

Podgorica, Montenegro, 1-3 October 2018

SUBJECT | Minutes of the 8th Management Committee Meeting of COST Action CA15104 "Inclusive Radio Communication Networks for 5G and beyond (IRACON)"

DAY 1 – 1 OCT 2018

1. Welcome to participants

Prof. Claude Oestges, Chair of the Action, opened the meeting on October 1st, 2019, at 9.00 am. The participants were welcomed by the Local Organizer, Dr. Enis Kocan, University of Montenegro. Information about the local arrangements were provided to the audience.

The Chair acknowledged the fulfilment of the quorum, i.e. at least two thirds of the COST countries participating in the Action are represented at the 8th MCM.

2. Adoption of agenda

The agenda of the 8th MCM was adopted without modifications, based on the online version previously circulated.

3. Approval of minutes and matters arising from last meeting (MCM7, Cartagena)

The Chair informed the attendees that, following the change of Grant Holder Secretary, a few processes had to be postponed, including the preparation of the minutes from the 7th MC meeting in Cartagena. These will therefore be approved at the following meeting in Dublin, Ireland, in January 2019.

The Chair reminded to sign the official attendance list for each day of the meeting attended and to sign one attendance list for each WG/EWG attended. No reimbursement of travel expenses (for those entitled to) will be processed if attendance lists are not duly signed.

The Newsletter Meeting among the members of the steering committee will take place on Tuesday at 6 pm sharp in the room "Milica".

4. Status of the Action

The Chair moved on to update the audience on the overall status of the Action. Here below the main figures presented:

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	Russian Federation
YK State University of Grodno	Belarus
RUDN University	Russian Federation
University of Prishtina	Kosovo
- International Partner Country Institutions: **12** approved and activated, **2** pending

Beijing Jiaotong University	China
Tokyo Institute of Technology	Japan
Comsearch	United States of America
NIST	United States of America
Samsung Electronics Co.	Korea, Republic of
Japan Advanced Institute of Science and Technology	Japan
Motorola Mobility LLC	United States of America
Universidad Icesi	Colombia
Niigata University	Japan
Northeastern University	United States of America
CSIR	South Africa
Huawei Device Company	China
University of Canterbury	New Zealand
ETS	Canada

The Chair reminded that contributing to the Action is important and that Action participants must fulfil some obligations, namely:

COST Country institutions & Near Neighbour Country institutions

- Commitment to have contributions (TD, tutorial, etc.) at least at **ONE** meeting / training school per year
- Deregistration from the internal website access if not fulfilled

International Partner Country Institutions

The Chair reviewed the rules for accepting an IPC in the Action, i.e.:

- mutual benefit (COST rule)
- scientific excellence (Universities)
- role in industrial context (Industries)

- technical topics and WGs addressed
- geographic balance

The obligations for IPCs are similar to those of the other Partners:

- Commitment to have contributions (TDs, tutorial, etc.) at **TWO** meetings/training schools per year
- Deregistration from the internal website access if not fulfilled

Pending approvals

There are currently two pending approvals within the Action, i.e.:

- University of Canterbury (NZ), represented by Dr Fred Samandari

The application was initially rejected from COST officers because the Motivation Letter was not hand-signed. On September 30th the Chair received the Motivation Letter, properly signed.

The suggestion of the Core Group was to invite this institution to attend one meeting before it can be granted a role as observer (i.e. 2 contributions per year). This would give them the possibility to present themselves and to personally discuss with the MC their involvement in the Action.

- École de Technologie Supérieure (QC, Canada), represented by Dr Ghassan Dahman

The application was validated by the COST office, thus the MC was asked to take its own decision in the matter.

ETS application was subject to a careful analysis from the MCM, since apparently the motivation letter mentioned some contracts with the Army, which would be against COST rules. Indeed, COST should fund networking activities in the field of science and technology destined only for peaceful purposes (see "Rules for Participation in and Implementation of COST Activities", COST 132/14; http://www.cost.eu/rules_participation_implementation), page 4, no. 17).

Through an email exchange the Chair asked Dr Dahman to clarify this point. Dr Dahman explained that there are no contracts involved with the army and the point mentioned in the motivation letter was purely related to having access to facilities e.g., ships, via the Canadian Navy and maritime research, for propagation measurement purposes.

After careful consideration the MC agreed that the application was not violating the "peaceful-purpose rule for Participation in and Implementation of COST Activities".

A final decision on the issue was postponed to Wednesday Oct 3rd. ETS approval would in any case be conditional to Dahman's participation in the Action.

Important Reminders

The Chair went on to remind the participants about some important procedures and internal rules of the Action, such as: reimbursement eligibility, deadlines and procedures, e-Mailing and acknowledgments.

REIMBURSEMENT ELIGIBILITY

- MC meetings
 - ✓ Up to two MC members per COST Country
 - ✓ MC members can be replaced by officially nominated MC substitute, if the Chairman and GH receive request by given deadline
 - ✓ Eligibility priority for MC meetings
 1. All MC members who apply, or MC official substitutes, Action Chair, Secretary, invited speakers and ECI representative
 2. WG/EWG/SWG Chairs (while budget is available*)
 3. Non-MC members, presenting a TD, when replacing an MC member (while budget is available*)
 4. Other experts, one per country (while budget is available*)
- Technical meetings
 - ✓ Eligibility priority
 1. Action Chair, invited speakers
 2. WG/EWG/SWG Chairs (while budget is available*) in combination with COST policy priorities (inclusiveness/gender)
 3. Core Group members, Secretary (while budget is available*)

DEADLINES AND PROCEDURES

The Chair reminded everyone to request TD numbers and submit TDs on time!

- 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
- 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

Those entitled to a reimbursement should always keep their original supporting documents (tickets, receipts, invoices), even after uploading the claim on the e-COST.

E-MAILING AND ACKNOWLEDGMENT

The Chair reminded that it is very important to acknowledge the Action, because it is one of the few metrics to show that the Action is doing well.

- 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*

Afterwards, the Chair reported about the activities, events and dissemination actions that had taken place in 2018 and reviewed the current and future steps:

February 2018

[COST Academy](#) Training on **Using social media to communicate your research** (Brussels, 6 Feb 2018)

IRACON represented by Luis Correia

March 2018

3rd IRACON Training School, jointly with IEEE VTS (Lisbon, 5-9 March 2018)

Beyond 5G Networks operating in the Millimetre Wavebands enabled by Joint Analogue-digital Signal Processing

April 2018

COST Connect on **“How to shape a Sustainable Urban Mobility for all?”** (Bucharest, 25-26 April 2018)

IRACON represented by Vasos Vassiliou (MC Cyprus)

April 2018

4th IRACON Training School, jointly with Met5G (Guildford, Surrey, 16-17 April 2018)
Defining and Realising SINR in Future Mobile Networks

May 2018

7th MCM (Cartagena, 30 May-1 Jun 2018)
Organized by Jose Molina-Garcia-Pardo
98 participants
Training seminar on "RF Localisation Techniques" (jointly organized with ITN WIBEC)

June 2018

EuCNC 2018 COST/IRACON special sessions (Ljubljana, Slovenia, 18-21 June)
IRACON represented by Gordana Gardašević and Claude Oestges

September 2018

PIMRC 2018 (Bologna, Italy, 9-12 Sep)
IRACON workshops and special sessions

September 2018

COST Academy Webinar on "How to Promote International Cooperation in your Action" (19 Sep)
IRACON represented by Conchi Garcia Pardo

October 2018

8th MCM (Podgorica, 1-3 Oct 2018)
Organized by Enis Koçan
49 TDs
1 invited speaker
76 participants

November 2018

COST Action Sustainability networking event (Brussels, 29 Nov 2018)
Motivation letter sent

Dissemination Actions: IRACON Special Sessions

- **PIMRC 2018, Bologna, Sep 9-12, 2018**
 - 4 special sessions were organized by IRACON members
 - ✓ Spectrum Management for 5G Systems: Reference Models and Field Trials
 - ✓ UAVs for Future Wireless Networks
 - ✓ Deterministic Propagation Modelling and Channel Characterization for 5G and Future Wireless Systems
 - ✓ Electromagnetic Exposure in 5G Networks
- **SPAWC 2018, Kalamata (Greece), 25-28 June 2018**
 - ✓ Advances in Wireless Communications through Experimentation, organized by Florian Kaltenberger and Ana García Armada

Dissemination Actions: IRACON Workshops

- **EuCNC 2018: Joint IRACON-Clear5G-5Gcar Workshop on Vertical Industries & Applications for 5G (VIA5G), Ljubljana, 18 June 2018**
 - ✓ Workshop organizers: Haibin Zhang, Klaus Moessner, Woon Hau Chin, Erik Ström, Chiara Buratti
 - ✓ IRACON speaker: Claude Oestges
 - **IEEE PIMRC 2018: Joint IRACON-WIBEC Workshop on Wireless Body Communications in Medicine (WIBCOMM), Bologna, 9 Sep 2018**
 - ✓ Workshop organizers: Concepcion Garcia-Pardo, Narcis Cardona
 - **PIMRC 2018: Joint IRACON-5GIC Workshop on Millimetre Wave Communications, Bologna, 9 Sep 2018**
 - ✓ Workshop organizers: Reiner Thomä, Harris Pervaiz
 - **PIMRC 2018: IRACON Workshop on V2X Communications and Channel Modeling**
 - ✓ Workshop organizers: Christian Schneider, Massimo Condoluci
 - **PIMRC 2018: IRACON Workshop on UAV Communications for 5G and Beyond**
 - ✓ Workshop organizers: Chiara Buratti, et al.
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Dissemination Actions: Participation in COST-organized Special Sessions

- **5th European Conference on Sustainable Urban Mobility Plans - Planning for Multimodal Cities, Nicosia, May 14, 2018**
 - ✓ COST special session (organized by Mickaël Pero)
 - ✓ IRACON represented by Vasos Vassiliou (MC Cyprus)
- **EucNC 2018, Ljubljana, June 18-21**
 - ✓ COST special session (organized by Ralph Stübner)
 - ✓ IRACON represented by Gordana Gardašević (MC Bosnia-Herzegovina)
- **ICT 2018, Vienna, Dec 4-6, 2018**
 - ✓ COST networking session (organized by Ralph Stübner and Karina Marcus)
 - ✓ IRACON represented by Claude Oestges

As a general rule for future conferences, it was agreed not to mention the names COST/IRACON in the titles of the special sessions, as this may lead people to identify such events as promotion of a European Project rather than actual science and not attend. Ad hoc mentions will be included instead in the sessions' description, e.g.: the session was organised/supported by COST.

Monitoring Report

On the 25th month of the Action’s lifetime, the Chair, on behalf of the Management Committee, submitted the Progress Report, which includes information on the first 24 months of activity. An external Rapporteur, after receiving the Progress Report, submits a Progress Review, with the aim to monitor and assess the Actions activities up to month 24.

The Chair summarised to the audience the main topics addressed in the Monitoring Report Review:

<u>M25 Monitoring Report Review</u>
The number of workshops, short term scientific missions, training schools, and publications in the most prestigious journals and conferences on signal processing and wireless communications is a clear indication that the Action is fulfilling the objectives set in the memorandum of understanding for the implementation of the COST action. The research is addressing most of the challenging topics for 5G networks and beyond. For the remainder of the action, the researchers could also consider the timely topic of machine learning for communications, which seems largely absent in the list of publications available on the website. The only minor concern is that one of the deliverables promised by April 2018 is not yet available.
The level of ambition of the MoU objectives was Low . Overall, all MoU Objectives are progressing appropriately .
Validity, relevance and significance (in particular importance and timeliness) of the impact reported by the Action: IRACON is addressing important problems in wireless communications, which clearly has had a profound impact on the society. However, the potential contributions of IRACON to the society is indirect. The action has been developing enabling technologies that might find their way into future products. Therefore, it is not clear why the "expect timing of impact" is by the end of the Action.
The website is adequate. However, in the spirit of reproducible research, the impact could be higher if code used in the simulations of the publications were available.
There were many highly effective Action activities focusing on dissemination of Action results [Excellent] There were many highly effective Action activities focusing on exploitation of Action results [Excellent]

Other matters

Difficulties in implementing the Action

The Action Rapporteur made the following observations regarding difficulties in implementing the Action: One deliverable intended for April 2018 seems to be missing. Otherwise, I have no additional comments because the action seems to have achieved the expected progress.

Emerging topics / developments in the field of the Action

The Action reported the following emerging topics / developments in the field of the Action.

- This information will be provided in the final report of the Action.

The Action Rapporteur made the following comment on the emerging topics / developments in the field reported by the Action.

- Nothing to comment as the information will be provided later. The action also seems to be covering most of the important challenges of 5G networks. However, some topics that have been gaining attention by the international bodies could receive more attention (e.g., machine learning applied to communication systems)

Action Rapporteur

This Second Progress Report was submitted on 2018-08-20 by:
Dr Renato Luis Garrido Cavalcante
Fraunhofer Heinrich Hertz Institute
Germany

The Chair informed the attendees that he will submit an application for a follow up action after IRACON and that, if the application is accepted, a new Chair will have to be chosen.

With no further comments from the Audience, Part 4 on the Status of the Action was officially approved.

5. Review of action deliverables

The Chair updated the participants on the status of the technical deliverables (in green the deliverables already provided):

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**

The Chair analysed particularly the last Deliverable to be submitted (no.5), underlying that it was finalised late with respect to the original timetable.

DELIVERABLE 5

Edition

- ✓ WG chairs are the contributors
- ✓ Chair and Vice-Chair are the editors

Content

- ✓ 1 page per WG/meeting
- ✓ It includes scientific results and dissemination activities (no equations!)
- ✓ Published on IRACON website

Schedule: provided late

- ✓ Draft version by April 22, 2018 → **received last inputs August 8, 2018**
- ✓ Delivery by May 31, 2018 → **delivered August 30, 2018**

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**

6. Report from the Grant Holder

The new GH Secretary, Alice Baldini, who had started her collaboration on September 1st, was officially presented to the attendees.

Then the Grant Holder reported that the Action is currently underspending, as shown in the tables below:

Work and Budget Plan for Y3

Networking Tool	Description	Budget
Meetings	3 MCMs	131 350.00 EUR
Training Schools	2 TS	19 960.00 EUR
STSMs	At least 12 STSMs	14 400.00 EUR
ITC Conference Grants	Conference grants	4600.00 EUR
Other Expenses Related to Scientific Activities	Bank fees	976.50 EUR
Total Science Expenditure		171 286.50 EUR
Financial and Scientific Administration and Coordination (MAX. 15%)	15 %	25 692.98 EUR
Total Grant		196 979.48 EUR

Updated situation

Steps		Budget
Total Grant		196 979.48 EUR
1st Instalment received (August)	50 %	98 489.74 EUR
Reimbursements for Cartagena (to be made right after Podgorica)		38 660,12 EUR
ITC Conference Grants (to be made right after Podgorica)	three	2 025.00 EUR
STSMs (to be made right after Podgorica)	two	1 920.00 EUR
Available funds after payments will be made		55 884.62 EUR
Estimated cost of Podgorica	44 people	35 200.00 EUR
UNDERSPENDING BY APPROXIMATELY		11 600.00 EUR

Proposed changes to the budget allocation

To address this issue, part of the budget must be reallocated to make sure it is properly spent. The following budget changes were suggested:

1. Increase the LOS for the Training School in Lyon and for the Meeting in Dublin from 1000 EUR to 3000 EUR, in order to reduce the participation to LO paid by participants
2. Increase the number of training school grants and of trainers' reimbursements.
3. Increase the number of STSM and the max budget per STSM: from 1200 EUR to 1500 EUR

A vote was taken: [the above suggestions were approved unanimously](#)

7. Report from Training Manager (STSMs, Training Schools and Tutorials)

The Training Manager, Prof. Laurent Clavier, reviewed the list of Training School that had taken place:

2017/2018

4th Training School: IRACON/Met5G Training School – April 16-17, 2018
Guildford, Surrey, UK

3rd Training School: 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

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

2016/2017

1st Training School: WIBEC/COST-IRACON Joint Training School on Antennas and Propagation Modeling for Body Environment Communications – May 1-3, 2017 Dresden, Germany

He presented the next Training School, which will be held in Lyon on 18-22 November 2018:

IRACON Winter School on Information Theory and Signal Processing for Internet of Things

Dates – 18-22 Nov 2018

Host – Lyon, France. Jean-Marie Gorce, Laurent Clavier

Speakers

- Christophe Fournet (Sigfox) Welcome speech – Sunday Evening !
- Jan Sykora (Prague) – Network coding.
- Maël Le Treust (Paris – Cergy Pontoise) – Strategic Communication and Persuasion
- Chiarra Buratti (Bologna) – About MAC & Network layers
- Petar Popovski (Aalborg) - Principles of Wireless Access for Ultra-Reliable Low Latency Communication (URLLC)
- Marco Di Renzo (Centrale-SUPELEC, Paris Saclay) – About Stochastic Geometry
- Jean-Marie Gorce (Lyon)– Short packets & Information Theory
- Malcolm Egan (Lyon), Laurent Clavier (Lille) – Communication in Dynamic Interference
- Leo Cardoso, Guillaume Villemaud (Lyon) – Experiment on Cortex Lab

He informed the audience that the training school in Madrid will likely be replaced by one in Barcelona, as the Local Organiser asked to postpone it to 2020.

Finally, the Training Manager reviewed the list of STSMs that had been organised throughout the action:

STSMs for GP1

Spain (x2), Austria, Denmark (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)

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

1. Measurement and Characterisation of a Real-Time Channel Emulator based on a Software Defined Radio
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
7. Implementation of Low-complexity Hybrid Analogue-digital Solutions in CAP-MIMO
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

STSMs for GP3

7 submitted - 3 accepted – 3 rejected – 1 still under review

Belgium (UCLouvain, ICTeam) → **Spain** (Barcelona, CTTC)

New channel estimation algorithms at the physical level to improve the performance of future communications systems relying on the use of a new waveform.

Danemark (Aalborg University) → **Croatia** (University of Split - FESB)

Utilization of Advanced RFID Physical Layer Modeling for the Design of Advanced Reception/Transmission Algorithms

Spain (Barcelona, CTTC) → **USA** (Northeastern University, Boston, MA)

Robust Bayesian Parametric/Nonparametric Statistical Inference for Indoor Localization, Tracking and Navigation

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 ...

Still some space (at least 9 !)

... but ...

Involvement in the action has to be clear

Opening new ways are of course good ideas as long as they are in the action objectives and clearly contribute to the networking of active users, which does not mean “old” in the action.

Beside, due to the e-cost tool I would ask you to send me a copy of the workplan including the requested budget (max : 1500€). The work that will be achieved during the mission must be detailed but also the preparatory work and the outputs (including a TD !)

8. Report from Dissemination Manager

The Dissemination Manager, Prof. Luis Correia, invited the attendees to share ideas to disseminate the Action and to improve the participation in the EuCNC COST special session.

It was then proposed to keep in the publication list of the IRACON website only the accepted papers and not the submitted ones.

A vote was taken: the above suggestions were approved unanimously

IRACON members were invited to check the website to see if any of the submitted papers had become accepted in the meantime. They were also asked to send any new accepted paper to Alice, so as to keep the list updated.



9. Presentation and Discussion of Technical Documents

The Chair informed the audience that a total of **49 TDs** will be presented during the Working Group meetings and shared the schedule:

Podgorica (MO) October 1-3, 2018															
Monday				Tuesday				Wednesday							
# of TDs submitted				52											
# of TDs not to be presented				3											
# of TDs to be scheduled				0											
# of TDs scheduled already				49											
Start time				Room				Room							
Hours				M1 9:00 - 11:00				M1 9:00 - 11:00							
Sessions				D1M15H				D2M15H				D3M15H			
TD number or other				MC Plenary				WG1				LT			
TD number or other								mmW&THz				IoT			
TD number or other								RRM				Groups			
TD number or other								44				6			
TD number or other								19				8			
TD number or other								25				23			
TD number or other								46				42			
TD number or other								DISC				26			
TD number or other								Book (3)				Book (LT)			
TD number or other															
Coffee Break				11:00-11:30				11:00-11:30				11:00-11:30			
Sessions				M2 11:30 - 13:00				M2 11:30 - 13:00				M2 11:30 - 13:00			
TD number or other				D1M25H				D2M25H				D3M25H			
TD number or other				Technical plenary				WG1				Invited talk			
TD number or other								RA+WG3				MC Plenary			
TD number or other								Models							
TD number or other								NR & Nets							
TD number or other								32							
TD number or other								37							
TD number or other								38							
TD number or other								47							
Lunch				13:00-14:00				13:00-14:00				13:00-14:00			
Sessions				A1 14:00 - 15:45				A1 14:00 - 15:45				Lunch 13:00-14:00			
TD number or other				D1A15H				D2A15H				End of Meeting			
TD number or other				t+2				WG1				Cancelled			
TD number or other				PHY				IoT-H				17			
TD number or other				MNs&Spectrum				Body comms				18			
TD number or other				2				Topic				51			
TD number or other				31				30							
TD number or other				27				16							
TD number or other				45				7							
TD number or other				14				DISC							
TD number or other				Book (1)				33							
TD number or other								Book (IoT-H)							
Coffee Break				15:45 - 16:15				15:45 - 16:15							
Hours				A2 16:15 - 17:45				A2 16:15 - 17:45							
Sessions				D1A25H				D2A25H							
TD number or other				WG1 (+3)				OTA							
TD number or other				Tools				IoT (+LT)							
TD number or other				PHY				IoT Radio							
TD number or other				4				1							
TD number or other				10				50							
TD number or other				28				20							
TD number or other				21				9							
TD number or other				13				35							
TD number or other				DISC				3							
TD number or other				24				Book (IoT)							
TD number or other				Book (2)				Book (OTA)							
End time				17:45				Newsletter (WG Chairs)							

He also stressed that the WG discussions should address the following topics:

- Next deliverables (Spring 2019)
- Training School proposals/topics for 2019 and beyond
- Joint activities with H2020 projects
- Tutorial offers for upcoming meetings
- **Final book chapter sections + section editors**
- Joint activities (experiments, papers, etc.)
- Short Term Scientific Missions among participant institutions
- Any other idea to foster the dissemination of the Action ?

DAY 3 – 3 OCT 2018

The Management Committee Meeting resumed on Friday at 11:15 am.

Returning to the application of the École de Technologie Supérieure (ETS), the Chair asked the MC to express their opinion and called a vote:

Does anyone oppose ETS joining IRACON? [The unanimous response was NO](#)

10. Final book

The Chair provided an update on the preparation of the Action's final book, which is a report on the TDs presented throughout the 4 years.

During the Podgorica meeting the Table of Contents will be frozen, with an estimate of 40 pages per chapter, and the section editors will be identified.

Before October 30 the Chair will distribute templates (latex).

The first draft of the book must be ready by April 2019.

A few possible publishers were mentioned (Rivers, Elsevier, Cambridge, Wiley, Springer, etc.); the actual search for a publisher will start after the meeting.

The Chair informed the attendees that he is available as book editor and that a few more editors must be identified as well.

WG Chairs/Leaders were asked to discuss about the book's structure during the 3-day meeting and to allocate the TDs in the different sections.

It was reported that, according to Rivers (which had produced the book of the previous Action IC1004), people mostly bought separate chapters rather than the whole book, therefore chapters must have captivating titles and be somehow independent.

The draft Table of Contents was then presented:

1. Introduction

2. Propagation channel modelling methods and tools

2.1 Radio propagation environments

2.2 Channel modelling approaches

2.3 Algorithms for estimation of radio channel parameters

3. IRACON measurements and channels

3.1 Measurements of electric properties of materials for channel simulators

3.2 Measurement scenarios

3.3 Measurements and estimation of channel parameters in the mm wave and THz bands

3.4 MIMO channels

3.5 High speed channels

4. OTA

- 4.1 Field emulation for electrically large test objects – Pekka Kyösti
- 4.2 Emulation of mmWave channels – Moray Rumney
- 4.3 Emulation techniques for testing hardware internals – Wim Kotterman

5. Coding and processing for advanced wireless networks

- 5.1 Advanced waveforms, coding and signal processing – Andreas C., Laurent C.
- 5.2 Distributed and cooperative PHY processing in wireless networks – Alister B., Jan S.
- 5.3 Massive MIMO – Fredrik Tufvesson
- 5.4 Implementation and HW driven solutions and full duplex communications – Mark Beach, T. Werner

6. 5G and Beyond Networks

- 6.1 Introduction – Silvia + Hamed
- 6.2 Wireless connectivity – Gordana, ... (Yoram ?)
- 6.3 Spectrum management and sharing – Konstantinos, Fernando (+ Paolo, Valeria ?)
- 6.4 Scheduling and RRM – Arie, ?
- 6.5 5G platforms – Florian + WG2
- 6.6 HetNet and UDN – Fernando, Rui Paulo
- 6.7 CRAN – Luis + EWG2
- 6.8 SDN and NFV – Behnam, Hamed
- 6.9 UAVs – Chiara (+ Margot ?)
- 6.10. Application domains and solutions – Haibin

8. IoT Chapter

- 8.1 Low Power Wide Area Networks – Luca Feltrin (UniBO), Laurent Clavier (ULILLE)
- 8.2 Routing and MAC Protocols for IoT – Gordana Gardašević (UNIBL), ??
- 8.3 Vehicular Communications – Erik Strom (Chalmers), Thomas Blazek (TU Wien)
- 8.4 Energy Efficient/Constrained Solutions for IoT – Lazar Berbakov (PUPIN), Carles Anton (CTTC)
- 8.5 Software Defined Networking and Virtualization for IoT – Chiara Buratti (UniBo), ??
- 8.6 Special Applications of IoT – Piotr Rajchowski (GUT), Haibin Zhang (TNO)

9. IoT Health Chapter

- 9.1 Nano-communications – Paweł Kułakowski
- 9.2 Wearable and implantable IoT-Health Technology
 - Channel measurements, modelling and antennas – Krzysztof K. Cwalina, Kenan Turbić
 - Human body phantoms and SAR measurement – Conchi Garcia-Pardo
- 9.3 IoT-Health Networking and Applications – Gordana Gardašević, Konstantinos Katzis

10. Localization and tracking

- 10.1 Introduction – Carles Anton and Klaus Witralsal
- 10.2 Measurement acquisition, modeling, and performance limits – Wout Joseph
- 10.3 Positioning methods, data fusion, and tracking
- 10.4 Channel modeling and multipath exploitation
- 10.5 System study, system-level performance analysis and performance limits
- 10.6 Testbed and prototyping activities – Carles Anton and Klaus Witralsal

11. Future MCMs and Workshops

The Chair reviewed the next meetings that will be organised within the Action:

- **9th IRACON MC/technical meeting and workshop (?)**
 - ✓ DCU Dublin (EI), 16-18 January 2019
 - ✓ Organizer: Conor Brenan
- **10th IRACON MC/technical meeting and workshop (?)**
 - ✓ Spring 2019
 - ✓ Detailed offer received so far from U Oulu/Keysight (FI), 27-29 May 2019
 - ✓ Initial offer from JCT/Tel-Aviv/Jerusalem (IL)
- **11th IRACON MC/technical meeting and third workshop (?)**
 - ✓ Proposed dates: 4-6 Sep 2019
 - ✓ Gdansk University (PL)
 - ✓ Organizer: Slawomir Ambroziak
- **12th (final) IRACON MC/technical meeting and 4th workshop (?)**
 - ✓ Early 2020 (before March 22)
 - ✓ Offers from Belgium (UCLouvain and/or UGent)

The audience was asked to choose a location, between Oulu, Finland, and Tel-Aviv, Israel, to host the 10th MC & WG meeting.

A vote was taken: [Oulu was approved by the majority](#)

12. Reports from Working Group Chairs

DWGs

1. Sana Salous and Katsuyuki Haneda reported about the activities carried out within WG-1 (radio channels)
2. Hanna Bogucka and Jan Sykora reported about the activities carried out within WG-2 (PHY-MAC)
3. Silvia Ruiz and Hamed Ahmadi reported about the activities carried out within WG-3 (NET)

EWGs

1. Wim Kotterman and Moray Rumney reported about the activities carried out within WG-OTA
2. Erik Ström and Chiara Buratti reported about the activities carried out within WG-IoT
 - ✓ Slawomir J. Ambroziak and Kamran Sayrafian reported about the activities carried out within SWG IoT-Health
3. Carles Anton and Klaus Witrissal reported about the activities carried out within WG-LT
4. Florian Kaltenberger and Mark Beach reported about the activities carried out within WG-RA

13. Liaisons with International Bodies, Standards and Projects

The Action is involved with several international bodies and other projects:

- **3GPP** – Aki Hekkala
- **URSI** – Sana Salous
- **ITU-R** – Sana Salous and Belen Montenegro
- **H2020 5G-XCAST** – Narcis Cardona
- **H2020 5G X-haul** – 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-EVE** – Florian Kaltenberger

14. AOB

The Chair reminded the upcoming deadlines and action points:

UPCOMING MEETINGS IN 2019

- **9th IRACON MC/technical meeting**
 - ✓ DCU Dubin (EI), 16-18 January 2019
 - ✓ Organizer: Conor Brennan
 - ➔ **book your flight early**

- **10th IRACON MC/technical meeting + workshop (?)**
 - ✓ U Oulu/Keysight (FI), 27-29 May 2019
 - ✓ Organizers: Janne Lehtomäki, Pekka Kyosti

- **11th IRACON MC/technical meeting + joint workshop with RECODIS (?)**
 - ✓ Gdansk University (PL), 4-6 Sep 2019
 - ✓ Organizer: Slawomir Ambroziak

FOLLOW-UP ACTION

Ideally, the proposal for a follow-up action should be submitted in Sep 2019, therefore internal proposals should be ready by June 2019.

Anyone with ideas for a new action *framework* was invited to send an email to the Chair before 15 November 2018.

Anyone willing to participate in the writing OR reviewing of the proposal should also send an email to the Chair before 15 November 2018.

Anyone interested in chairing the new action should send an email to the Chair at any time (open call).

15. Close of Meeting

ACTION POINTS

AP	WHAT	WHO	WHOM	WHEN
9/1	Submit reimbursement forms	Those entitled to	e-cost	Oct 14
9/2	Send Minutes of Group Meetings	Group Chairs	Chair + Secretary	Oct 14
9/3	Send STSM Applic.	Those interested	e-cost + Training Chair	Open call
9/4	Send ITC Conf. Grant Application	ITC ECIs	e-cost + Action Chair	Open call
AP	WHAT	WHO	WHOM	WHEN
9/5	Register to 9th MCM	Attendees	Website	Dec 17
9/6	Request TD number	Authors	Website	Dec 17
9/7	Submit TD	Authors	Website	Jan 8

List of Annexes

Annex 1- Agenda

Annex 2- Chair's Presentation

Annex 3- List of persons entitled for reimbursement

Annex 4- TDs list

Annex 5- TDs Schedule

Annex 6- Attendance lists

Annex 7- WGs Minutes

Annex 8- report on WIBEC