhard Rigoll	
Spatially-Multiplexed MIMO Markers .....	191
Hideaki Uchiyama, Shinichiro Haruyama, Atsushi Shimada, Hajime Nagahara, Rin-ichiro Taniguchi	

A Multi-Touch Finger Gesture Based Low-Fatigue VR Travel Framework.....	193
Zhixin Yan, Robert W. Lindeman	

## Contest

3DUI Idol – 6th Annual 3DUI Contest.....	197
Rongkai Guo, Michael Marner, Benjamin Weyers	
Crosscale: A 3D Virtual Musical Instrument Interface .....	199
Marcio Cabral, Andre Montes, Gabriel Roque, Olavo Belloc, Mario Nagamura, Regis R A Faria, Fernando Teubl, Celso Kurashima, Roseli Lopes, Marcelo Zuffo	
ChromaChord: A Virtual Musical Instrument.....	201
John Fillwalk	
Interval Player: Designing a Virtual Musical Instrument Using In-Air Gestures.....	203
Wallace Lages, Mahdi Nabiyouni, Javier Tibau, Doug A. Bowman	
Wedge: A Musical Interface for Building and Playing Composition-Appropriate Immersive Environments.....	
Alec G. Moore, Michael J. Howell, Addison W. Stiles, Nicolas S. Herrera, Ryan P. McMahan	
The Digital Intonarumori.....	207
Stefania Serafin, Amalia De Götzen, Smilen Dimitrov, Steven Gelineck, Cumhuri Erkut, Niels Christian Nilsson, Francesco Grani, Rolf Nordahl, Stefano Trento	
Cirque des Bouteilles: The Art of Blowing on Bottles .....	209
Daniel Zielasko, Dominik Rausch, Yuen C. Law, Thomas C. Knott, Sebastian Pick, Sven Porsche, Joachim Herber, Johannes Hummel, Torsten W. Kuhlen	