

MINUTES OF THE 7TH MC/WG MEETINGS AND IWOW WORKSHOP

Minutes taken by Prof Dr Yahya Baykal

17.09.2014 Wednesday

The third edition of Annual Action Workshop (IWOW) was held on September 17, 2014.

8:30 - 9:00	Registration
9:00 - 9:15	Opening Note
9:15 - 10:30	IWOW Session 1: Free Space Optics I
10:30 – 11:00	Keynote Speech I (Joint event with Networks Conference)
11:00 – 11:30	Coffee Break
11h30 – 12:30	IWOW Session 2: Free Space Optics II
12:45 – 14:00	Lunch
14:00 – 14:30	Keynote Speech II (Joint Event with Networks Conference)
14h30 - 15:30	IWOW Session 3: Visible Light Communication Systems - Applications
15:30 - 16:00	Coffee Break
16:00 - 17:15	IWOW Session 4: Visible Light Communication Systems – Modeling and Characterization
17:15 – 18:00	MC Meeting - Part 1 Opening remarks and discussion on agenda items for MC&WG meetings

IWOW Session 1: Free Space Optics I

1. On the Performance of Free-Space Optical Communication Systems with Multiuser Diversity
Liang Yang (Guangdong University of Technology, P.R. China); Xiqi Gao (Southeast University, P.R. China); Mohamed-Slim Alouini (King Abdullah University of Science and Technology (KAUST), Saudi Arabia)
2. Outage Performance Analysis of Underlay Cognitive RF and FSO Wireless Channels
Imran Shafique Ansari (King Abdullah University of Science and Technology, Saudi Arabia); Mohamed M. Abdallah (Texas A&M University at Qatar & Cairo University, Cairo, Qatar); Mohamed-Slim Alouini (King Abdullah University of Science and Technology (KAUST), Saudi Arabia); Khalid A. Qaraqe (Texas A&M University at Qatar, USA)
3. Outage Analysis of Hybrid FSO/RF Systems based on Finite-State Markov Chain Modeling
Hossein Kazemi (Ozyegin University & Communication Theory and Technologies Laboratory, Turkey); Murat Uysal (Ozyegin University, Turkey); Farid Touati (Qatar University, Qatar)
4. Generalized Performance Analysis of Mixed RF/FSO Systems
Ehsan Soleimani-Nasab (Graduate University of Advanced Technology, Iran); Murat Uysal (Ozyegin University, Turkey)
5. Relative Intensity Noise of Vertical-Cavity Surface-Emitting Lasers Subject to Variable Polarization-Optical Feedback
Salam Nazhan Ahmed (Northumbria University, United Kingdom); Zabih Ghassemlooy (Northumbria University, United Kingdom); Krishna Busawon (Northumbria University, United Kingdom); Stanislav Zvanovec (Czech Technical University in Prague, Czech Republic)

IWOW Session 2: Free Space Optics II

1. On the Low SNR Capacity of Log-Normal Turbulence Channels with Full CSI Fatma Benkhelifa (King Abdullah University of Science and Technology, Tunisia); Abdoulaye Tall (Orange Labs, France); Zouheir Rezki (King Abdullah University of Science and Technologie (KAUST), Saudi Arabia); Mohamed-Slim Alouini (King Abdullah University of Science and Technology (KAUST), Saudi Arabia)
2. Analysis of Field Correlations in Atmospheric Optical MIMO Systems Yahya K. Baykal (Cankaya University, Turkey); Murat Uysal (Ozyegin University, Turkey)
3. Free Space Optics to Enable High Data Rate Download from LEO Satellites: the Impact of Clouds Lorenzo Luini (Politecnico di Milano, Italy); Carlo Capsoni (Politecnico di Milano, Italy); Roberto Nebuloni (Ieiiit - Cnr, Italy)
4. Modeling Scintillation Effects on Free Space Optical Links using Radiosounding Profile Data D. Carrozzo (Sapienza University of Rome, Italy); Saverio Mori (Sapienza University of Rome, Italy); Frank S. Marzano (Sapienza University of Rome, Italy)

IWOW Session 3: Visible Light Communication Systems Applications

1. Continuous Synchronization for LED-to-LED Visible Light Communication Networks Stefan Schmid (ETH Zurich & Disney Research, Switzerland); Giorgio Corbellini (Disney Research Zurich, Switzerland); Stefan Mangold (Disney Research, Switzerland); Thomas R. Gross (ETH Zurich, Switzerland)
2. Optical CDMA Codes for an Indoor Localization System using VLC Steven De Lausnay (KU Leuven, Belgium); Lieven De Strycker (KU Leuven, Belgium); Jean-Pierre Goemaere (KU Leuven, Belgium); Bart Nauwelaers (Katholieke Universiteit Leuven, Belgium); Nobby Stevens (KU Leuven, Belgium)
3. Experimental Demonstration of an Indoor Visible Light Communication Positioning System Using Dual-Tone Multi-Frequency Technique Pengfei Luo (Northumbria University, United Kingdom); Zabih Ghassemlooy (Northumbria University, United Kingdom); Hoa Le Minh (Northumbria University, United Kingdom); Mohammad-Ali Khalighi (Ecole Centrale Marseille, France); Xiang Zhang (Beijing University of Posts and Telecommunications, P.R. China); Min Zhang (Beijing University of Posts and Telecommunications, P.R. China); Changyuan Yu (National University of Singapore, Singapore)
4. Effectiveness of Blue-filtering in WLED based Indoor Visible Light Communication Hyunhae Chun (Oxford University, United Kingdom); Sujan Rajbhandari (University of Oxford, United Kingdom); Grahame Faulkner (University of Oxford, United Kingdom); Dominic O'Brien (Oxford University, United Kingdom)

IWOW Session 4: Visible Light Communication Systems Modelling and Characterization

1. The Impact of Location Errors on Achievable Rates in OFDM-Based Multi-User Visible Light Communication Systems Mohamed Kashef (Texas A&M University at Qatar, Qatar); Mohamed M. Abdallah (Texas A&M University at Qatar & Cairo University, Cairo, Qatar); Khalid A. Qaraqe (Texas A&M University at Qatar, USA); Murat Uysal (Ozyegin University, Turkey)

2. Spatial ODAC performance for indoor environment Ales Dobesch (Brno University of Technology, Czech Republic); Luis Nero Alves (Universidade de Aveiro & Instituto de Telecomunicações, Portugal); Otakar Wilfert (Brno University of Technology, Czech Republic)
3. Channel Characterization for Indoor Visible Light Communications Shihe Long (Ecole Centrale Marseille, France); Mohammad-Ali Khalighi (Ecole Centrale Marseille, France); Mike Wolf (Ilmenau University of Technology, Germany); Salah Bourenane (Ecole Centrale Marseille & Fresnel Institute, France); Zabih Ghassemlooy (Northumbria University, United Kingdom)
4. Clipping Noise Mitigation using Partial Transmit Sequence for Optical OFDM Systems Zekeriyya E Ankarali (University of South Florida, USA); Syed Imtiaz Hussain (Texas A&M University at Qatar, Qatar); Mohamed M. Abdallah (Texas A&M University at Qatar & Cairo University, Cairo, Qatar); Khalid A. Qaraqe (Texas A&M University at Qatar, USA); Huseyin Arslan (University of South Florida, USA); Harald Haas (The University of Edinburgh, United Kingdom)
5. Precoded Generalized Space Shift Keying for Indoor Visible Light Communications Ishaque Ashar Kadampot (King Abdullah University of Science and Technology (KAUST), Saudi Arabia); Ki-Hong Park (King Abdullah University of Science and Technology (KAUST), Saudi Arabia); Mohamed-Slim Alouini (King Abdullah University of Science and Technology (KAUST), Saudi Arabia)

MC Meeting - Part 1

After the workshop sessions are over, the Action Chair Prof Uysal made some opening remarks for the MC meeting and presented agenda items for MC&WG meetings for the next two days. The session ended at 17:50.

18.09.2014 Thursday

MC Meeting – Part 2

The session started at 9:00. The Action Chair Murat Uysal made presentation with the following agenda items:

- Approval of the Minutes of the 6th MC Meeting
- Action Budget (2014-15)
- Current Participation Statistics
- Progress Monitoring
- Updates on Meeting Planning
- Preparations for Final Publication
- Dissemination Activities

MC DECISION: The minutes of the VI. MC/WG Meeting is approved.

MC DECISION: 2014-2015 Action Budget is approved.

MC DECISION: 8th MC Meeting will be held in Berlin, Germany in March 2015.

MC DECISION: 4th Annual Workshop (IWOW) + 9th (Final) MC/WG Meetings + Training School will be held in Istanbul, Turkey in September 2015.

Regarding Final Publication:

- At the last meeting, we discussed two main approaches:
 - Structured format: 4-5 chapters from each WG preceded by an edited chapter from the WG Chairs.
 - Less structured format: All types of contributions from COST participants which will be later categorized. It was also suggested that input documents presented at previous COST meetings can be converted into chapters.
- Our approach on this should be decided and we should start working asap. More discussion will be made at MC Meeting –Part 3 in this afternoon.

Regarding Dissemination Activities:

- Action Website: <http://opticwise.uop.gr>
- Action Database is in place. If you need update on your profile, please get in touch with the Website admin Dimitris Soukaras
- Semi-Annual Action Newsletter (Editor: Florian Moll)
 - The new issue was finalized and will be distributed shortly.
- Social Networking - Joaquin Perez Soler.

Regarding New COST Application:

- Our Action will officially end on November 2015.
- If we want to continue our activities without interruption, we need to consider applying for a new Action in 2014 as a continuation of OPTICWISE
- Applications are typically made twice per year. Due to transition to HORIZON2020, deadlines for 2015 are not yet announced.

Cagatay Edemen made a presentation and provided information on reimbursement rules. The session ended at 10:30.

WG Meetings

The session started at 11:00 with two invited talks.

- *Visible Light Communication & Professional Lighting*, Dr. Martin Siegel Head of Technology Experts & Scouting Zumtobel Group, Portugal
Overview: Company Presentation, the Professional Lighting Market, VLC in Professional Lighting.
- *Laser Communication Systems for Aerial Platforms - from Perspective of a Startup in Mobile-FSO*, Dirk Giggenbach ViaLight Communications GmbH (VLC), Germany.
Contents: ViaLight Communications and DLR-Heritage, Atmospheric Boundary Conditions, Aircraft Downlinks, Inter-Platform Links, Components.

Several follow up questions were raised by participants. The session ended at 13:05.

WG1 & WG2 Meetings

The session started at 14:00. WG1 Progress Report was presented by Frank Marzano. WG2 Progress Report was presented by Ali Khalighi. This was followed by presentations of input documents.

Input Documents presented: (Presenter is shown by the underlined name).

- D. Carrozzo, S. Mori, F. S. Marzano, Scintillation Effects on Free Space Optical Links: Numerical Analysis using Radiosounding Profile Data.
- Vladimir Brazda, Ondrej Fiser, Zdenek Kolka, Results from measurement by newly installed free space optical link in presence of clouds.
- Ondrej Fiser, Vladimir Brazda, Rain Attenuation on FSO Links – Theoretical Computation from Measured DSD.
- Yahya Baykal, Comparison of intensity fluctuations of collimated and focused higher order beams in non-Kolmogorov medium.
- Carlo Capsoni, Dan Sporea, Roberto Nebuloni (presented by F. S. Marzano), Mid-IR optical communications, new frontiers in optical wireless.
- Stanislav Zvanovec, Petr Chvojka, Mansour Abadi Mojtaba, Paul Anthony Haigh, Zabih Ghassemlooy, Jan Bohata, Joint CTU and NU Experimental Campaigns Focused on VLC Systems and LTE over FSO.

The session ended at 15:35.

MC Meeting - Part 3

The session started at 16:00. Discussion was made on the edited book which would be the final publication of the Action. So far, only WG1 provided some chapter titles. Other WG chairs would follow up with WG participants for chapters in their parts.

Final Report Book Plan

Introductory chapter about 40-50 pages followed by chapters from each WG. The editors of the book would be the Action Chair and WG Chairs.

WG1

Outdoor facilities (ground links) experiments and database	Stanislav Zvanovec
FSO/RF	Erich Leitgeb
Turbulence	Yahya Baykal
Physical characterization of the outdoor channel	Frank Marzano
Satellite communication (experiment and theory)	Florian Moll
Propagation through fog, rain, snow (results obtained so far)	Ondrej Fiser
Channel modeling	Carlo Capsoni
Optical beam shaping and distortion in FSO terminals	Otakar Wilfert

WG2

Chapters to be defined.

WG3

Chapters to be defined.

WG4

Chapters to be defined.

The session ended at 17:20.

19.09.2014 Friday

SIG Meetings

The session started at 9:00.

- SIG-VLC Report presented by Luis Alves
Progress on the VLC Book.
- SIG-UW Report presented by Yahya Baykal
Progress on the Tübitak Project.
Equipment and machinery purchased in the project.
Paper published: Hamza Gerçekcioğlu, “Bit error rate of focused Gaussian beams in weak oceanic turbulence,” J. Opt. Soc. Am. A, 31 (9), 1963-1968, Sept. 2014.

An additional presentation was made by Kihong Park (KAUST, Saudi Arabia) on “Underwater optical wireless channel modeling” relevant to SIG-UW.

The session ended at 10:30.

WG Meetings

The session started at 11:00. The invited speaker Tuncer Baykaş (İstanbul Medipol University, Turkey) gave an invited talk on “IEEE 802 Standardization and Opportunities for a New Visible Light Communication Standard”. This prompted discussions on participation in IEEE standardization activities as OPTICWISE. It was discussed that this would be a valuable opportunity for dissemination of our research results and wider impact.

MC DECISION: On behalf of OPTICWISE, the Action Chair will participate in IEEE 15.7a Optical Camera Communications and propose to expand its scope to Optical Wireless Communication. Budget will be re-allocated for this purpose.

The session ended at 13:10.

WG3 & WG4 Meetings

The session started at 14:05. WG4 Progress Report was presented by by Gábor Fehér. This was followed by presentations of input documents.

Input Documents presented: (Presenter is shown by the underlined name).

- Luka Mustafa, Tomaž Krštofelc, Gorazd Kandus, Mihaelb Mohorčič, Miha Smolnikar, World Wide KORUZA: distributed and coordinated wireless optical experiment.
- Yuan Li, Michal Pioro, Mirror-assisted Topology Design for Cellular Backhauling with Free Space Optics.
- Dominic Schulz, Michael Schlosser, Christos Alexakis, Kai Habel, Jonas Hilt, Volker Jungnickel, Low-Cost Infrared Led Link with 14 Gbit*/M/S and 10 ms Latency for the Backhaul of Small LTE Radio Cells.
- AnnaLysiukYevhenYashchyshyn, The Analysis of the Impact of the Incident Electromagnetic Wave on the Coaxial Pigtailed Packaged Laser Diode Characteristics.

- Jürgen Van Erps, Michael Vervaeke, Hugo Thienpont, Micro-optical components for beamsteering.

WG Meetings

The session started at 16:00. Some additional discussuion was made on the Final Publication and some potential ideas for book chapters were discussed. Since there is no AOB, the session ended at 16:45.