10th Management Committee Meeting

Oulu, Finland
May 27-29, 2019

Claude Oestges
ICTEAM
Université catholique de Louvain
1. Invited speakers

Keynote session

- Keynote 0: 6G Flagship program, Matti Latva-aho (Centre for Wireless Communications Oulu)
- Keynote 1: Janne Kolu (Keysight Technologies)
- Keynote 2: Olli Liinamaa (Nokia)
- Keynote 3: Kimmo Hyrynkangas (Verkotan)
2. Adoption of the Agenda

1. Welcome to participants and keynotes
2. Adoption of agenda
3. Approval of minutes and matters arising of last meetings (MCM9)
4. Status of the Action
5. Review of action deliverables and final book
6. Action sustainability
7. Report from the Grant Holder
8. Report from Training Manager (STSMs, Training Schools and Tutorials)
9. Report from Dissemination Manager

10. Presentation and Discussion of Technical Documents

11. Final book update (on Tuesday)
12. Future meetings
13. Reports from Working Group Chairs
14. Liaisons with International Bodies and Projects
15. AOB
16. Close of Meeting
2. Adoption of the Agenda

Any change to the agenda?

ATTENDANCE LISTS

Please sign the attendance list for the day(s) you are present

AND

ONE attendance list for EACH WG/EWG you attend

No reimbursement of travel expenses (for those entitled to)
if attendance lists are not duly signed

NEWSLETTER MEETING

Who? Members of the steering committee
When? Tuesday at 6:00 pm
Where? in the plenary room
Any comment on MCM9 minutes?

**Subject** | Minutes of the 9th Management Committee Meeting of COST Action CA15104 “Inclusive Radio Communication Networks for 5G and beyond (IRACON)”
4. Status of the Action

Partners

- Number of signatory countries: 35 (out of 36)
- Number of MC Members: 66 (+ Chair)
- Near Neighbour Country Institutions: 4 approved
  
  National Research Tomsk Polytechnic University  
  YK State University of Grodno  
  RUDN University  
  University of Prishtina

- International Partner Country Institutions:
  - 13 approved and activated, 1 conditionally approved

  ✓ Beijing Jiaotong University  
  ✓ Tokyo Institute of Technology  
  ✓ Comsearch  
  ✓ NIST  
  ✓ Samsung Electronics Co.  
  ✓ Japan Advanced Institute of Science and Technology  
  ✓ Motorola Mobility LLC  
  ✓ Universidad Icesi  
  ✓ Niigata University  
  ✓ Northeastern University  
  ✓ CSIR  
  ✓ Huawei Device Company  
  ✓ ETS  
  ✓ University of Canterbury
4. Status of the Action

- 326 registered experts
- 68 MC Members (+chair)
- 101 participants per meeting (average)
- 35 research infrastructures
- 74 presented TD/workshop papers per meeting

- 191 institutions (industry/university/research/small and medium enterprises) currently participating
- 621 participants registered

- 3 meetings per grant year
- 5 training school completed
- 21 STSM completed

- 15% women
- 36% ECI
- 7% industry
- 16% Research
- 2% Small and medium enterprises
- 75% university
4. Status of the Action

Important Reminders: Deadlines and Procedures

• TD submission
  ✓ Request a TD number (usually **20 days** before the meeting)
  ✓ Send to the secretary a full TD (**10 days** before the meeting) using the cover page available on the website

*These deadlines are set to enable the StC to prepare the meeting schedule*

• Meeting registration: two actions are required
  ✓ Register on IRACON website (**20 days** before the meeting)
  ✓ Accept the e-cost invitation
Important Reminders: Deadlines and Procedures

• Reimbursement (for those entitled to)
  ✓ Accept the e-cost invitation
  ✓ Fill the the e-cost and submit the claim (after the meeting)

  The reimbursement procedure MUST take place on e-cost

✓ If you cannot attend but are replaced by an eligible substitute
  • Send a request to the Chair and GH (cc: secretary) at least 20 days prior to the event to enable the reimbursement of your official substitute
Important Reminders: e-Mailing and Acknowledgment

• Usage of global reflector
  ✓ From this meeting on, the global reflector (all_ca15104@iracon.org, moderated) should not be used to advertise events (outside those of the Action itself)
  ✓ Ask Alice (a.baldini@unibo.it) to include your announcement on the IRACON Web Page

• WG reflectors have been created

• Acknowledge COST CA15104 IRACON on all joint publications
  ➔ This work was carried out in the framework of COST Action CA15104 IRACON
  ➔ The authors acknowledge the fruitful discussions in COST Action CA15104 IRACON
4. Status of the Action

January 2019
9th MCM (Dublin, 16-18 Jan 2019)
   Organized by Conor Brennan
   90 TDs (including 4 workshop contributions)
   3 invited speakers
   131 (!) participants

February 2019
COST Academy - Storytelling: spotting and writing a good story. Getting people to listen (Brussels, 19-20 February 2019)
   IRACON to be represented by Luis Correia

March 2019
COST Connect event on “Data sharing” (Brussels, 13-14 March 2019)
   IRACON to be represented by Margot Deruyck
ECI Representative

• What is an ECI?

Early Career Investigator, maximum 8 years after the PhD (ie no PhD degree or PhD degree after June 1, 2011)

• Role of ECI representative in the core group (one-year mandate)

Participation to core group discussions and preparation of MC meetings Newsletter editor and blog moderator

¬ Margot Deruyck (BE) was elected for Y1
¬ Luca Feltrin (IT) was elected for Y2
¬ Conchi Garcia Pardo (ES) was elected for Y3
¬ Two applications have been received for Y4 (elections on Monday 3:45 pm in the plenary room)

Piotr Rajchowski
Nuno Leonor
5. Deliverables

Technical deliverables for the first two years

• **Deliverable 1** (M14, May 2017): Working Groups first year term annual report summarising the achievements of every WG  → all WGs

• **Deliverable 2** (M20, November 2017): Overview of IRACON Reference Scenarios and assessment of 5G radio access techniques through experimental platforms  → WG3, EWG-RA

• **Deliverable 3** (M24, March 2018): Submission to international bodies of contributions about concerted 5G radio channel models  → WG1

• **Deliverable 4** (M24, March 2018): Collaborative white paper on new localization techniques suitable for 5G and the Internet of Things  → EWG-LT+IoT

• **Deliverable 5** (M26, May 2018): Working Groups second year term annual report summarising the achievements of every WG  → all WGs
Technical deliverables for the last two years

- **Deliverable 6** (M36, March 2019): Collaborative white paper on future architecture and protocols for the Internet of Things → EWG-IoT

- **Deliverable 7** (M38, May 2019): Working Group third year term annual report summarising the achievements of every WG → all WGs

- **Deliverable 8** (M42, September 2019): Technical inputs and liaison statements to Standardisation Groups on metrics for Over the Air (OTA) testing → EWG-OTA

- **Deliverable 9** (M42, September 2019): IRACON concerted radio channel models for 5G and beyond (draft book chapter) → WG1

- **Deliverable 10** (M50, May 2020): Working Group final report summarising the achievements of every WG in the overall Action (draft book) → all WGs
Deliverable 7 timeline

• **Edition**
  - WG chairs are the contributors
  - Chair and Vice-Chair are the editors

• **Content**
  - 1 page per WG/meeting
  - Scientific results and dissemination activities (no equations !)
  - Will be published on IRACON website

• **Schedule**
  - Draft version by March 31, 2019 → postponed to June 15, 2019
  - Delivery by June 30, 2019
5. Final Book

Timeline

• During Cartagena meeting, each WG discusses about a list of sections
• After Cartegena meeting, the WG chairs finalize the discussion and propose the list of sections to the Chair
• Integration of all sections into a set of coherent chapters by the BEC
• The ToC is frozen at Podgorica meeting (40 pages per chapter)
• Chapter and section editors are identified at Podgorica meeting
• IRACON Chair must search for publisher between MCM8 and MCM9
• The first draft of the book is ready by April-May 2019

Book Editors

• Claude Oestges and François Quitin
Table of Content

1. Introduction

2. Radio propagation modelling methods and tools
   2.1 5G and beyond propagation environments
   2.2 Channel model classification
   2.3 Algorithms for estimation of radio channel parameters

3. IRACON measurements and channels for 5G and beyond communications
   3.1 Measurement scenarios
   3.2 Millimetre wave and THz channels
   3.3 MIMO and massive MIMO channels
   3.4 Fast time-varying channels
   3.5 Electric properties of materials for 5G channel simulators

4. Over-the-Air testing for 5G
   4.1 Field emulation for electrically large test objects
   4.2 Emulation of millimetre wave channels
   4.3 Emulation techniques for testing hardware internals
Draft Table of Content (2)

5. Coding and processing for advanced wireless networks
5.1 Advanced waveforms, coding and signal processing
5.2 Distributed and cooperative PHY processing in wireless networks
5.3 Massive MIMO
5.4 Implementation and HW driven solutions and full duplex communications

6. 5G and beyond networks
6.1 Wireless connectivity
6.2 Spectrum management and sharing
6.3 Scheduling and RRM
6.4 5G radio access platforms
6.5 HetNet and UDN
6.6 CRAN
6.7 SDN and NFV
6.8 UAVs
6.9. Application domains and solutions
Draft Table of Content (3)

7. IoT protocols, architectures and applications
   7.1 Low power Wide Area Networks
   7.2 Routing and MAC protocols for IoT
   7.3 Vehicular communications
   7.4 Energy efficient/constrained solutions for IoT
   7.5 Software Defined Networking and Virtualization for IoT
   7.6 Special applications of IoT

8. IoT for healthcare applications
   8.1 Nano-communications
   8.2 Wearable and implantable IoT-Health Technology
   8.3 IoT-Health Networking and Applications
Draft Table of Content (4)

9. Localization and tracking
9.1 Measurement acquisition, modeling, and performance limits
9.2 Positioning methods, data fusion and tracking
9.3 Channel modeling and multipath exploitation
9.4 System study and system-level performance analysis
9.5 Testbed and prototyping activities

10. Future trends in communications, networking and beyond
Anyone with ideas → contributions sent on shared document but the document remains open
## 7. Report from the Grant Holder

### Grant Holder

**cnit**

### Secretary

Miss Alice Baldini

### Work and Budget Plan for Y3, including top-up

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<th>Quantity/Description</th>
<th>Budget</th>
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7. Report from the Grant Holder

Grant Holder

Secretary
Miss Alice Baldini

cnit

Status

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<td>98.5%</td>
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7. Report from the Grant Holder

Grant Holder

Secretary

Miss Alice Baldini

Approved Work and Budget Plan for Y4

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8. Report from Training Manager

Training Schools

2017/2018

4- IRACON/Met5G Training School on interference in 5G – April 16-17, 2018 Guildford, Surrey, UK.

3- VTS PT Chapter/COST-IRACON Joint Winter School on Beyond 5G Networks operating in the Millimetre Wavebands enabled by Joint Analogue-digital Signal Processing – March 5-9, 2018 Lisbon, Portugal

2- ESoA/COST-IRACON Joint Training School on Large Scale Radio Propagation – June 12-16, 2017 Louvain-La-Neuve, Belgium

2016/2017

1- WIBEC/COST-IRACON Joint Training School on Antennas and Propagation Modeling for Body Environment Communications – May 1-3, 2017 Dresden, Germany
8. Report from Training Manager

Training Schools

2018/2019 - Great successes

7- Training School on Machine Learning and Wireless Communication – 8-11 Apr. 2019 - Barcelona, CTTC.
   20 Grants, 80+ attendees (Limited due to logistic reasons)

   16 Grant (29 requests) – 45 attendees

   16 grants – 40 attendees (Space limitations due to practical works)
8. Report from Training Manager

Reminder: Grants are allocated on a first arrived first served basis with a limitation to one per institution if necessary.

Training Schools – Grant period 4

Planned

Training school on 'Network Models, Architectures and Applications for 5G'

Proposal

End 2019 Winter School on System Level Optimization and Waveforms in Radio Communication Networks for 5G and Beyond”
With Marie Curie action TeamUp5G MSCA ITN
Fernando Velez
COST CA15104 (IRACON) Training School: Network Models, Architectures and Applications for 5G
7 – 11 October 2019
RUDN University, Moscow, Russia

**Scope** Global view in key features of the emerging 5G technologies from the networking perspective
- models,
- architectures and
- applications.

Lectures will give background on 5G wireless communications networks concepts, ranging from the more fundamental ones related to concepts and mathematical modelling to experimental and applied ones connected to the incoming standardisation features.
8. Report from Training Manager

**Speakers**

Andres Gonzalvez, Telenor, NO  
Antonio Orsino, Ericsson, FI  
Carles Anton, CTTC, ES  
David Calligaris, Huawei, DE  
Hamed Ahmadi, U. Essex, UK  
Konstantin Samouylov, RUDN, RU  
Luis M. Correia, IST-U. Lisbon, PT  
Paul Sutton, SRS, ES  
Roberto Verdone, U. Bologna, IT  
Silvia Ruiz, UPC, ES  
Yuliya Gaidamaka, RUDN, RU

**Organisers**

Hamed Ahmadi, U. Essex, UK  
Konstantin Samouylov, RUDN, RU  
Luis M. Correia, IST-U. Lisbon, PT  
Silvia Ruiz, UPC, ES
8. Report from Training Manager

STSMs for GP1

10 accepted

Spain (x2), Austria, Danemark (x2), Croatia, Belgium, Italy (x3), Germany (x2), France (x3), Finland (x2), Portugal, Bosnia and Herzegovina (x2)

1. Multi-bands MIMO dual-Pol measurements and characterization of Radio Propagation for future 5G and B5G Wireless systems
2. Spatial Consistency in 5G Radio Channel Propagation mm-wave Spectrum
3. Characterization and Modeling of the MIMO Radio channel in the W-band
4. Concealed, Chassis Integrated, Pattern Reconfigurable, Automotive Antenna
5. Over-the-air performance evaluation of massive MIMO antenna systems in anechoic chambers
6. Implementation and measurement of 5G waveform candidate using OpenAirInterface
7. Introducing Multiple UAV Trajectories in UAV-Aided B5G Networks
8. Impact of Radio Channel on the Performance of ALOHA-based Medium Access Control Schemes
9. Experimental Characterization of Joint Scheduling and Routing algorithm over 6TiSCH
10. Performance Evaluation of MCF (minimum cost forwarding) and SRMCF (source routing MCF) routing protocols over 6TiSCH (IPv6 over the TSCH mode of IEEE 802.15.4e)
8. Report from Training Manager

STSMs for GP2

11 accepted – 2 rejected – 1 cancelled
Sweden (x5), Belgium, Austria (x2), UK, Finland, Spain (x3), Poland (x2), Portugal (x3), Italy, Russia, France, Germany

2. Characterization and design of mm-wave antennas for 5G
3. Polarised Off-body Channel Measurements with Dynamic User
4. Simulations of the radio channel in off-body communications in a passenger ferry environment
5. 5th Generation (5G) Communications: Parameterizing COST2100 at 60 GHz for the establishment of simplified user scheduling for Massive MIMO
6. Full-Duplex device-to-Device Communications
8. Power-efficient and reliable mm-wave communications in dynamic environments
9. Design RF devices in millimetres with glide-symmetry structures
10. Tactile internet enabled Drone Control over LTE for Ultra-Dense Cloud Drone Networks
11. Elaboration and description of multipath propagation for mmW
8. Report from Training Manager

STSMs for GP3

16 submitted - 11 accepted – 5 rejected

Denmark, Belgium (x3), Spain (x3), Croatia, Serbie, France (x2), Poland (x2), Portugal (x4), Italy, Russia (x3), USA

1. Air-to-ground channel characterization at mmWave frequencies
2. Simulation of polarised off-body channels with dynamic users
3. New channel estimation algorithms at the physical level to improve the performance of future communications systems relying on the use of a new waveform.
5. Modulation based Simultaneous Wireless Information and Power Transfer
7. Implementation of algorithms or designs in Software Defined Radio (SDR) nodes, in order to evaluate diverse communication scenarios using FIT/CortexLab
8. SLA-based network slicing analytical modelling
9. Analytical modelling of the mobile computing offloading
10. Robust Bayesian Parametric/Nonparametric Statistical Inference for Indoor Localization, Tracking and Navigation
11. Communication interfaces for medical chips in patients bodies suitable for early detection of infections
8. Report from Training Manager

STSMs for GP4

4 submitted - 2 accepted – 2 under revision
Austria (x2), France (x2), Norway, Spain, Sweden, Ireland

1. New Measures of Service Reliability for Shared Mobile Networks
2. Exploitation of 3D deterministic channel models for realistic hybrid 5G and GNSS positioning simulations d Navigation
3. User Separability in Distributed Massive MIMO Systems
4. Millimetre Wave Over-the-Air Testing with Measured Channels
8. Report from Training Manager

STSMs for GP4

Still some space
... but ...
Involvement in the action has to be clear

State this in your applications: previous participation to a meeting / plan to present in a coming meeting.

Maximum grant: 1200€

Main rejection reasons
1. Not enough experience (Master Students) → and a risk of non continuity
2. Topics a bit far from the core of the activities (antenna design)
3. Involvement in the action questionable ...
4. Application received too late
Dissemination Actions: IRACON Special Sessions

- EuCAP 2019, Krakow, March 31-April 5, 2019
  → 2 IRACON special sessions, and 2 IRACON-inspired special sessions

IET / COST session CA15104 (IRACON): Propagation Measurements and Modelling for 5G and Beyond

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COST session CA15104 (IRACON): Measurements and Simulations in Channel Modelling in Wireless Body Aera Network

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Assessment and Modelling of Antennas and Radio Channels Jointly

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Propagation Channels for Wide Sense Vehicle to X Communications

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<td>Ke Guan</td>
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9. Report from Dissemination Manager

Dissemination Actions: social media

- **Dissemination list** for PhD training events
- **Leaflet**
  - Goal: high-level introduction of the Action
  - Updated after each meeting
- **Newsletters**
  - All issues available at [www.iracon.org](http://www.iracon.org) under “Publications”
  - Next issue to be expected after this meeting
- **Blog**
  - To launch discussions and/or express views
- **Instagram, youtube, facebook, linkedin**
  - Send contributions to Alice

Dissemination Actions: special issue in Radio Science
There are 65 TDs to be presented

Working Groups discussions should include

- Next deliverables (September 2019)
- Joint activities with H2020 projects
- Tutorial offers for upcoming meetings
- Final book
- Joint activities (experiments, papers, etc.)
- Short Term Scientific Missions among participant institutions
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<td>BANs</td>
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Management Committee Meeting resumes on Wednesday at 11:15 am
Future versions

- **Version 1.2 (to be released before MCM11)**
  - Only for chapters 2, 3 and 5
  - All sections completed

- **Version 2 (to be released by end 2019)**
  - For all chapters
  - Must include TDs from MCM10 and 11
  - Copy-right free figures and graphs
  - Updated references (replace TDs by papers if any)
## 11. Final Book

### Deadlines (chapters 2, 3 and 5)

SE: Section editors – CE: Chapter editors – BE: Book editors

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<tr>
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<td>Send reminders and compile all chapters</td>
<td>BE</td>
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<td>Aug 1</td>
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<tr>
<td>B/4</td>
<td>Upload draft book v1.2</td>
<td>BE</td>
<td>Secretary</td>
<td>Aug 20</td>
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## Deadlines (all chapters)

SE: Section editors – CE: Chapter editors – BE: Book editors

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Eligibility of secretary’s travels to meetings

• New rule in the vademecum

  ✓ In the case that the Grant Holder Manager must travel to the meeting place in an administrative role (eg. ensuring the attendance list is signed, assisting the MC Chair with the Minutes, providing support to the Local Organiser, etc) then the travel costs of the Grant Holder Manager can be funded with the Action’s budget.

• Does the MC agree to include this rule in our own set of reimbursement eligibility rules?
Future Meetings

• 11th IRACON MC/technical meeting (with joint workshop ?)
  ✓ Dates: 4-6 Sep 2019
  ✓ Gdansk (PL)
  ✓ Organizer: Slawomir Ambroziak

• 12th (final) IRACON MC/technical meeting and workshop
  ✓ Proposed dates: Jan 27-29 2020
  ✓ Louvain-la-Neuve (BE)
  ✓ Organizer: Claude Oestges
13. Reports from WG Chairs

**DWGs**

1. WG-1 (radio channels): Sana Salous and Katsuyuki Haneda
2. WG-2 (PHY-MAC): Hanna Bogucka and Jan Sykora
3. WG-3 (NET): Silvia Ruiz and Hamed Ahmadi

**EWGs**

1. WG-OTA: Wim Kotterman and Moray Rumney
2. WG-IoT: Erik Ström and Chiara Buratti
   - SWG IoT-Health: Slawomir J. Ambroziak and Kamran Sayrafian
3. WG-LT: Carles Anton and Klaus Witrisal
4. WG-RA: Florian Kaltenberger and Mark Beach
14. Liaisons

List of liaisons with international bodies, standards and projects

- 3GPP – Moray Rumney
- URSI – Sana Salous
- ITU-R – Sana Salous and Belen Montenegro
- H2020 5G-XCAST – Narcis Cardona
- 5G-PICTURE – Mark Beach
- CommNet (EPSRC network) – Mark Beach
- IEEE 1900.6 – Kostas Katzis
- EurAAP – Claude Oestges
- EURACON – Roberto Verdone
- WiBEC – Conchi Garcia
- 5G initiative – Fernando Velez
- Met5G – Tim Brown
- Clear5G – Haibin Zhang
- Wavecombe – Sana Salous/Narcis Cardona
- 5G-VINNI – Per Hjalmar Lehne
- 5G-HEART – Per Hjalmar Lehne
- 5G-EVE – Florian Kaltenberger
- EMPOWER – Per Hjalmar Lehne
- 5G-SMART – Fredrik Tufvesson
- MEANS – Fredrik Tufvesson
# Action points

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<td>Those entitled to e-cost</td>
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<td>Send Minutes of Group Meetings</td>
<td>Group Chairs Chair + Secretary</td>
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<td>Send STSM Applic.</td>
<td>Those interested e-cost +Training Chair</td>
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**16. Close of Meeting**
### 16. Close of Meeting

**Action points**

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Thank you!

See you in Gdansk, Poland
Sep 4-6, 2019

Claude Oestges
ICTEAM
Université catholique de Louvain