

# Workshop on Industrial Augmented Reality

# Program

## Session 1: Real-World Requirements for Industrial Augmented Reality Applications

- 9:00 Applying MR Technologies to Product Exhibition at Canon  
*Ohshima Toshikazu, Human Machine Perception Laboratory, Canon Inc*
- 9:15 AR Applications for the Car Development Process at Volkswagen  
– Lessons Learned *Stefan Nölle, Volkswagen AG*
- 9:30 Augmented Reality Applications in Experimental Vehicle  
Construction at BMW *Stephan Huber, BMW AG*
- 9:45 Report on the Post-ARVIKA Industry-based AR Interest Group  
*Werner Schreiber, Volkswagen AG*
- 10:00 Applications of AR in Broadcasting *Graham Thomas, BBC*

## Session 2: Existing Toolkits / Solutions: Tracking

- 10:30 History and Roadmap of InterSense Tracker Development for  
Industrial AR and Automation *Eric Foxlin, InterSense Inc.*
- 10:45 AR-Browser: an Application based on the Mixed Reality System  
VR-AVALON *Jens Weidenhausen, Harald Wüst and Didier Stricker, IGD*
- 11:00 Potential of the ARToolKit for Use in Industrial AR Applications  
*Hirokazu Kato, Osaka University and Mark Billinghurst, HIT Lab NZ*
- 11:15 The Achilles' Heels of Optical Tracking Systems: Occlusions and  
Optical Interferences – A.R.T.'s Solutions *Konrad Zürl, A.R.T. GmbH*
- 11:30 Rapid Prototyping of Augmented Reality Applications with the  
STUDIERSTUBE Framework *Dieter Schmalstieg, TU Graz*
- 11:45 Unifeye SDK – Mixed Reality, Unique Solutions.  
*Peter Meier, metaio Augmented Solutions*
- 12:00 Industrial Applications of D'Fusion Software  
*Bruno Uzzan, Total Immersion*
- 12:15 ARTag Rev2 Fiducial Marker System: Vision based Tracking for AR  
*Mark Fiala, National Research Council of Canada*

## Session 3: Current Applications

- 13:30 Future Research Directions for Markerless Augmented Reality at  
the Example of an Aircraft's Landing Gear *Dieter Langer, EADS*
- 13:45 Augmented Reality Applications at Daimler Chrysler  
*Axel Hildebrand, Daimler Chrysler*
- 14:00 AR-based Analysis of Interfering Edges between  
Real and Virtual Objects *Fabian Doil, Volkswagen AG*
- 14:15 AMRA: Augmented Reality Assistance in Train Maintenance  
Tasks *Jean-Yves Didier, Laboratoire Systèmes Complexes*
- 14:30 AR for Plant Service – Applications, Challenges, Future Directions  
*Mirko Appel, Siemens AG, Corporate Technologies*
- 14:45 Augmented Reality in Rockwell Corporate Research  
*Reinhold Behringer, RSC*
- 15:00 Vehicle in the Loop – Augmented Reality Application for Collision  
Mitigation *Thomas Bock, AUDI AG*

## Session 4: Existing Toolkits / Solutions: Authoring

- 15:30 Authoring the Impossible?  
*AMIRE toolkit, Michael Haller, FH Hagenberg*
- 15:45 The DART Project: Building Real Tools for Real People  
*Maribeth Gandy and Blair MacIntyre, Georgia Institute of Technology*
- 16:00 Authoring – A Key Element to Efficient Creation of VR/AR  
Content *Marco Schumann, IFF FHG Magdeburg*

## Wednesday Oct 5

8:30-17:00 Workshop on Industrial Augmented Reality

## Thursday Oct 6

8:00 Registration  
8:45-9:00 Opening Comments  
9:00-10:00 Keynote Presentation: Mixed Reality Research:  
The European Dimension by Eric Badiqué,  
European Commission  
10:30-12:00 Rendering and Displays  
14:00-15:30 Applications and Authoring  
16:00-17:00 Vision-based tracking 1  
17:00-17:30 Demo teaser session  
17:30-18:00 Poster Teaser Session  
18:00-19:30 Poster Session

## Friday Oct 7

8:30-10:00 Panel: Hand-held Augmented Reality  
10:30-11:50 Collaboration  
14:00-15:00 Demo session  
15:00-16:00 Interaction techniques  
16:00-17:00 Keynote presentation: The Art of Technology and  
the Future of MR, Christopher Stapleton, University  
of Central Florida  
19:00-on Conference Dinner

## Saturday Oct 8

9:00-10:10 Vision-based tracking 2  
10:45-12:05 Tracking and calibration  
14:00-16:00 Demo Session  
16:00-16:40 View generation and modeling  
16:40-17:00 Concluding remarks

## Conference Location

The main conference will be held at the Österreichische Akademie  
der Wissenschaften; the workshop takes place at the Siemens Forum  
Wien..

Österreichische Akademie der  
Wissenschaften (ÖAW)  
Dr. Ignaz Seipel-Platz 2  
A-1010 Wien  
Tel.: (+43 1) 51581-1910

Siemens Forum Wien  
Dietrichgasse 25  
1030 Wien  
Tel.: (+43 5) 1707 37200

## Sponsors



# ISMAR 05

Fourth IEEE and ACM International Symposium  
on Mixed and Augmented Reality  
Sponsored by IEEE Computer Society and the  
Österreichische Akademie der Wissenschaften

October 5-8, 2005  
Vienna, Austria

[www.ismar05.org](http://www.ismar05.org)

# Paper Presentations

## Thursday Oct 6

### 10:30-12:00 Rendering and Displays

Session Chair: Steven Feiner

Enabling View-Dependent Stereoscopic Projection in Real Environments  
*Oliver Bimber, Gordon Wetzstein, Andreas Emmerling, Christian Nitschke Bauhaus-University Weimar*

ASTOR: An Autostereoscopic Optical See-through Augmented Reality System  
*Alex Olwal, Christoffer Lindfors, Jonny Gustafsson, Torsten Kjellberg, Lars Mattsson KTH, Royal Institute of Technology*

Simulation-Based Design and Rapid Prototyping of a Parallax-Free, Orthoscopic Video See-Through Head-Mounted Display  
*Andrei State, Kurtis Keller, Henry Fuchs, UNC Chapel Hill and InnerOptic Technology, Inc.*

A Polarized Head-Mounted Projective Display  
*Hong Hua, Chunyu Gao, University of Arizona and University of Illinois*

### 14:00–15:30 Applications and Authoring

Session Chair: Dieter Schmalstieg

Synchronizing 3D movements for quantitative comparison and simultaneous visualization of actions  
*Tobias Sielhorst, Tobias Blum, Nassir Navab, TU Munich*

Authoring and User Interaction for the Production of Wave Field Synthesis Content in an Augmented Reality System  
*Frank Melchior, Tobias Laubach, Diemer de Vries, Fraunhofer IDMT and TU Delft*

ARvino - Outdoor Augmented Reality Visualisation of Viticulture GIS Data  
*Gary King, Wayne Piekarski, Bruce Thomas, University of South Australia*

Experimental Evaluation of an Augmented Reality Visualization for Directing a Car Driver's Attention  
*Marcus Tönnis, Christian Sandor, Gudrun Klinker, Christian Lange, Heiner Bubb, TU Munich*

### 16:00–17:00 Vision-based tracking 1

Session Chair: Tom Drummond

Adaptive Line Tracking with Multiple Hypotheses for Augmented Reality  
*Harald Wuest, Florent Vial, Didier Stricker, Fraunhofer IGD*

A Balanced Approach to 3D Tracking from Image Streams  
*Raghav Subbarao, Peter Meer, Yakup Genc, Rutgers University and Siemens Corporate Research*

## Friday Oct 7

### 10:30-11:50 Collaboration

Session Chair: Wayne Piekarski

Face to Face Collaborative AR on Mobile Phones  
*Anders Henrysson, Mark Billinghurst, Mark Ollila, Linköping University and HITLab NZ*

Evaluation of Mixed-Space Collaboration  
*Raphael Grasset, Philip Lamb, Mark Billinghurst, HITLab NZ*

Enhanced Eyes for Better Gaze-Awareness in Collaborative Mixed Reality  
*Keisuke Tateno, Masayuki Takemura, Yuichi Ohta, University of Tsukuba*

### 15:00-16:00 Interaction techniques

Session Chair: Tobias Hoellerer

Augmented Foam: A Tangible Augmented Reality for Product Design  
*Woohun Lee, Jun Park, KAIST and Hongik University*

Immersive Mixed-Reality Configuration of Hybrid User Interfaces  
*Christian Sandor, Alex Olwal, Blaine Bell, Steven Feiner TU Munich, NADA Royal Institute of Technology, and Columbia University*

AR Karaoke: Acting in Your Favorite Scenes  
*Maribeth Gandy, Blair MacIntyre, Peter Presti, Steven Dow, Jay Bolter, Brandon Yarbrough, Nigel O'Rear, Georgia Tech*

## Saturday Oct 8

### 9:00-10:10 Vision-based tracking 2

Session Chair: Eric Foxlin

Localisation and Interaction for Augmented Maps  
*Gerhard Reitmayr, Ethan Eade, Tom Drummond, University of Cambridge*

Lens Model Selection for a Markerless AR Tracking System  
*Birger Streckel, Jan-Friso Evers-Senne, Reinhard Koch, Kiel University*

Augmenting Deformable Objects in Real-Time  
*Julien Pilet, Vincent Lepetit, Pascal Fua, EPFL*

### 10:45–12:05 Tracking and calibration

Session Chair: Hideo Saito

A Hybrid and Linear Registration Method Utilizing Inclination Constraint  
*Daisuke Kotake, Kiyohide Satoh, Shinji Uchiyama, Hiroyuki Yamamoto, Canon, Inc.*

Encoded LED System for Optical Trackers  
*Leonid Naimark, Eric Foxlin, InterSense*

Calibration Errors in Augmented Reality: a Practical Study  
*Javier-Flavio Viguera Gomez, Gilles Simon, Marie-Odile Berger LORIA – INRIA Lorraine and LORIA – University of Nancy*

### 16:00–16:40 View generation and modeling

Session Chair: Gudrun Klinker

Novel View Generation from Multiple Omni-directional Videos  
*Tomoya Ishikawa, Kazumasa Yamazawa, Naokazu Yokoya Nara Institute of Science and Technology*

A Pipeline for Rapidly Incorporating Real Objects into a Mixed Environment  
*Xiyong Wang, Aaron Kotranza, John Quarles, Benjamin Lok, B. Danette Allen University of Florida and NASA LaRC*

# Posters

Poster teaser session Saturday Oct 8, 14:00-14:30

Poster session Saturday Oct 8, 14:30-16:00

Augmented Reality Techniques in Games  
*Dieter Schmalstieg, TU Graz*  
The Synthetic Character Ritchie: First Steps Towards a Virtual Companion for Mixed Reality

*Klaus Dorfmueller-Ulhaas, Elisabeth Andre, University of Augsburg*  
The SQUASH 1000 Tangible User Interface System  
*Mark Fiala, National Research Council Canada*

Autocalibration of an Electronic Compass for Augmented Reality  
*Xiaoming Hu, Yue Liu, Yongtian Wang, Yanling Hu, Dayuan Yan, Beijing Institute of Technology*  
A Mediated Reality Environment using a Loose and Sketchy rendering technique

*Michael Haller, Florian Landerl, Upper Austria University of Applied Sciences*  
Reality Toning: Fast Non-Photorealism for Augmented Video Streams  
*Jan Fischer, Dirk Bartz, Wolfgang Straßer, University of Tübingen*  
Camera-Marker Alignment Framework and Comparison with Hand-Eye Calibration for Augmented Reality Applications

*Gérald Bianchi, Christian Wengert Matthias Harders, Philippe Cattin and Gábor Székely, Swiss Federal Institute of Technology, Zurich*  
Projected Augmentation II – A Scalable Architecture for Multi Projector Based AR-Systems based on 'Projected Applications'

*Jochen Ehnnes, Koichi Hirota, Michitaka Hirose, University of Tokyo*  
Annotating User-Viewed Objects for Wearable AR Systems  
*Ryuhei Tenmoku, Masayuki Kanbara, Naokazu Yokoya, Nara Institute of Science and Technology*

Specular Reflection Elimination for Projection-Based Augmented Reality  
*Hanhoon Park, Moon-Hyun Lee, Sang-Jun Kim, Jong-Il Park, Hanyang University*  
ARpm: An Augmented Reality Interface for Polygonal Modeling

*Peter Fiala, Nicoletta Adamo-Villani, Purdue University*  
AR Storyboard: An Augmented Reality based Interactive Storyboard Authoring Tool  
*Mideum Shin, Byung-soo Kim, Jun Park, Hongik University*

Shading and Shadowing of Architecture in Mixed Reality  
*Tetsuya Kakuta, Takeshi Oishi, Katsushi Ikeuchi, University of Tokyo*  
3D Video Mosaics: A Hybrid Image-based and Model-based Telepresence Technique Using Two-Pass Video Projection onto a 3D Scene Model

*Takefumi Ogawa, Kiyoshi Kiyokawa, Haruo Takemura, saka University*  
Real-Time Rendering of Realistic Trees in Mixed Reality  
*Alberto Candussi, Tobias Höllerer, Nicola Candussi, University of Padua and University of California, Santa Barbara*

A Step towards an AR Multimodal Interface: A New Handheld Device for 3D Interaction  
*Raphaël Grasset, Julian Looser, Mark Billinghurst, HIT Lab NZ*

Spatial Measurements for Medical Augmented Reality  
*Bernhard Reitinger, Pascal Werlberger, Alexander Bornik, Reinhard Beichel, Dieter Schmalstieg, TU Graz*  
Product Associated Displays in a Shopping Scenario

*Lúbomira Spassova, Rainer Wasinger, Jörg Baus, Antonio Krüger, Saarland University, DFKI, and University of Münster*  
Butterfly Effect: An Augmented Reality Puzzle Game  
*Marleigh Norton, Blair MacIntyre, Georgia Tech*

Driving View Simulation Synthesizing Virtual Geometry and Real Images in an Experimental Mixed-Reality Traffic Space  
*Shintaro Ono, Koichi Ogawara, Masataka Kagesawa, Hiroshi Kawasaki, Masaaki Onuki, Ken Honda, Katsushi Ikeuchi, University of Tokyo, Saitama University, Mitsubishi Precision Co., and Chodai Co.*

Design and Implementation of a Widget Set for Steerable Projector-Camera Units  
*Dennis Reiter, Andreas Butz, Saarland University and University of Munich*