12th Management Committee Meeting
Louvain-la-Neuve, Belgium
Jan 27-29, 2020

Claude Oestges
ICTEAM
Université catholique de Louvain
2. Adoption of the Agenda

1. Welcome to participants
2. Adoption of agenda
3. Approval of minutes and matters arising of last meetings (MCM11)
4. Status of the Action and upcoming events
5. Review of action deliverables, final Action Report (e-cost), final book
6. Final Report from the Grant Holder
7. COST Innovators’ Grant
8. Keynote Presentation
9. Presentation and Discussion of Technical Documents
10. Final Report from Training Manager (STSMs, Training Schools and Tutorials)
11. Final Report from Dissemination Manager
12. Reports from Working Group Chairs
13. Liaisons with International Bodies and Projects
14. AOB
15. Close of Meeting
2. Adoption of the Agenda

Quorum verification

Any change to the agenda?

ATTENDANCE LISTS
Please sign the attendance list for the day(s) you are present
(ONE DAY AT A TIME !)

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? Monday at 5:45 pm
Where? room BARB 03
3. Approval of MCM 11 minutes

Any comment on MCM11 minutes?

Gdansk, Poland, 4-6 September 2019

Subject | Minutes of the 11th 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, 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
4. Status of the Action

Facts and Figures (October 2019)

- 359 registered experts
- 68 MC Members (+chair)
- 100 participants per meeting (average)
- 36 research infrastructures
- 73 presented TD/workshop papers per meeting
- 195 institutions (industry/university/research/small and medium enterprises) currently participating
- 667 participants registered
- 3 meetings per grant year
- 9 training school completed
- 32 STSM completed

- 16% women
- 38% ECI
- 8% industry
- 16% Research
- 3% Small and medium enterprises
- 73% university
4. Status of the Action

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
4. Status of the Action

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
4. Status of the Action

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)
4. Status of the Action

Special Sessions (taking place after the end of IRACON)

**EuCAP 2020** (Copenhague, 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 (taking place after the end of IRACON)

**EuCAP 2020** (Copenhague, 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
4. Status of the Action

Special Issues (taking place after the end of IRACON)

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

Applied Sciences Journal
- Human Exposure in 5G and 6G Scenarios
4. Status of the Action

Training School (taking place after the end of IRACON)

DolCom 2020 (Canazei, June 2020)

- Summer Workshop and School on Radio Communications in the Dolomites
- Organized by EURACON
4. Status of the Action

My life as an ECI Representative

- 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
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
5. Deliverables

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
5. Deliverables

Deliverable 10

The content of the deliverable is the book, which cannot be published online on our own

→ My suggestion is to publish a *teaser* on iracon.org for the moment
  - Introduction chapter (CO, FQ)
  - ToC

... and later, to forward to the open-access version of the book
Timeline

- 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 copyright 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)

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
Final Report

- **Deliverables**

- **Additional Outputs**
  - Action Publications → send your publications using doi (Alice will create a google sheet)
  - Proposals / Projects → send your contributions (Alice will create a google sheet)
  - Other Outputs: white papers, etc.

- **Impacts**
  - Advancing the 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?
Final Report

- **Dissemination**
  - Meetings
  - Other Activities: special sessions, workshops, etc.
  - Exploitation ?

- **Action Successes**
  - Send Alice and Claude your success stories
## 6. Report from the Grant Holder

### Grant Holder
**cnit**

### Secretary
Miss Alice Baldini

**Work and Budget Plan for Y4 (Top-up: 15,035.69 EUR)**

<table>
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<tr>
<th>Networking Tool</th>
<th>Quantity/Description</th>
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<td>Meetings</td>
<td>3 MCMs</td>
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<td>Training Schools</td>
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<td>STSMs</td>
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<td>Other Expenses Related to Scientific Activities</td>
<td>Bank fees</td>
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**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
## 6. Report from the Grant Holder

### Grant Holder

| cnit |

### Secretary

| Miss Alice Baldini |

## Status

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<td>1\textsuperscript{st} Instalment received (Aug ‘19) - 50% of the pre top-up budget</td>
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<td>STSMs (5) - reimbursed</td>
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<td>Bank fees / OERSA (approx.)</td>
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<td><strong>Expected final expenditure</strong></td>
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<td>Expected balance on 21 March 2020 (approx.)</td>
<td><strong>-7,021.71</strong></td>
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CIG Proposal

- CIG Partners: 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: STSM, Meetings
- Submission Deadline: January 31st – IRACON MC Members will be requested to approve the proposal
There are 47 TDs to be presented

(these TDs will not be included in the final book, as already agreed)

Working Groups discussions should include

• Final book
• Success stories
• Joint activities after IRACON (experiments, papers, etc.)
# 9. Presentation and Discussion of TDs

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<th>Start time</th>
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<td>End time</td>
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**MC Plenary (Room BARB 94)**
9. Workshop Program (Jan 28, 2020)

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)

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 Witrisal (TU Graz, Austria)
Invited speaker

- Dr. Lahatra Rakotondrainibe, Thales Communications Belgium
  - 5G, a novel opportunity for smart transportation systems
Management Committee Meeting resumes on Wednesday at 11:15 am
Training Schools

9 training schools organized

8 Countries (Belgium, France, Germany, Italy, Portugal,Russia, Spain (x2), UK)

349 trainees - 94 grants for trainees, 26 trainers reimbursement

Total cost for the action: 70289 €

• We favored grants to a maximum number of countries – all TS were attended by people from many countries

• The only criteria 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)
10. Report from Training Manager

- 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
37 STSMs – 43660€
- Covering many topics, many institutions, many countries

Efficient? 10 days ago, I sent an email to all those who performed one STSM …

- 19 replies
  - 14 applicants presented a TD after their mission
  - 11 were significantly active in the action after their mission (attended several meetings)
  - 14 conference papers – 5 Journals + 5 in preparation
  - 16 collaborations are continuing (the ones who stopped is generally due to PhD moving to industry)
  - Budget… it depends: the upper limit is not always sufficient
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 what follows, one presents the status on the Dissemination and Exploitation actions that we’ve presented in the Action proposal, and that we’re 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 (1)

- 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.
11. Report from Dissemination Manager

Dissemination in IRACON (2)

- 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.
Dissemination in IRACON (2)

• 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.
Exploitation in IRACON (1)

- 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.
Exploitation in IRACON (2)

• 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.
11. Report from Dissemination Manager

The Plan (1)

- “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.”
## 11. Report from Dissemination Manager

### The Plan (2)

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Other Actions (1)

• 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.
11. Report from Dissemination Manager

Other Actions (2)

• 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.
11. Report from Dissemination Manager

Still Other Actions

• 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 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
13. 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
- MINTS – Fredrik Tufvesson
COST survey

To those who have received it: please fill in the survey

A special thank you …
### Action points

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<td>Submit reimbursement forms</td>
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<td>12/2</td>
<td>Send Minutes of Group Meetings</td>
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<tr>
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<td>Send final report inputs on google docs</td>
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Thank you!