

Date: Thursday 2013-04-25	Start Time: 09:15	Location: Main meeting room IAP Prague
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Agenda topics

1. Presentation and welcome at MCM4:

Presenter: Prof Ondrej Fiser instead of Dr Sokol. Time: 09:20 AM.
Topics presented:

- Agenda issues, location, lunch, social event minutes
- Social event Schedule
- MCM4 Local organising team introduction

2. Action Progress report

Presenter Dr Murat Uysal (MU), COST IC1101 chair - Time: 09:30 AM

Action item	Approval MCM3 PISA October 2012 minutes
Discussion:	No objection by MC members
Action Item is approved	

2.1 2011-2012 Action Budget report presentation

- Meetings: the budget left over used to 1st training school hold by UN
 - o Regarding the comments the training school provided good results
- STSMs : only 5 STSM were done during 2011-2012 period
- Dissemination actions: Newsletter leaflet + website costs
- Other expenses: administration issues
- Training school costs: 16782.67 €
- Presenter point out that all remain balance was returned to the COST office if it is unused as planned.
- **NO QUESTIONS from MC Members.**

2.2 2012-2013 Action Budget prevision

- Meetings – 2 planned, MCM4 and MCM5
- STSMs: expecting 10 missions at least with 2000 Euros each
- Training School: has a located budget of 9500 € to be deployed during MCM5
- Dissemination activities: 3000 €
- Other cost and admin costs remain the same previous budget allocation
- AS summary the Total annual budget is higher than last year because we have more money allocated as planned for the action duration.

QUESTIONS: Prof Harald Haas, Edinburgh University.

Q: COST officers are looking for what kind of figures of merit to assess the project?

A (MU): The joint Publications are the main figure. Others are grants obtained from other funding bodies (FP7) jointly with other COST IC1101 members. On the other hand any activities at standardization bodies, media attention through dissemination are also desired.

2.3 Current participation

Action item	Approval of DENMARK and FYRM as new COST IC1101 MC members
Discussion:	No objection from MC members
Action Item is approved	

2.4 International participation

- Canada, Taiwan and Japan official participation at COST IC1101 is under application process approval.

2.5 STSMs 2011-2012:

- 3 hosted at Northumbria, 2 hosted at Aveiro

FARY: point out more participation from cost members RA, students to improve quality research network

2.6 Annual Action Report

- April 18 2013, approved by email and MC Action Chair
- *FARY: cost members have to increase the collaboration in terms of ACK at papers to COST IC1101. This is a recognition issue to rise up.*
- ICT APM is Malta June 2013
- Next one is May 2014

2.7 Progress monitoring

2.8 Input document

- How to do an input document as expected:
 - o Survey, tutorial,
 - o Type conference paper summarize RECENT achievements

QUESTION G. Djordjevic:

Q: How to register and send the input document?

A (MU): Please follow instructions from website

2.9 Annual participant report

- o This report will include research projects, publications, and other dissemination
- o These reports will inform WG-SIG reports, and those one the final one.

3. Meeting Planning

Presenter Prof Z. Ghassemlooy (ZG), COST IC1101 vice-chair - Time: 10:30 AM

3.1 Next meeting MCM5 Host: Northumbria University, Newcastle Upon Tyne, UK

- Agenda
 - Workshop 1st day
 - MCM 5 2nd-3rd day
 - Training School 1st-3rd day
- Dates October 2013
- Duration of Workshop + MCM5 expected is 3 days
 - 1 Day workshop, similar to previous IWOW 12012 in Pisa, Italy
 - 40% acceptance of submissions
 - 20 papers maximum
 - Accepted and presented papers to be publish in IEEE publication
 - Standard Peer to Peer review
 - 2 reviewers
 - Additional they will hold 2nd training school
 - OPEN to COST members

MU reminds that training school is 3 days along in order to join the workshop and training school activities. It is necessary to encourage to hold the training school in other places, in other COST facilities, for next times.

- **Questions:**

Q - HARALD HAAS: Nowadays there are No so many OWC conferences, and this one will be clashing with Globecom OWC workshop ... Could COST merge with that one?

A - MURAT: It is a Good idea for 2014, COST could sponsor them. The only problem will be with reimbursement issues for non-COST members.

FARY: USA, China, and Japan they have 2 conferences with OWC but not in Europe, so this is an opportunity to be placed in a global level, our COST workshop ... Europe has a lot of activities on OWC, and so this could be a platform on that.

HARALD: OWC could appear as a workshop in ICC2015, I (HH) will push for it.

3.2 Volunteer for MCM6 – MCM7

- Ideal date for the meeting May 2014
- Volunteer appear from Portugal LUIS ALVES-
 - o Interest to host COST meetings – Oporto, Aveiro
 - o They are more interest on host workshop, training school, he volunteer for 7th
 - o No volunteer for MCM6 yet

4. Dissemination activities

Section chaired by Murat Uysal

4.1 Website status:

- Greece report by KOSTAS.

Questions

Several MC members have asked about availability of documents and others tools on the website.

A: Action to solve that issues an improve the website – this should be done by Dimitros Soukaras

Dr Ali Khalighi: How to access Input documents in website? Registration and logging doesn't work properly? How to update your own input documents? Via registration could be a good way

A: I will contact with them directly, today. Maybe it is a problem on registration issues and database corruption.

- **Action database: need to be update, MC members should contact administrator with more info**

4.2 Newsletter: Florian, looking for 2nd issue

- o Early June 2013
- o Newsletter one month after each MCM

4.3 Social networking:

- o Dr Joaquin Perez (social OpticWise community manager); It is necessary more activity from MC members.

5. Some news from the Action

Section chaired by Murat Uysal

5.1 OPTICWISE at Li-Fi forum 2013 – talk presented by Murat

- IC 1101 is an official member now of Li-Fi Forum.

5.2 Collaboration with other COST actions

- TD1001 - Novel and Reliable Optical Fibre Sensor Systems for Future Security and Safety Applications (OFSeSa)
- IC1004 - Cooperative Radio Communications for Green Smart Environments
- IC1104 - Random Network Coding and Designs over GF(q)
- IC0905 – Techno-Economic Regulatory Framework for Radio Spectrum Access for Cognitive Radio/Software Defined Radio (TERRA)

5.3 Roger Green stepped down as WG4 chair (UW and VLC activities)

- We need a Volunteer to chair WG4:
 - o By the end of MCM5 or email Murat
 - o A suitable candidate from Photonic components

5.4 Task force on EU applications

- Based on EVANGELOS report:
 - o Regarding the next new calls, there will be few slots to compete for funding
 - o It is necessary to check on that soon and deeper
 - o Clear discussion of work action
 - o HORIZON 2020 framework

5.5 FAQ

Murat Uysal proposed a few questions that have been repeatedly asked by MC members.

- Q; If an MC member is not able to come? Who comes, student?
- A: NO. You should Contact your COUNTRY MC Substitute member.
- If you want to send a student, the MC committee can invite a small number of people according with budget and COST action Chair. NO is the straight answer.

6. Suggestion and Open discussion

6.1 Consideration about produce White Papers

6.2 Niche on OWC, e.g. Li-Fi forum

- o By our own is better, than rely on other groups.

- o *FARY: As an example IEEE Communication Magazine special issue on OWC standards*
- o *MURAT: Companies are looking for real assessment on OWC, so we can provide a white submission on that. Industrial sector is expecting for this expertise, our expertise*
- o *CARLO CAPSONI: he has received question from an IT Italian industry. They were looking just to work with a system, not about design or budget, their point of view is about manufacturing issues, how to clean lenses and antennas in OWC, we have to be aware of this.*
- o *HARALD: What it is the status of standardisation on IEEE 802.16 or others? This is the correct forum to discuss this. It is very interesting to start collaboration of one COST IC1101 partner with companies*
- o *KLAUS HHI: From his experience in Collaboration with companies, industry is now interested on standards.*
- o *HARALD: Why not to invite more industries to the next workshop? A broader view of OWC expectations, industry point of view,*
- o *KLAUS HHI: How to transfer the Research in to Operational is the main point of view. We can contact companies and check the great interest of ITU about OWC and how it affects the previous standards.*
- o *HARALD: Nowadays there are some talks about Standardization IEEE 802.xx, then OWC is under discussion*
- o *MURAT: for MCM5 it will be very interesting the participation of this industrial partners, and standardisation bodies. We should encourage this on all the following meetings, feedback from industry is essential.*

- *MURAT: all this is about VLC. What about FSO??*
 - o *CARLO: ESA is looking for FSO to be used as part sat-earth links. Great effort on that area, they are providing figures for LEO, GEO, ESO satellites. They are changing their mind of how to proceed with those optical communications links. They are more open to incorporate the SAT-EARTH FSO link and all the other issues regarding this. We should produce a white paper and positioned the action on this topic with the ESA.*

- MURAT: More Questions??
 - o No more questions.

- MURAT: About Horizon 2020 framework?

KOSTAS: No information about HORIZON 2020.

EVANGELIOS: Budget is still under renegotiation. Schedule is not still available, no official information. Impacts and instruments are under discussion, but some of them are available, e.g. Marie Curie People they know how to schedule and deliver, but not others.

6.3 CARLO CAPSONI: Announcement of EuCAP 2014 CONVENED session:

EuCAP 2014 Convened session proposal directly to CAPSONI.

OWC is a good idea, antenna and propagation largest world conference.

EuCAP 2014 The Hague April. 700 € registration

One or two slots, 5 papers for slot.

On OWC each slot 2 papers of terrestrial propagation, 2 SAT-earth FSO, and 1 paper on UW. The other slot paper 1-2 of terrestrial link of SAT-SAT and extra UW, and 2 to VLC.

They are focused in fixed and mobile propagation. We can link a COST meeting to this issue.

The main idea are joint papers!

Decision to apply for this one month (MAY-JUNE) to have answers from EUCAP 2014. From September 2013 to send the abstract and wait for results.

6.4 FARY: PIMRC conference 2013 September in London.

Invited special session offered to FARY based on OWC, 5 papers on this, please contact FARY during the meeting.

LUNCH break 12:30

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Afternoon session:

7. Introduction of new MC members

7.1 Prof Harald Haas, Edinburgh University, UK

- VLC – Li-Fi Research
- Cisco RF spectrum shortage and Qualcomm, Li-Fi is an opportunity is not a niche; future of spectrum is in light.
- Projects of the group: Green MIMO Marie Curie ITN (RF) and VLC networks
- Funding: EPSRC – UK grants – FP7 Marie Curie ITN – NPRP – PureVLC

Research activities:

- Spatial Modulation Space Shift Keying (paper 2013)
- Small cells – reuse concept from RF cellular to optic – femtocell networks (ICC 2013, Stefan et al.)

- Li-Fi is a solution to Internet of Things and M2M

7.2 Dr Ioannis Krikidis, ECE University of Cyprus, Cyprus

- University and department quite new 10 years old
- Research at department:
 - o Physical layer for RF, information theory
 - o Cooperative networks – relay channel
 - Full duplex relay
 - o Energy harvesting
 - EH – how to design communications systems to deal with unpredictable energy harvesting batteries to improve robustness and reliability
- Contribution to WG2 and WG3

7.3 Prof Shlomi Arnon, Ben Gurion University, Israel

- OWC Books at Cambridge press
- Research:
 - o Transdermal optical wireless communications
 - The OWC for blind people, (retro-reflective transdermal OWC, Applied Optics, 2012).
 - Applications on security, communications, closer link to intra body communications
 - o VLC issues, clock jitter
 - o Unguided BUS interconnection (PTL, 2011 23(21), 2012 24(15))
 - Scattering as a positive effect bus connection when light is present
 - FAN on computers on OWC links inside computers!!! How to deal with high BER requirements on the computer systems using OWC links (JLT 30(11), **Computer Backplane With**

Free Space Optical Links: Air Turbulence Effects)

- Underwater optics wireless communications networks
 - Non-light of sight UW optical Communications. (JOSA A, Vol. 26 Issue 3, pp.530-539 (2009))
- Hybrid System
 - High altitude platforms (IEEE trans. Electronic systems, 46(4), 2010)

7.4 Dr Erdal Panayirci, Kadir Has University, Istanbul Turkey

- Foundation university, 15 years old
- Research:
 - Channel Estimation, Equalization,
 - NEWCOM and NEWCOM ++ and WIMAGIC FP7 projects experience
 - Mesh and Haas – Spatial Modulation, IEEE trans on Veh. Tech, 57(4), 2008
 - National grants – UBITAK – VLC research

7.5 Dr Marta Ruiz Llata, Universidad Carlos III, Spain

- Optoelectronics Instrumentation team
- Lab capacities
 - Characterization of OE devices
- Characterization of Lasers, Photonics Integrated Circuits, mm-W and THz.
- Research:
 - Collaboration on TJ-II with CIEMAT
 - Design of state of the art detectors
 - Fiber optic sensors!
 - Remote sensor for road condition detection - patented
 - Holography in optical interconnections

8. Invited speakers

8.1 Dr Peter Shardlow (Southampton University)

ISLA Project, Southampton is leading this

- Laser issues for 2 micrometres
- Application transparent plastic cutting, PV cell scribing
- Partners Time-Bandwidth products, Oclaro, Vivid components
 - Fiber development – Tm doped Silica fibers
 - Isolators. material for 2 micrometres Faraday rotation
 - Fibre to FSO and Fibre Fibre designed!
 - AOM modulators
 - Carbon nanotube modelockers
 - Laser diode development for Tm-pumping
 - Wavelength stabilisation

Focus now on University Southampton work in ISLA

- Silica fiber design and fabrication

Questions:

Q- Shlomi: That Fibre could operate at GB/s or Laser GB/s?

A; They are working on that

Q- Shlomi: If the communications has 20-80 MHz BW with low power it is possible to use them?

A: The conversion efficiency is going to be really low, the answer is yes, and they will be amplifiers in the systems. It will be an interesting project moving to optical communications and the overall optical systems.

8.2 Dr Ciprian Gavrincea (Centre Tecnològic de Telecomunicacions de Catalunya, CTTC, Spain) – time: 14:52

- Radio Software defined with VLC systems, 2013-04-25
- Standard IEEE 802.15.7
 - o Focused in dual functionality
 - o First version of standard in Sept 2011
 - o Applications?? Need to attract the industry.
- Definition of PHY and MAC in the standard
 - o PHY I.. PHY II.. PHY III
- Dimming functionality
 - o OOK, insertion of compensation symbol
 - o VPPM, combination of PWM and 2PPM

- Motivation is SDR, software digital radio
- System model
 - o HW submodel
 - 2 USRP2
 - TX= LED driver with MOSFET
 - o Light source LE CW E2B
 - o High power LED from OSRAM
 - RX: Thorlabs

Difficulties RX synchronization parts

Software to manage and extract the information.

Synch is more demanding in computational time.

- Demo with Chat over VLC
 - o Performance – 500 LUX
 - o Luminous flux 180 450 lm
 - o

Work in Honk Kong centre associated with CTTC.

- VLC as communication for mobile devices, augmented reality and cloud computing.
 - o Low data rates
 - o Problem light on the environment on the screen
 - o The image will send information
 - Problem background information
 - Limitation of the smartphone
 - Presented at ICT Expo 2013, HK
 - o Applications on smartphone are slow (latest from Edinburgh is 10 kbps)

Questions:

Q-HARALD HAAS: *It is a good standard?*

A: *For illumination systems yes, it is a first step. We need t to start to close the gap between academia and industrial standard.*

Q - KLAUS: *more info of other standards or industrial:*

A: *No*

Q - Baykal Turkey: *What are the main issues on these systems?*

A: *Timing and rate, the channel is quite stable in our experiments. Distance depends on the daylight but doesn't have to much influence the channel.*

8.3 Dr Giorgio Corbellini (Disney Research Zurich), time 15:12

- Science at play!
 - o Disney synchronizing sound and images at 1933, patented with the animated work "steamboat Willie".
 - o Multiplane camera, control device for animation!! 1938 patented
 - o Creative Story Telling and technology, computer start to animated all, 1991 Beauty and Beast!!

- Research is behind Disney!
 - o Labs around the world (USA, Switzerland, Scotland)
 - o Connection to Universities
- Intelligent LEDs → VLC!
 - o Light is cool!
 - o Transmit magic cool issues with VLC?
 - o Low bit rate, short distance (baby and toy, toy and toy), cost-effective
 - o Reuses existing technology
 - o Safe technology, no radio waves
 - Demo between to cars, or a magic ward and a dress!!! Lighting a princess, dress to dress communications!!

Technical team: Stefan Schmid, Stefan Mangold

- LEDs used as light receivers [Dietz et alt, 2003]

Receiver:

- LED used in reverse bias → capacitor
- LED is periodically charged
- High slope or slow discharge!!
- Synch two devices!

Possibility to build a complete system, PHY and MAC PDU

- Low data rate, up to 800 bps
- Up to 1.5 m
- Network of devices, researching on that!

Questions:

Q-Shlomi : LED as a detector? Why? You will introduce an issue that the others will follow? Is the price?

A: We want to reuse the same toy, with the same led, minimizing the components needed to open the new system.

Q-FARY: Use of OLED? OLED has many interesting applications as changes in colours, bigger surface, flexible, adapted to any surface?

A: Yes, but the only ones right now are quite expensive. We are interested, but nowadays are not in the bigger market. Our interest is the simplicity and the colours.

Q-FARY: What's the future? It is possible to use it in the outdoor communications? As trigger for small communications interaction for leisure parks?

A: Lots of applications will come, e.g. interaction people-toys, etc..

Q-Shlomi: How to collaborate with Disney?

A: We are open to visitors. It is just to talk and sit down, why not, the potential is in you and we are interested to develop it.

9. INPUT DOCUMENTS WG3.

9.1 Tony Boucouvalas and Kostas Yiannopoulos (presenter), "Link Layer Analysis and Optimization of 10 Gb/s Half duplex communications" – 15:45

- Standard Giga-IR and improvements

10. INPUT DOCUMENTS WG1.

Carlo Capsoni WG1 Chairman opened the section at 16:30 with a brief summary.

- Reminder of Call for Papers – Optical Wireless Communications – Pakistan - journal
- Reminder of EuCAP 2014 OWC convened session
 - Two slots - 10 papers 4 topics

WG1 will contain 4 input documents

10.1 Wave Structure function for underwater medium, Presenter: Ata&Baykal, Turkey

- Wave structure function (WSF) under investigation
- Oceanic turbulence
 - Fluctuation spectrum in ocean by Nikishov.
- WSF increasing close to surface

10.2 INFLUENCE OF ATMOSPHERE ON LASER BEAM, Presenter; Wilfred from Brno University.

- Mileksova, measurements FSO, great place for very harsh weather conditions.
 - Statistical model for link availability
- More measurements on Brno, for Hybrid RF/FSO

- Other effects:
 - Frost, mist on windows, path inhomogeneity

- MMF system and RF
 - Two TRX with their own lenses and beam
 - Uses of POF at the objective end in trx, helping to improve the transmission
- Hybrid systems
 - 850 nm, 1550 nm and 122 GHZ in RF ISM band – maybe 10 Gbps future
 - results under fog and rain events
 - Rain is dominant phenomenon
 - Attenuation comparison between RF and Optical 1550 nm
 - RF better than FSO a fog
 - From rain it is similar, but optical is better

QUESTIONS:

Q-FARY question: two links working at same time, dual link?

A: Yes, no switching between FSO and RF.

Q-FARY: Link range?

A: 750 m

Thursday session finished at 17:00.

WG1 reports will continue on 2nd session Friday 26th April 2013.

Date: Friday 2013-04-26	Start Time: 09:00	Location: Main meeting room IAP Prague
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11. Presentation of the Agenda

11.1 Still pending WG3 input documents, European Projects Discussion and STSMs reports from Thursday

11.2 Tentative agenda

09:00 - 10:50	WG2 & WG4 Meetings <ul style="list-style-type: none"> • Presentations of Input Documents
10:50 - 11:10	Coffee break
11:10 - 12:30	MC Meeting - III <ul style="list-style-type: none"> • Progress Reports by SIG and WG Chairs
12:45 - 13:45	Lunch
14:00 - 15:30	MC Meeting - IV <ul style="list-style-type: none"> • Presentations of Input Documents
15:30 - 15:50	Coffee Break
15:50 - 17:00	MC Meeting - V <ul style="list-style-type: none"> • Wrap-up and concluding remarks

12. WG2 input documents.

Chair WG2 Prof Fary Ghassemlooy presents input documents – time 09:20

12.1 Gu Wei, Institut Fresnel, France,
Analytical performance of FSO systems

12.2 Anita, DLR, Germany
Laser Ethernet Technology

- Fading issues, unstable receiver power, recovery of data

Questions:

Q-Stanislav (CTU, Prague): Are you planning to improve statistically?

A: This technology will allow to increase up to work with 100 Mb/s channel.

12.3 Andrea Ando, FSO activities

- Time-correlated FSO channel
- Rateless codes
 - i. Variable codes – from LT to Raptor to RaptorQ codes
- Simulation 1 Gbps and 1518 byte frame size
 - i. Depending of zenith angle at receiver ...
 - ii. RaptorQ codes are the best choice at worst case

Optical turbulence?

- 1550 nm and 2 Ge-In PD.

GEO Satellite-Ground link

600 Mbps transmission

Questions:

Q-Stanislav (CTU): Why this Rytov variance formula?

A: It is accurate to the time correlate channel

12.4 Joaquin Perez, Northumbria, VLC 50 Mb/s

Questions:

Q- Erdal, Turkey: Are you considering any information from channel?

A: No just post-equalization

Q – HARALD: How are you claiming for 50 Mb/s? Are you implementing any multiplexing?

A: Spatial multiplexing is used. We map the coefficients of the system

12.5 Stanislav, CTU, Prague

- Route diversity in FSO turbulent channel

Questions:

Q-Shlomi: have you considered that with very fast devices they will introduce noise in measurements?

A: We have different noise sources for example:

Synchronisation on devices

Noise of the smaller devices will affect

Precision of temperature sensors

12.6 Rome+Aveiro (ISCOM, IT), reporting input document of the JOINT mission WG2
– SIG TESEO.

13. WG4 input documents.

13.1 Luis Nero Alves, Portugal presented Bruno Fracasso, Brest France, Input Document

- Activities during last year in BREST, France
- Workshop collaboration, publication inputs, others

14. MC Meeting – III- Progress Reports by SIG and WG Chairs

14.1 WG1 Progression Report Year 1.

By Carlo Capsoni WG1 Chair.

- Main outcomes:
 - WG1 has obtained a great scientific production
 - Now is the best time after one year, each one know each other capabilities and the joint activities are increasing quickly.
- Next objectives to be addressed in 2013:
 - More efforts to reach firm conclusions on channel estimation to link with the listed objective at the MoU.

14.2 WG2 Progression Report Year 1.

By Fary Ghassemlooy WG2 chair

Outputs:

- Number of Inputs documents
- Number of Tasks
- Achievements, in terms of scientific production, STSM and others

No questions

14.3 WG3 Progression Report Year 1.

By Kostas Yiannopoulos

- The WG3 tasks have been focused in two main areas:
 - Outdoor Systems and short/medium-range indoor
- Self evaluation:
 - Very active in to reach the objectives listed in the MoU.
 - Searching for funded research activities

Questions:

MURAT: WG3 needs to increase its activities in terms of members, as a suggestion is the inclusion of Invited Experts on network layers or PHY-NET

14.4 WG4 Progression report Year 1

As Roger Green step down as WG4 chair Luis Nero Alves presents the report.

- Activities:

- UW activities
- FSO tracking systems

MURAT: New action item, WG4 chair and vice-chair candidates proposed to be approved by MC members

Action item	Approval of new WG4 Chair and vice-chair
Discussion:	Eszter (Hungary) and Marta (Spain) proposed as Chair and vice-chair of WG4, respectively
Action Item is approved by all the MC members	

14.5 VLC-SIG annual report Y1

Luis Nero Alves presents the report of the SIG VLC

This special group VLC-SIG is the merging of VLC vehicular communications and VLC for outdoor applications.

Main outcomes:

- Project proposal international: 2 running + 1 proposal
- Cooperation with industry done.

Other activities on the VLC-SIG since MCM3 meeting:

- Participation on Li-Fi Forum
- Online survey on VLC application
- Book on VLC theory and application
- Need to start discussion of the ToC, editors, editorial

Self-evaluation:

- Cooperation SIG members improved
- Cooperation with WG has to be improved

Initiatives:

- VLC applications book proposal:
 - ToC idea: theoretical concepts, indoor VLC applications, outdoor VLC applications and Future trends

Part I VLC Theory	6 chapters
Part II Indoor VLC applications	5 chapters
Part III outdoor VLC apps;	4 chapters
Part IV Future trends	5 chapters

- SURVEY:

Results from the survey indicate a complex VLC survey and mark the opinion and feelings of substantial part of our VLC colleagues.

The feeling after all is that VLC has potential in the industry on the integration sector not just components.

Other comments include the possibility of create a comparative about techno-economics between radio and VLC:

Comments and questions from MC members:

- *Open the survey to others members, using LinkedIn or website to COST members*
- **Book comments**
- *Circulate the final ToC, then after the COST member's opinion open the book the capture the state of art in VLC globally.*

- *FARY's comments:*

Look for specialist book contributors in Asia, America, Europe, Africa and Middle East.

Books are to be thought as a contribution not as a submission to a journal.

Define book total pages and Deadlines

- *HARALD:*

The book should contain a more technical or more new views about VLC. The idea is to contain more white papers rather than technical contributions.

- *MURAT:*

We as knowledge body (COST) we have to move on it.

Time frame: next meeting we should define the outline of the book. October 2013

There is a need to define a road map.

FARY:

Guideline is fair; using the proposed part scheme is OK

However it is necessary to expand the structure and define deadline in a realistic way.

LUIS:

He will prepare the ToC based on those 4 parts.

HARALD: Is a book of state of the art or a COST activities report Book?

LUIS: The idea is a state of the art book, highlight applications and a combination of best practices, real applications ...

HARALD and FARY: the topic is very broad to cover it easily.

LUIS: the contributors worldwide will cover many topics to discuss, contributors are not defined yet.

KLAUS: idea is not going so deep in some technical aspects, e.g. channel modelling, signal format in order to focus in applications that will focus in the KEY things applications.

HARALD and FARY: This book should allow to initiate people in VLC and show the tools to continue the learning, not to present all the facts about VLC; e.g. signal formats just basics and links to other sources

MURAT: this is not a journal of new ideas, is a book to show VLC from applications, not totally disrupting ideas.



MCM4 Meeting Minutes

LUNCH BREAK – 12:30 AM

15. Introduction of new MC members (from Thursday Session)

15.1 New Turkish Colleague presentation.

Main facilities and research.

- UWB over FSO channels
- Coded MIMO over Atmospheric Turbulence Channels
- Spatial modulation over FSO channels

16. MC Meeting – III- Progress Reports by SIG and WG Chairs (continuation)

16.1 SIG - UW Optical Communications Annual Progress Report

Presented by Dr Baykal, Turkey.

- Networking between COST members and SIG was very active

Questions:

Q - MURAT: Do you mention to replace RF communications with UW OWC?

A: It is not right, in the short term it is not possible, but we should trust in them.

16.2 SIG – TESEO Annual progress report

Presented by Klaus, HHI

- Main activities during last year:
 - Contact and consult interest on OWC from industrial, economics groups, other COST and FP7 consortium.
 - By the end of 2012 a report was released regarding Industry, Standardization, University and Research trends and Other COST/EU projects trends. They mentioned the targets to follow in this area
- Results obtained from Questionnaire:
 - 2 sets of questionnaires one about technology and other about services
 - Technology main outcomes:
 - Network topology: P2P for short range
 - Data rates: 1 Mbps to 5 Gbps
 - Link distances: from chip (0.001) to sat communications link (40000 km).
 - Services main outcomes
 - Communications, inside there LTE and Fiberless telecomm interconnections.
- Standardisations activities recognised in our area:
 - REC G640
 - P1621-1
 - P1622
 - P1817-1
 - F.2106-1
 - 60825-12
 - 60825-12 2nd Ed.
 - P802.15 daft 5c
- Contact with industrial partners:

- Successful with Cassidian Optics.
- Increase of capacity of wireless systems and interesting
- Joint contribution to ICTON 2013, with Aveiro and ISCOM and Cassidian.

Questions:

Q-FARY: big interest in the questionnaire results. We should contribute or understand the industrial implications.

A: Yes, it is very interesting a list of more than 20 partners is available and the survey among them will bring results to focus our activities on OWC in order to align them correctly.

17. INPUT DOCUMENTS WG1 (continuation from Thursday)

Chaired by Carlo Capsoni, WG1 chair.

17.1 Ondrej Fiser, IAP, Czech Republic.

- Experimental results obtained at Mileksova Observatory.
 - Proposed visibility measurements:
 - Weighted visibility.
 - Results indicate the combination proposed fits with the channel attenuation
 - CCD camera used for visibility
 - Sonic temperature is the only one well correlated with the optical attenuation.

Questions:

Q-Stanislav: Correction of your equations is dependent on your devices?

A: Not initially, because we consider different levels of scattering and has been checked and aligned.

17.2 Carlo Capsoni, Milano, Italy

Experiment results and studies about the textbook case, Mie scattering.

- Monodispersion, and droplet size distribution (DSD)
 - Now, fog droplet size distribution.
- Dependency of optical wavelengths windows.
- Dependency of attenuation – WAVELENGTH sensitivity.
- Denormalizing DSD. Considering liquid water content (LWC) and its consequences

Conclusions:

- Fog variability cannot be reduced to few DSD types
- 10.6 micrometres can substantially reduce beta.
- To quantify beta we need a method to classify fog
- Visibility in not enough!!!!
- Visibility plus LWC looks enough for DSD detection

Questions

FARY: Biasing problem when you're capturing our data? Why we have that problem if we can truncate the measurements?

CARLO: WE are looking for a model, then we have to move a different region the model doesn't work and biasing appears, for indoor to FSO outdoor.

FARY: We do not introduce baseline measurements to standardise your method, and then continue with the fog measurements

CARLO: If we compare baseline and fog, the results are clear. Measuring the path with different wavelengths. Going to real fog with different frequency it is possible to derive the DSD, larger the wavelength it is necessary to know better the DSD in the path if not it's not applicable to calculate and characterize the fog.

17.3 Final Issues from WG1

CARLO CAPSONI:

The final report is coming, it is necessary to answer the questions we have committed to the MoU:

- Best wavelength for OWC
- Best model for fog prediction, rain, etc.

The idea is to resize small groups in the WG1 to answer and work experimentally towards these questions. The main issue behind this idea is to push the experimental discussion based on measurements have to be done on time. Good results could help other groups to accelerate their measurements.

18. SIG – future activities, FUNDING BODIES opportunities regarding IC1101 activities.

Report and open discussion chair by Vangelis, Linköping University, Sweden.

18.1 Main funding calls and activities done.

- New HORIZON 2020 for ICT main schemes are not revealed yet. All is delayed. Looking for Clues at HORIZON 2020
- MARIE CURIE GRANTS PEOPLE:
 - ITN
 - IEF
 - COFUND
- CELTIC funding initiative

18.2 Deadlines:

- PEOPLE 14 Aug 2013 – Marie Curie
- PEOPLE 5 Aug 2013 – FP7-PEOPLE-2013-CIG Mobility – career integration grant
- PEOPLE 10 Dec 2013 – FP7-2013-ICT-FI “technology Foundation Extension and Usage” (IP/CSA)
- ICT2013 8th November – Vilnius conference EU commission on ICT

18.3 Networks of excellence NoE

- The most realistic tool for COST continuation
- Maybe will be continue under NoE
- 30 or more institutions

Action WG to define the strategy/diagram of interest										
Harald Haas – WG2	Klaus Industry	–	Stanislav WG1	–	Marta WG4	–	Slavisa WG3	Shlomi	Fary	Murat

19. Other Questions and discussion:

KLAUS: regarding the survey, coordination of activities on that he asked Luis to regard for more opportunities to broad the database of interest. More contact with the community in order to offer a broader view out of the COST IC1101 interest.

MURAT:

- Website hosted in Northumbria University, check with IT people, in order to assure the update. Answer by June 2013
- About login and accounts, please only MC members have access to all documents

FARY: Workshop and training school in MCM5. All the possible or interested demonstrator and lecturers have to contact him in advance with title of presentation and requirements. OpticWise 2nd workshop, more people to TPC contact Fary. Deadline will be move to 1st July.

HARALD: Check dates, GLOBECOM2013 OWC workshop deadline 25th June 2013. Could be changed our dates? New workshop dates.

Dr Murat Uysal COST IC1101 closed the MCM4 at IAP Prague at 17:00