

Louvain-la-Neuve, Belgium, 27-29 January 2020

SUBJECT | Minutes of the 12th Management Committee Meeting of COST Action CA15104 “Inclusive Radio Communication Networks for 5G and beyond (IRACON)”

MONDAY, 27 JANUARY 2020, 9:00 AM

1. Welcome to participants

Prof. Claude Oestges, Chair of the Action, opened the meeting on Jan 27th, 2020 at 9.00 am. As Local Organizer of the event he also welcomed the participants and provided information about the local arrangements.

He then acknowledged the fulfilment of the quorum, i.e. at least two thirds of the COST countries participating in the Action were represented at the 12th MCM.

2. Adoption of agenda

The Chair presented the agenda of the 12th MCM, which had been previously circulated online. The Agenda was adopted without modifications.

The Chair took the opportunity to remind all participants to sign the official COST Attendance List for every day of attendance and to sign only once the attendance list of every WG/EWG session attended. No reimbursement of travel expenses (for those entitled to) will be processed if the COST attendance list is not duly signed.

Finally, the attendees were informed that the Newsletter Meeting, involving the Members of the steering committee, will take place on Monday at 5:45 pm in Room BARB 03.

3. Approval of minutes and matters arising from last meeting (MCM11 - Gdansk, Poland)

With no further comments from the attendees, the minutes of the 11th MC Meeting, previously circulated online, were officially approved.

4. Status of the Action

The Chair moved on to update the audience on the overall status of the Action. Since the last meeting in Gdansk, no new Partners have joined IRACON.

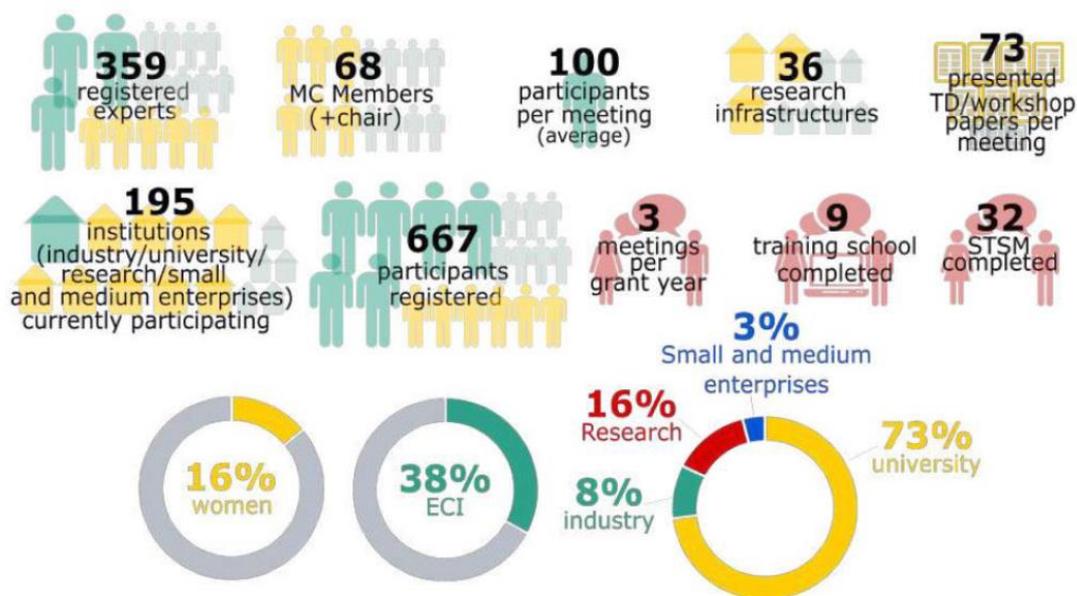
Here below the main figures presented:

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: **13** approved and activated

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
ETS	Canada



The Chair went on to summarise the most recent events that took place within the Action, namely:

September 2019

11th MCM (Gdansk, 4-6 Sep 2019)

Organized by Slawomir Ambroziak, Gdańsk University of Technology

55 TDs

2 invited speakers, including one from COST Action RECODIS

95 participants

October 2019

8th IRACON Training School: Network Models, Architectures and Applications for 5G (Moscow, Russia, 7-11 Oct 2019)

22 participants

10 IRACON grants

October 2019

COST Academy, *Working with the Media* (Brussels, 16 Oct 2019)

IRACON represented by Luis Correia

November 2019

9th IRACON Training School: New radio access techniques enabling advanced video applications in 5G (Madrid, Spain, 20-22 Nov 2019)

33 participants

8 IRACON grants

November 2019

COST Connect *Actions for Standards* (Brussels, 28-29 Nov 2019)

IRACON represented by Claude Oestges

January 2020

12th MCM and Final Workshop (Louvain-la-Neuve, 27-29 Jan 2020)

47 TDs

4 invited (industrial) speakers

111 participants

February 2020

Invited talk on *IRACON Dissemination* at COST CA15223 iPlanta (Athens, 25 Feb 2020)

IRACON represented by Luis Correia

March 2019

COST Connect *Climate Neutral and Smart Cities* (Brussels, 18-19 March 2019)

IRACON represented by Vasos Vassiliou (CY)

A number of events will take place after the end of IRACON, including:

SPECIAL SESSIONS

EuCAP 2020 (Copenhagen, March 2020)

- Joint AMTA/IRACON Session: Over-The-Air Testing of 5G Radios
- Joint IET/IRACON Session: Propagation Measurements and Modelling for 5G and Beyond
- IRACON Session: Spectrum Sharing: Challenges and Opportunities for 5G and Beyond

URSI GASS 2020 (Rome, August 2020)

- IRACON Session: Measurement & Modelling of Radio Waves Propagation in Body Area Networks
- IRACON Session: Channel Measurements, Characterization and Verification through Electromagnetic Metrology and Measurement Post Processing
- IRACON Course on 5G

WORKSHOPS

EuCAP 2020 (Copenhagen, March 2020)

- COST CA15104 (IRACON): Measurements and Simulations in Channel Modelling in Wireless Body Area Networks

ICC 2020 (Dublin, June 2020)

- IoT-Health 2020: Third International Workshop on IoT Enabling Technologies in Healthcare

SPECIAL ISSUES

Radio Science

- Radio Channel Modelling for 5G Millimetre Wave Communications in Built Environment

Applied Sciences Journal

- Human Exposure in 5G and 6G Scenarios

TRAINING SCHOOL

DolCom 2020 (Canazei, June 2020)

- Summer Workshop and School on Radio Communications in the Dolomites
- Organized by EURACON

Prof. Verdone, EURACON Chair and organiser of DolCom 2020, spent a few words on this training school / workshop and invited the attendees to register and participate.

Being this the last MC Meeting of the Action, the Chair recalled the 4 ECI Representatives that were nominated during the 4 years of IRACON.

- Margot Deruyck (BE) was elected for Y1
- Luca Feltrin (IT) was elected for Y2
- Conchi Garcia Pardo (ES) was elected for Y3

- Piotr Rajchowski (PL) was elected for Y4

Margot Deruyck and Piotr Rajchowski, who were attending the meeting, briefly recounted their experience and how it impacted positively on their career, giving them the opportunity to get in touch with a lot of new colleagues.

Prof. Oestges took the chance to thank the ECI Representatives for their great work in coordinating and producing the IRACON Newsletters, for which they were responsible. Dr Ralph Stuebner, Science Officer of the Action, also shared his appreciation for the Newsletters and told the attendees that he often used them as a good example to show to the other Actions.

5. Review of action deliverables

The Chair updated the participants on the status of the technical deliverables, all of which have been completed, apart from number 10, i.e. the Final Book.

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 summarizing the achievements of every WG in the overall Action (draft book) → **all WGs**

Final Book

Prof. Oestges focused particularly on **Deliverables 10**, the final book. The production of the book is on schedule and the final chapter will be completed in the coming month by Prof. Claude Oestges and François Quitin, the book editors.

As the content of the book cannot be published online individually, the Chair suggests publishing initially a *teaser* on iracon.org, including the introduction chapter and the table of contents, and later forwarding to the open-access version of the book.

He then reviewed the timeline of the deliverable:

- During Cartagena meeting, each WG discusses about a list of sections
- After Cartagena 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 May 2019
- The second draft is ready by Sep 2019
- The graphs are made copy-right free
- The TDs are mapped to papers when existing
- The final draft is ready by Jan 2020 (the book will **not** include TDs from the final meeting)

The updated Table of Contents is as follows:

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

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

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

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

Final Action Report

The Chair went on to talk about the Final Report of the Action, highlighting the information that have already been collected (in **green**) and those that still need contributions from the participants (in **red**).

□ Deliverables

□ Additional Outputs

Action Publications → send your publications using DOI on the Google sheet provided by Alice

Proposals/Projects → send your contributions on the Google sheet provided by Alice

Other Outputs: white papers, etc.

□ Impacts

Advances in careers, skills and network of researchers

Which of the stakeholders described in the Action's MoU have been engaged and how? What additional stakeholders have been, or will be, engaged and how?

❑ **Dissemination**

Meetings

Other Activities: special sessions, workshops, etc.

Exploitation

❑ **Action Successes**

→ Send Alice and Claude your success stories

6. Final Report from the Grant Holder

Prof. Roberto Verdone, Grant Holder (GH) of the Action, showed the **Work and Budget Plan for Year 4**, including the top-up of € 15,035.69 received from COST:

Networking Tool	Quantity/Description	Budget
Meetings	3 MCMs	127,655.75 EUR
Training Schools	3 TSs	15,968.76 EUR
STSMs	5 STSMs	6,000.00 EUR
ITC Conference Grants	2 conference grants	600.00 EUR
Other Expenses Related to Scientific Activities	Bank fees	1,546.00 EUR
Total Science Expenditure		151,770.51 EUR
Financial and Scientific Administration and Coordination (MAX. 15%)	15 %	22,765.58 EUR
Total Grant		174,536.09 EUR

He then presented the current **Status of expenditures**.

Steps	Budget
Total budget for science	151,770.51
1st Instalment received (Aug '19) - 50% of the pre top-up budget	79,750.20
2nd Instalment received (Dec '19) - 35% of the pre top-up budget	55,825.14
Budget for Science	117,891.60
Meeting Oulu - reimbursed	51,316.33
Meeting Gdansk - reimbursed	38,459.44
Training School ESoA/IRACON Cesenatico	0.00
Training School Moscow - reimbursed	10,268.76
Training School Madrid - ongoing reimbursement	5,107.19
STSMs (5) - reimbursed	5,800.00
ITC Conference Grants (1) - reimbursed	600.00
Bank fees / OERSA (approx.)	940.50
Total spent	112,492.22
Current Balance	5,399.38
Estimated cost of Louvain-la-Neuve (approx. 54 reimburs. + bank fees)	46,300.00
Expected final expenditure	158,792.22
Expected balance on 21 March 2020 (approx.)	-7,021.71

As shown on the table, by estimating the number of participants in the last meeting and consequently the total amount to be reimbursed, a negative final balance of about 7K€ is expected. This might mean that the GH will not be in the condition to reimburse the participants 100% of their claim, but approximately an 85%. Of course, these figures will only be confirmed once all the claims have been submitted and processed by the GH Manager.

Having assumed a negative balance, the GH pre-alerted the eligible participants ahead of the meeting about the possible partial reimbursement, to allow them to find alternative funding sources, should this situation actually occur.

7. COST Innovators' Grant

Prof. Chiara Buratti illustrated the CIG proposal that she is coordinating on behalf of the IRACON MC Members.

- The partners involved are: UniBO, CNIT, UoOulu, UoLille, CTTC, INSA
- Grant Period: May 1, 2020 – April 30 2021
- Aims: Set-up a Business Plan, IMMUNet TRL increasing
- Networking Tools: STSMs, Meetings
- Submission Deadline: January 31st

As the submission deadline is January 31st, the MC Members will soon be requested to express their explicit approval via email.

8. Keynote Presentation

The keynote speaker Lahatra Rakotondrainibe from Thales Belgium made a presentation on “5G, a novel opportunity for smart transportation systems”.

9. Presentation and Discussion of Technical Documents

After the keynote, Prof. Oestges informed the audience that a total of **47 TDs** will be presented during the Working Group meetings. As anticipated, these TDs will not be included in the final book for a matter of time.

He also stressed that Working Group discussions should include:

- Final book
- Success stories
- Joint activities after IRACON (experiments, papers, etc.)

The schedule of the technical presentations is as follows:



	Monday			Wednesday		
	BARB94	BARB93	BARB01	BARB94	BARB93	
Start time	09:00			09:00		
Hours	9:00 - 10:45			9:00 - 10:45		
Sessions	MC Plenary (Room BARB 94)			WG1	WG2+3+RA	
TD number				Stat. mod.	RA	
TD number				36	16	
TD number				23	38	
TD number				25	46	
TD number				26	47	
TD number	30	DISC				
Coffee Break	10:45-11:15			10:45-11:15		
	11:15 - 13:00			11:15 - 13:00		
Sessions	WG1	WG2	WG3	MC Plenary (Room BARB 94)		
TD number	mmW	Perf. sim.	NET			
TD number	31	1	10			
TD number	33	13	27			
TD number	34	20	39			
TD number	35	11	40			
TD number	37	DISC	DISC			
Lunch	13:00-14:00			13:00-14:00		
	14:00 - 15:45			End of Meeting 14:00		
Sessions	WG1	WG2	OTA			
TD number	V2V-UAV	PHY	Ant. + CS			
TD number	19	8	17			
TD number	2	45	29			
TD number	3	12	22			
TD number	24	21	18			
TD number	DISC	42				
Coffee Break	15:45 - 16:15					
Hours	16:15 - 17:45					
Sessions	WG1	IoT-IoTH	LT			
TD number	RT	IoT	Loc			
TD number	5	28	6			
TD number	9	32	14			
TD number	15	43	41			
TD number	7	DISC	44			
TD number	4		DISC			
End time	17:45					

The Chair then shared the programme of the Final Workshop, taking place on Tuesday Jan 28th.

Session 1: Future Internet-of-Things and its Applications (9:00-10:45)

- *IoT for Health: The Communication Infrastructure for a Pervasive Healthcare Environment*, Kamran Sayrafian (NIST, USA)
- *Future Internet of Things: Building Intelligent Environments*, Chiara Buratti (Uni. Bologna, Italy)
- *Quo Vadis, Wireless: An Industrial Automation Perspective*, Ognjen Dobrijevic (ABB, Sweden)

Session 2: PHY Layer and Cellular Radio: Trends and Challenges (11:15-13:00)

- *The Intelligent Distributed Physical Layer*, Alister Burr (Uni. York, UK), Jan Sykora (Czech Technical University, Czech Republic), Laurent Clavier (IMT Lille-Douai, France)
- *Cellular Radio Mobility Standards and Future Challenges for Propagation Research and Radiated Test Methods*, Moray Rumney (Rumney Telecom)

- *5G Testbeds and Trials, Mark Beach (Uni. Bristol, UK)*

Session 3: Intelligent Radio Networks (14:00-15:45)

- *Research Challenges and Technologies for Future Radio Network Layer, Silvia Ruiz (UPC, Spain)*
- *Connected Humans in 2030 Society, Narcis Cardona (UPValencia, Spain)*
- *Wireless Networks Empowered by Reconfigurable Intelligent Surfaces, Marco di Renzo (Supelec, France)*

Session 4: Smart Mobility and Positioning (16:15-18:00)

- *Radio Channel Modeling for Automotive Radar, Tommi Jamsa (Huawei, Finland)*
- *Cooperative, Connected and Automated Mobility (CCAM) – Challenges and Technical Enablers, Maciej Muehleisen (Ericsson, Germany)*
- *Positioning for 5G Wireless Systems and the Internet-of-Things, Klaus Witrissal (TU Graz, Austria)*

WEDNESDAY, 29 JANUARY 2020, 11:15 AM

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

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

The Training Manager, Prof. Laurent Clavier, provided an overview of the Training Schools that have been organised during the Action:

- 9 training schools organized
- 8 Countries (Belgium, France, Germany, Italy, Portugal, Russia, Spain (x2), UK)
- 349 trainees - 94 grants for trainees, 26 trainer's reimbursement
- Total cost for the action: **€ 70,289**
 - We favoured grants to a maximum number of countries – all TS were attended by people from many countries
 - The only criterion was 1st arrive first serve with the basis of 1 per country
- Various sizes of training schools – from 20 to 80 trainees, from 3 to 5 days.
- Five of them were joint (with ESoA (x2), MET5G, VTS Portugal Chapter, WIBEC)
- + 1-day Training Workshop on «Wireless Medical Devices» (with WIBEC ITN)

The topics addressed by the training schools have been the following:

- **New radio access techniques enabling advanced video applications in 5G**
- **Network Models, Architectures and Applications for 5G**
- *Mobile radio propagation for 5G and beyond*
- **Machine and Deep Learning Techniques for (Beyond) 5G Wireless Communication Systems**
- **ISP-IoT – Information Theory and Signal Processing for Internet of Things**
- **Defining and Realising SINR in Future Mobile Networks**
- **Beyond 5G Networks operating in the Millimetre Wavebands enabled by Joint Analogue-digital Signal Processing**
- **Large Scale Radio Propagation**
- **Antennas and Propagation Modeling for Body Environment Communications**

Prof. Clavier presented then an overview of the Short-Term Scientific Missions (STSMs) that have taken place throughout the Action:

37 STSMs covering many topics, many institutions, many countries – for a total budget of **€ 43,660**.

To find out whether the STSMs tool was efficient, Prof. Clavier sent an email to all those who performed one STSM within IRACON and he received 19 replies. This is the information he could gather from the replies:

- 14 applicants presented a TD after their mission
- 11 were significantly active in the action after their mission (they attended several meetings)
- 14 conference papers, 5 Journals + 5 in preparation
- 16 collaborations are continuing (the main reason why some have stopped is that the PhD moved to industry)
- Budget: the upper limit is not always sufficient

11. Final Report from Dissemination Manager

The Dissemination Manager, Prof. Luis Correia, reviewed the Dissemination Actions that took place, namely:

DISSEMINATION ACTIONS: SOCIAL MEDIA

- **Leaflet**
 - Goal: high-level introduction of the Action
 - Updated after each meeting
- **Newsletters**
 - All issues available at 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

In the next part the Dissemination Manager presented the status on the Dissemination and Exploitation actions that were presented in the Action proposal and that were required in general.

The following Colour Code is used for status:

- **Not done**
- **Partially done**
- **Done**
- **No longer valid**
- **General Statements**

DISSEMINATION IN COST

- *“dedicated dissemination and exploitation activities targeting small and medium-sized enterprises (SMEs) and companies in Europe.”*
- Dissemination is one of the 4 “Networking Tools” to be used to reach the Objectives.
- Together with Exploitation, it’s part of the Measures to Maximise Impact.
- The Research Coordination Objectives identifies:
 - *“Dissemination of research results to the general public”*
 - *“Dissemination of research results to stakeholders (excluding specific input in view of knowledge application, as per objective)”*

DISSEMINATION IN IRACON

- Organisation of Training Schools, with IRACON lecturers, which are open to the community at large.
- Joint organisation of Training Schools, with lecturers from IRACON and from other Actions and H2020 R&D projects, open to the scientific community at large.
- Establishment of strategic liaisons and joint activities (e.g., joint meetings and workshops) with other COST Actions and H2020 R&D projects in this area.
- Organisation of topic specific Special Sessions and Workshops in conferences, namely EuCNC, but extending to key IEEE ones, such as ICC, GLOBECOM, PIMRC, and WCNC, and URSI GA.
- **Presentation of IRACON in EC Coordination Meetings, reaching projects in the same area.**
- Active participation in COST supervised and organised activities and events.
- Issue of an Action Leaflet, by the beginning of activity, explaining the key aspects of IRACON, to be distributed to stakeholders.
- Issue of:
 - a Quarterly Newsletter, with key news from IRACON, addressing major technical and scientific developments, and announcing future activities and events;
 - White Papers, with the views of IRACON on the future development and research challenges in wireless communications, focusing on its specific areas.

Prof. Correia pointed out that as there are not many COST Actions in the field covered by IRACON, it was not easy to establish liaisons and joint activities with other projects.

EXPLOITATION IN IRACON

- To set up consortia with some of its members for the proposal of projects within H2020.

- To develop models and methods coming from the joint work developed within the Action, to be published in the proper means (e.g., scientific journals, but not exclusively).
- To foster the conditions to submit contributions on models and methods to standardisation bodies, jointly with industry, towards the conclusion of the Action.
- To foster the creation of a confederation of experimental environments in research labs, so that experimentation can be made available to other research groups (in both academia and industry) as well as SMEs (e.g., to evaluate solutions before reaching the market) within the Action.
- To use the knowledge created in the Action by many of its members in teaching at graduate and post-graduate levels.
- To edit a book at the end of the Action, with its main results, to be published by a commercial company in the area of R&D.

THE PLAN

- *“Dissemination and training will be supervised by the Dissemination Manager and the Training School Coordinator,”*
- *“each WG will deliver one annual report on achievements”*
- *“each WG will be responsible for the organisation of one tutorial (tutorials will be organised in conjunction with MC meetings)”*
- *“each WG will be responsible for the organisation of one training school;”*
- *“all WGs will also organise workshops and special sessions in international conferences and contribute to WG- and Action-level white papers.”*

Project Year			1			2			3			4		
Project Quadrimester			1	2	3	4	5	6	7	8	9	10	11	12
WG / Task	Start	End												
Dissemination	1	12												
White Paper	1	9					WP.1			WP.2				
Recomm. & Stds	10	12												RS
STSMs	3	12												
Contact Research.	1	9												
List Grad Sch.	1	3												
Joint Meetings	1	12			JM.1		JM.2			JM.3				JM.4
Sp. Sess. & Works.	1	12		SW.1			SW.2			SW.3			SW.4	
Coord. Meetings	1	12			CM.1			CM.2			CM.3			CM.4
Newsletter	1	12	NL.1	NL.2	NL.3	NL.4	NL.5	NL.6	NL.7	NL.8	NL.9	NL.10	NL.11	NL.12
Book	8	12								B.1		B.2	B.3	B.4

OTHER ACTIONS

- To establish liaisons to other Bodies (Actions, Projects, Working Groups, etc.), and to report on it both ways.
- To organise joint activities with other Actions, Projects, Working Groups, etc.

- To invite Keynote Speakers from relevant projects, industries, and so on, to our meetings.
- To promote the publication of joint papers within ourselves, in journals, conferences, workshops, etc.
- To circulate the Newsletter among the liaisons, within our organisations, etc.
- To send the Newsletter to our Scientific Officer (and Rapporteurs!?), and to provide him with further news.
- To have the website always update, and to include frequent updates in it.
- To use Social Media (LinkedIn Group, Facebook, Instagram, Twitter, etc.) in order to foster international visibility.
- To make available several platforms on specific topics that will allow testing new solutions in real conditions.
- A list of the research groups in Europe with activity in the area of the Action will be established and invited.
- A list of the Graduate Schools (i.e., universities awarding a Ph.D. degree) in Europe with activity in the area of the Action will be established, so that the Action can reach Ph.D. students for its Training Schools.
- The Action will be presented to the Networld2020 ETP and the 5G-PPP.

12. Reports from Working Group Chairs

The WG Chairs reported about the activities carried out and the TDs presented during the technical sessions of their Working Group.

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

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

13. Liaisons with International Bodies, Standards and Projects

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

- **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
- **MINTS** – Fredrik Tufvesson

14. AOB

The Chair reminded the attendees to fill out the survey received via email from COST.

15. Close of Meeting

Before closing the Meeting, the Chair reminded the attendees about the upcoming deadlines and Action Points:

AP	WHAT	WHO	WHOM	WHEN
12/1	Submit reimbursement forms	Those entitled to	e-cost	Feb 14
12/2	Send Minutes of Group Meetings	Group Chairs	Chair + Secretary	Feb 14
12/3	Send final report inputs on google docs	All	Chair + Secretary	March 20



List of Annexes

Annex 1- Agenda

Annex 2- Chair's Presentation

Annex 3- List of persons entitled for reimbursement

Annex 4- List of TDs

Annex 5- TDs Schedule

Annex 6- Attendance lists

Annex 7- WGs and Liaisons Reports