



MINUTES OF THE 5TH MC MEETING IN NEWCASTLE

Notes taken by Yahya Baykal and Joaquin Perez

22.10.2013 Tuesday

COST IC 1101 Action Chairman Murat Uysal made presentation with the following agenda items:

- Approval of the Minutes of the 5th MC Meeting
- Action Budget (2012-13)
- Current Participation Statistics
- STSMs
- Progress Monitoring
- Meeting Planning
- Dissemination Activities
- News from the Action

The details of the presentation are attached to this minutes of meeting. Some related points mentioned are:

MC DECISION: The Minutes of IV. MC Meeting is approved.

- At the end of the year, all of the budget should be spent, deadline being February 2014. An estimate of 25,000 \$ is left over from the meeting budget. Suggestions to spend the left over are to organize another training school or to organize another MC meeting. The MC meeting will provide a platform to discuss the research progress and also strategic directions in the light of HORIZON 2020 calls.
- Encourage your students / post-docs to apply for STSMs to visit the participating institutions.

MC DECISION: Leftover Budget will be used to hold a MC meeting in Edinburg.

- 23 countries signed the MoU.
- International participation: There were already 6, additional 2 applications are from Prof. Steve Hranilovic from Canada and Prof. Mitsuji Matsumoto from Japan.

MC DECISION: Prof. Mitsuji Matsumoto's (Japan) MC Membership is approved. Prof Hranilovic's application would be discussed when the application is complete.

- Annual Action Report for the 2nd Annual Monitoring Progress is approved on April, 18, 2013.
- ICT Annual Progress Meeting (APM) was held in Malta on June, 12-13, 2013.
- The Action Chair Prof. Murat Uysal presented the Action report which received positive feedback.
- Next Monitoring Progress Report will be due May 2014.
- At the end of each year, each participant is expected to submit Annual Participant Report providing details on research projects, publications and dissemination activities. Based on the participants' reports, WG/SIG Chairs will prepare Annual Progress Reports and based on the Annual Progress Reports, MC Chair will prepare the Annual Progress Report for the overall activities of the Action. MC will approve the reports. Early January, reports will be asked from individuals.
- Meeting planning for the 3rd Annual Workshop + 6th MC Meeting + 3rd Training School: ICTON 2014 will take place in Graz, Austria during July 6-10, 2014. Possible concerns in timing are that ICTON has already OWC workshop. Merging of 2 workshops vs keeping independent identity of IWOW needs a decision..

MC DECISION: 6th MC Meeting will be held in Graz, Austria co-located with ICTON 2014.

MC DECISION: 7th MC Meeting + 3rd Annual Workshop will be held in Portugal. Expected time is September-October 2014 but the exact dates will be fixed later by the Action Chair in consultation with the local organizer.

- Dissemination Activities: Action Website: <http://opticwise.uop.gr>, Action Database is in place, (Website administrator is Dimitris Soukaras), In early September, Fall 2013 issue of the Semi-Annual Action Newsletter was distributed in both soft and hardcopy (Editor: Florian Moll), Social Networking (Report from Joaquin Perez Soler)
- Some News from the Action:

To establish collaborations with other COST Actions, the following MC members were assigned as liaisons

 - Prof. Dan Sporea → TD1001 “Novel and Reliable Optical Fibre Sensor Systems for Future Security and Safety Applications”
 - Prof. Marian Marciniak → IC1004 “Cooperative Radio Communications for Green Smart Environments” and MP1204 “TERA-MIR Radiation: Materials, Generation, Detection and Applications”
 - Prof. Murat Uysal → IC1104 “Random Network Coding and Designs over GF(q)” - Currently serving as a substitute MC member
 - Dr. Giorgio Tosi Beleffi → IC0905 “Techno-Economic Regulatory Framework for Radio Spectrum Access for Cognitive Radio/Software Defined Radio” Received an invitation for a presentation on OPTICWISE during the next MC meeting on November 26-27, 2013
 - Prof. Roger Green will give invited talks on OPTICWISE at Wireless World Research Forum (Vancouver, Canada, Oct. 22-24, 2013)

- 4th International Conference on Photonics (Melaka, Malaysia, Oct. 28-30, 2013)
 - Upon the invitation of COST Office, Prof Vangelis Angelakis will give a presentation on OPTICWISE at EC Concertation Meeting of “Converged and Optical Networks (CaON)” Cluster (Brussels, Belgium, October 22-23, 2013) <https://ec.europa.eu/digital-agenda/en/future-networks-concertation-meeting>
- Horizon 2020 Applications
- Expected publication date of first calls for proposals is 11 December 2013
 - As discussed at our last meeting, our ultimate target within the HORIZON framework is to apply for a Network of Excellence with all or most OPTICWISE participants involved.
 - With a subset of OPTICWISE participants, we should also try our change with the other funding mechanisms (STREP, IP, ITN etc) as much as possible.

Murat introduced invited speaker.

Invited speaker from Waseda University, Japan. - Dr Matsumoto

Title: Challenges of VCL in Japan

- VLC consortium in Japan
- Projects on VLC, lighthouse project long range, traffic signal hub,
 - Image sensor application as key tool for VLC communications for multiple information, compared with photodiode (Image sensor communication)
 - VLC ISC
 - IrDa Application Low data rates
 - LED and VLC projects trials in submarines, large boats, one solution the VLC LAN
- Underwater VLC FSO comms, business established by a Japanese company for marine underwater applications “marine comms ryukyu inc.” I-majun project
- QUESTIONS:
 - Nikolas, Pure VLC UK: Why only focus on lighting and comms? Not why to use the full BW of LED in comms?
 - Answer: LED is still a lighting component in a room, in order to use the all the BW is very difficult to identify the light source. And the FD capability is available at IRDA at LED is more for broadcasting and lightning that an FD comm
 - Question: What is Zigbee?
 - Answer: Zigbee is a protocol for low data rate comms, automatic data transmission, very interesting and very active. Look at IEEE protocols and companies.
 - Ciprian, CTTC, Spain: VLC just is in your labs applications, when will it be possible to show it in the industry?
 - Answer: Market is not ready yet, the complete product is not still mature enough. Industry is not about be ready is more about the capability of the technology, e.g., High Speed??
 - Murat: Are VLC devices appearing in Japan? Commercialisation?
 - Answer: Now we can show them in exhibition fairs, still on that level, not in the final user or consumer. Now they are many LED lighting but not all of them have comm capability, then there is an opportunity there.

Murat introduced the 2nd Invited Speaker.

Commercialisation Pure VLC, Nikola Serafomovski.

Title: The commercialisation of Li-Fi

Showing confidential information from the marketing prediction in VLC.

- Using of Wifi, high speed users are the lower in time using the system. Most of the time the devices are operating in low data rates.
- LiFi coverage is more adaptable to user performance usage, almost individual coverage
- The uplink problem on a VLC system. LiFi?
 - You can use IR for UL, as pureVLC do.
- Issues on LI FI commercialisation
 - Optical-OFDM, is the future, but nobody incorporate it on a standardisation consortium, task group. Then??
 - Integration of LIFI? How to put to the final consumer on a friendly integration and using framework?? User demand-> integration > *adaption by industry_* market penetration ... a circle of demands.
 - Cost of the device will define the market and the industry penetration.
- Key actors (Spin-out)
 - PureVLC, UK Edinburgh University
 - Bytelight, USA Boston University
 - OLEDcomm, France University of Versailles
 - HHI
 - Nakagawa Labs
- Questions:
 - Shlomi: Energy consumption LiFi and WiFi?
 - Answer: Now WiFi is better, because they are on a chip device. LiFi is lighting, then the consumption is higher. The evolution is going on that way, not forcing the technology, just moving on what the people needs.
 - Bruno: Cells size topic, WiFi cells vs LiFi honeycomb cells, bit rate per user. The efficiency per user about EM fields, the energy efficiency on DAS is almost the same from distribute WiFi to big-spots approach, in terms of J/b necessary. Then the models for LiFi in terms of energy efficiency is an interesting topic for research in order to introduce them on the LiFi design and protocols.
 - Future indicates that killer apps will be higher data consumer then the comms will be based in fibres not in copper. Then VLC has a word to say on this, because a big market will arise soon on this, e.g., indoor applications for fibre+VLC.
 - Answer: Energy efficiency LiFi, depends on where we deployed the LiFi. Killer apps cannot define the infrastructure, 4G is a framework and many apps will use this. IR is there but the advantage is not at IR, we are looking for light+comms, business model is on that not on others.

The following presentations are made:

1. Prof. Haas presented some ideas on a possible Network of Excellence, Fundamental Technology.
2. Japanese researcher presented various VLC Applications.
3. Company personnel working with Prof. Haas made and presented a VLC demo.
4. Prof. Haas's speech and exchange of info on the Spherical Chart for the Network of Excellence, Fundamental Technology Networking. Social priorities such as security, transportation, smart environment communications should be somehow linked to OWC

of different applications. Designers must think how OWC can be incorporated to smart architecture materials and environments. More concentration on applications is required.

5. Carlo Capsoni presented the WG1 activities after the 4th MC meeting in Prag.
6. Fary Ghassemlooy, Ali Khalighi presented WG2 activities after the 4th in Prag. Average 4-5 input documents.
7. Tony Boucouvalas presented WG3 work. Only contribution is from Sweeden on protocols about indoor, outdoor, but not present.
8. Eszter G. Udvary presented WG4 activities. Exchange visits, EU Fusion Program, National Project, opening of Photonics Innovation Center in Brussels on 04.10.2013.

SIG Presentations:

1. Yahya Baykal, SIG UW-OWC. Submission of Underwater Wireless Optical Communications Project Proposal to Tübitak in Sept. 2013.
2. Luis Nero Alves, SIG VLC. Book to be written on VLC. Authors are listed and further volunteer authors are asked for.
3. Tosi Beleffi, on behalf of SIG TESEO. Techno-Economics, Industrial standards and Future Trends in OWC.

23.10.2013 Wednesday

Input Documents are presented:

1. Paul A. Haigh, Northumbria University, UK. Organic VLC.
 - OLED on OWC, trends and recent research outputs
 - Q - Shlomi: Without phosphor 50 Mb BW, is it so optimistic?
 - A: Just a literature review.
2. Ali Khalighi (Fresnel Institute, France), Murat Uysal, Fary Ghassemlooy.
 - Long Haul FSO links, performance under strong turbulence, how to mitigate fading?
 - Relay assisted FSO networks (ref JOCN 2013)
 - Better performance with serial relays than typical ones.
 - Methods of fading mitigation
 - MGF
 - Numerical results for a DF/AF signaling.
 - DF is better than AF.
 - Q – Capsoni. Is fading about turbulence or fog?
 - A: Is about turbulence.
 - Q – Erdal: channel estimation, how to achieve that?
 - A: We don't have any channel estimation incorporated.
 - Q – Stanislav: Independent fading but different channel could have correlated fading, turbulence around different channel could be considered correlated fading near a transmitter or a receiver?
 - A: Regarding the localised turbulence, we consider independent effects.
 - The discussion has included a few speakers about how to consider the fading effect independent or not, regarding that turbulence is located in different portions of the channel, how independent this will become.
3. Jürgen van Erps. Vrije Brussels University, B-Phot team. Photonics Innovation Center in Brussels is officially opened on 4th Oct, 2013. Ultraprecision diamond tooling, hot embossing, fabrication facilities, laser welding, metrology capabilities. <http://www.b-phot.org> is the web site.

- New facilities, in Brussels, fabrication of optical components at B-PHOT
 - Interesting opportunity for COST IC1101 members.
 - Nanotechnology fabrication less than 5 nm, 140 nm PV
 - Machine polymers, ZnSe, PMMA, Ni-alloys, CaF
4. L. Frigyes, C. Horvath, BME, Budapest University of Technology and Economics. Behaviour of FSO- MIMO in variable weak turbulence conditions.
 - FSO MIMO in variable weak atmospheric turbulence
 - Effective numbers of apertures — lognormal scintillation
 - System model: IM-DD, MIMO arrays, repetition coding at TX, Gaussian noise
 - Numerical results using parameters from Sergeev et al.
 - Conclusions:
 - Close receivers don't improve their performance with diversity action
 - Decrease of diversity outperforms decrease of fading
 - Q – Baykal: definition of variable environment?
 - A : We assume small variation in small space
 - Q- A. Belmonte: DD system, you define a coherence system and correlated system? Then why DD and diversity?
 - A: Correlation distance was taken equivalent to radius of coherence.
 5. L. Liu, Fary Ghassemloooy. Experimental demonstration of aperture averaging.
 - FSO systems, aperture averaging factors.
 - Q – Baykal: By splitting the beam, the point receiver will have a different aperture than the other one. Then how do you define the turbulence for both arms equally?
 - A – Both are captured before going to oscilloscope so both are affected equally by turbulence.
 - Q – In your channel, is fog modeling done?
 - A – No.
 - Q – Murat. The measurement is very interesting.
 6. S. O. Keefle, W. Habel, Romania. Novel and Optical Fiber Sensor Systems for Future Security and Safety Applications. From Cost Action TD1001.
 7. Dan Sporea, Bucharest. Testing Facilities at the National Institute for Laser, Plasma and Radiation Physics.
 - Announcement of new European COST collaboration. TD1001 OFSeSa (Novel and reliable optical fiber sensor systems for future security and safety applications.
 - Strong collaboration from industry on this COST, more than 40 % inputs from them.
 - Contact people: website OFSeSa.
 - Explanation of the capabilities of the laser modeling and characterisation laboratory.
 8. V. Brazda, Czech Rep. O. Fiser, V. Pek. IAP, Czech Republic. Structure Parameter and FSO Link Attenuation.
 - Q – Haas, what happens if the wavelength goes down?
 - A – according to the formula that is included in the analysis
 - Q – Fary, for 1550 nm the attenuation is almost constant
 - Q – Stanislav, which limits this model has? In terms of strong turbulence, will this model be able to predict the structure constant or not?
 - Q – Capsoni, , advice is not to use linear regression to analyze the attenuation and the structure constant.
 9. Yahya Baykal. The underwater turbulence effect on the optical transmittance is investigated. Parameters which constitute the power spectrum of turbulence and the effects of these parameters on the transmittance are discussed.
 10. Ying Yan. New MC member DTU Denmark, from networks group at FOTONIK Dept.

Open Discussion

- Participation of more persons from industry. Inviting more persons from the industry. How to attract them.
- Tony: Suggestion. Cable Free Company send them some meeting notes electronically.
- Murat. Tried to invite Sona but they went to exhibition.
- Some company names from France to be invited to Graz.
- Fary. Wanted to contact Nissan Smart Card on car-to-car communications. They are not aware of the activities. One person visited Fary.
- Science Festival in Sept. 2013. Smart phone demo, very good attendance.
- Fary. We need prototype for VLC.
- Shlomi. 2200 GHz is announced by German Telecom. 60 GHz, 2.4 GHz and 5.4 GHz are integrated in one module. Where and why this technology will be recognized. Great science but with regard to industry, what should be the right approach?
- Where and why this technology will be recognized?
- Carlo. Attending big conference like ICON so European COST can be presented.
- Fary. Growing number of VLC works from Universities. For example, huge grants are received by Cambridge University. They see golden opportunities.
- Fr Hong Kong. Hong Kong Technical University needs PhD students. Welcomes visitors. Taiwan, China are also involved.
- Fary's PhD Student. How to attract them?
- Fary. To approach them networking is essential. Toyota has VLC chip in lamp in vehicle to vehicle communication. BMW in England is working on VLC.
- Carlo. LED as lighting is offered to car manufacturers.
- Murat. In ICTON, can we have an industry session?
- Erdal. Quite difficult to form bridge to industry irrelevant whether it is OWC or not.
- Fary. Can we come together and form a prototype?
- From Hong Kong. Hospital applications.
- From France. Very difficult to face RF people. French high speed trains FSO communication is a nightmare. RF people say give me a clear application, safety or ... He was hospitalized in cardiac service in intensive care. Very strange that next to EEG, there was Wi-Fi internet connection and people were using mobile phones.
- Yahya. Can our COST Action issue a list of applications with the details and specifics of the applications?
- Dan. Marie Curie grant on training network, seashore marine interface. Presentation for applications.
- Murat. Wikipedia has no relation with what we are doing.
- Fary. Arduino is very much used to play with LED for art and architectural applications.
- Dan. Prototypes should be more than concept.
- Fary. How many persons know about OWC in your close environment. The students and staff should be aware first about the powerful software simulation tools. Dedicated facilities which are open for visitors. We need to share. Can be fully theoretical, institution hubs, centers of facilities. Joint publications need to be increased. Number of publications within the COST is good but percentage of cooperative publications is not too much.
- Action Items
 1. Murat Uysal. To inform editors of Wikipedia on OWC.
 2. Send industrial contact names to be invited to Graz meeting.

3. Harald Haas will send the excel form for NoE and in Jan 2014 NoE meeting will be held in Edinburg.
4. Open position (4 ea) for MC members
5. IEEE Proceeting (England)
6. Presentations will be passed to Murat Uysal and copy will go to web master of COST to make it available to COST MC members.

PRESENTATION OF THE COST ACTION IC1101
CHAIRMAN MURAT UYSAL



COST Action IC1101
Optical Wireless Communications
- An Emerging Technology



V. MC Meeting

October 21-23, 2013

Newcastle upon Tyne, UK



Agenda

- Approval of the Minutes of the 5th MC Meeting
 - Action Budget (2012-13)
 - Current Participation Statistics
 - STSMs
 - Progress Monitoring
 - Meeting Planning
 - Dissemination Activities
 - News from the Action
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IV. MC Meeting

- IV. MC Meeting was held in Prague, Czech Republic during April 24-25, 2013.
 - The participation requests of *Denmark* and *The Former Yugoslav Republic of Macedonia* were approved.
 - Information on the international participation and previous STSMs was presented.
 - Details on “progress monitoring” were provided.
 - Prof Eszter G Udvary was selected as the new WG4 Chair and Prof Marta Ruiz Llata was selected as the WG4 Vice Chair.
 - Input documents were presented and Invited speakers gave talks on OWC.

Action Item: Approval of the Minutes of IV. MC Meeting



2012-13 Action Budget

	Budgeted	Actual	Committed	Comments
Meetings	€ 95,400	€ 26,840	€ 42,000 ?	
• IV. MC Meeting (Czech Republic)	€ 42,000	€ 26,840		
• V. MC Meeting (United Kingdom)	€ 42,000		€ 42,000 ?	
• Participation in Standardization Activities	€ 4,500			
• Global Outreach Activity	€ 6,900		€ 1,600	Prof Green will make a presentation at World Wireless Research
STSMs	€ 20,000	€ 3,450	€ 8,000	4 open STSMs
Dissemination	€ 3,000	€ 447	€ 1500	One newsletter Website administration
Other Expenses	€ 500		€ 500	Bank charges
Training School	€ 9,500		€ 9,500	
Administration	€ 11,500		€ 11,500	Administrative/ secreterial charges
Total	€ 139,900	€ 30,737	€ 68,500	



Budget Issues

- COST office is very keen on all budgeted money spent within one Action year → considers it mainly as an Action performance indicator

 - Even if we spend all other items as budgeted, there is 15k Euro left-over from the IV. MC Meeting. Some suggestions:
 - We can consider holding another training school if there is a volunteer
 - An additional “core group” meeting can be arranged in early 2014 for NoE preparations

 - Encourage your students/post-docs to apply for STSMs to visit other participating institutions
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Current Participation

- As of October 2013, **23** COST Countries signed the MoU.
 - Two new participants are
 - Prof Qin Xin (Denmark)
 - Prof Zoran Utkovski (The Former Yugoslav Republic of Macedonia)
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International Participation

Nominee	Affiliation	Country	Status
S. Sheikh Muhammad	National Univ. of Comp. & Emerging Sciences	Pakistan	Approved by MC
Chung Ghiu Lee	Chosun University	South Korea	Approved by MC
Bill Cowley	Univ. of South Australia	Australia	Approved by MC
Jean Armstrong	Monash University	Australia	Approved by MC
Zhengyuan Xu	Tsinghua University	China	Approved by MC
Shien-Kuei Liaw	National Taiwan University of Science and Technology	Taiwan	Approved by MC

●●● International Participation

Nominee	Affiliation	Country	Status
Steve Hranilovic	McMaster University	Canada	Application in process
Mitsuji Matsumoto	Waseda University	Japan	Pending MC Approval

Action Item: Approval of Prof Matsumoto's application



STSMs

Title	Holder	Host	Period
Organic Light Emitting Diodes for Visible Light Communications	Mr Paul Anthony Haigh (Northumbria Univ., UK)	Prof. Erich Leitgeb (TU Graz,AT)	06.07.2013 21.07.2013
Hybrid optical-wireless outdoor links assessment at Czech Technical University in Prague	Dr Joaquin Perez (Northumbria Univ., UK)	Prof. Stanislav Zvanovec (Czech Technical University in Prague,CZ)	22.07.2013 02.08.2013
Visible light communication channel modeling	Mr Dehao Wu (Northumbria Univ., UK)	Prof. Murat Uysal (Ozyegin University,TR)	10.08.2013 25.08.2013
Multi colors indoor impulse response for next generation VLC	Mr Petr Chvojka (Czech Technical	Prof. Shlomi Arnon (Ben-Gurion University of	29.09.2013 19.10.2013
Joint characteristics of turbulence and dust particles influence on FSO links	Mr Jiri Libich (Czech Technical University in Prague,CZ)	Prof. Zabih Ghassemlooy (Northumbria Univ., UK)	30.09.2013 07.11.2013
Real-Time OFDM over Visible Light Communication	Mr Giulio Cossu (Scuola Superiore Sant`Anna, Pisa,IT)	Prof. Jianming Tang (Bangor University,UK)	01.10.2013 23.10.2013



Annual Action Report

- The Second Annual Monitoring Progress Report was prepared by the Action Chair and was approved by the MC through e-mail on April 18, 2013.
- **ICT Annual Progress Meeting (APM)** was held in Malta on June 12-13, 2013.
- The Action Chair Prof Uysal presented the Action report which received positive feedback.
- **Next Monitoring Progress Report: May 2014**



Progress Monitoring

- Before each MC meeting, each WG/SIG chair will invite the participants to submit “input documents” (template distributed by e-mail).
 - An input document can
 - be of tutorial/survey nature and provide insight into the [state-of-the-art](#) on an Action-related topic
 - be of conference paper type and summarize your [recent research achievements](#),
 - be a “position” paper and include your opinions on the [research directions/future developments](#) on an Action-related topic
 - Participants will make [presentations](#) based on their input documents [at the meeting](#).
 - These are [stored at the Action website for internal access](#).



Progress Monitoring

- At the end of each year, the Action participant is expected to submit an [Annual Participant Report](#) providing details on the research projects, publications and dissemination activities.
 - Based on the participants' reports, each WG/SIG Chair will prepare an [Annual Progress Report](#)
 - Based on the progress reports, the MC Chair will prepare the [Annual Progress Report](#) for the overall activities of the Action.
 - OMC will [approve](#) the reports before their submission to the COST Office.
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●●● Meeting Planning

○ **3rd Annual Workshop + 6th MC Meeting + 3rd Training School**

○ Prof Marian Marciniak proposed the 3rd Annual Workshop + 6th MC Meeting to be held with ICTON 2014

○ ICTON 2014 will take place in Graz, Austria during **July 6-10, 2014.**



○ Possible concerns:

- Timing? (IWOW is typically held in Fall)
 - ICTON has already OWC workshop. Merging of two workshops vs keeping independent identity of IWOW
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●●● 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)

- In early September, Fall 2013 issue was distributed in both soft and hardcopy

○ Social Networking – Report from Joaquin Perez Soler

facebook

LinkedIn

twitter



Some News from the Action

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Received an invitation for a presentation on OPTICWISE during the next MC meeting on November 26-27, 2013



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 - Angelakis will give a presentation on OPTICWISE at
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<https://ec.europa.eu/digital-agenda/en/future-networks-concertation-meeting>
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FAQ

- **Question:** I am unable to attend the MC meeting. Can my student/post-doc/colleague from my research group replace me?
 - **Answer:** If you are unable to attend, you should contact the MC substitute member of your country to replace you.
 - If budget allows, I can invite a small number of people in the category of “invited expert”.
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Horizon 2020 Applications

- Expected publication date of first calls for proposals:
11 December 2013
- As discussed at our last meeting, our **ultimate target** within the HORIZON framework is to apply for a Network of Excellence (NoE) with all or most OPTICWISE participants involved.
- With a subset of OPTICWISE participants, we should also try our change with the other funding mechanisms (STREP, IP, ITN etc) as much as possible.

●●● Questions

