



# Future Wireless Communications Empowered by Reconfigurable Intelligent Meta-Materials

## Deliverable 4.2: Dissemination, Standardization and Outreach Activities of Year One

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<sup>1</sup> IN = Information Note; R = Report; P = Prototype; PC = Proof of Concept; O = Other.

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## Executive Summary

This document summarizes the Dissemination, Standardization and Outreach Activities of the first year for the project METAWIRELESS, also registered as deliverable D4.2 of the Work Package 4 (WP4). The first year of the project was devoted to the hiring process. As expected, only few ESRs could contribute to the dissemination activities.

The purpose of this document is to list all the concrete actions done under the project during the first year, shall they be materializations of the original plan, described in the preceding document "*Deliverable 4.1: Dissemination, Standardization and Outreach Plan*", or additional activities not initially forecasted. The intention is to showcase the material achievements of the project in the time period covered, and the results of the efforts and resources dedicated to it.

## List of parties reporting activities on year one

<b>Name (Short Name)</b>	<b>Role</b>	<b>Country</b>
<b>CONSORZIO NAZIONALE INTERUNIVERSITARIO PER LE TELECOMUNICAZIONI (CNIT)</b>	Beneficiary	Italy
<b>CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE</b>	Beneficiary	France
<b>NEC LABORATORIES EUROPE GMBH (NEC)</b>	Beneficiary	Germany
<b>UNIVERSIDAD POMPEU FABRA (UPF)</b>	<b>Beneficiary</b>	<b>Spain</b>
<b>WAVE UP SRL (WUP)</b>	Beneficiary	Italy

## Acronyms

<b>Acronym</b>	<b>Meaning</b>
<b>ESR</b>	Early-Stage researcher
<b>ITN</b>	Innovative Training network
<b>MSCA</b>	Marie Skłodowska-Curie Actions
<b>METAWIRELESS</b>	Future Wireless Communications Empowered by Reconfigurable Intelligent Meta-Materials
<b>WP</b>	Workpackage
<b>RIS</b>	Reconfigurable Intelligent Surfaces
<b>KPI</b>	Key-Performance Indicator

# 1. Activities from Consorzio Nazionale Interuniversitario per le Telecomunicazioni (CNIT)

The *Consorzio Nazionale Interuniversitario per le Telecomunicazioni* has contributed to the dissemination objectives of the METAWIRELESS European Training Network in numerous different ways, being the largest contributor (by number of individual activities held related to the initiative). They include their participation in different groups and committees, advertising the project in activities technically related to the scope of the network, and publication presentations.

## 1.1 Participation in Groups, Emerging Technology Initiatives, Panels, etc.

Contributing, providing ideas, performing tasks, organization, decision taking and general participating in different special interest groups.

- CNIT participation as founding member and support of the project METAWIRELESS to the constitution of a European Telecommunication Standards Institute (ETSI) Industry Specification Group (ISG) on Reconfigurable Intelligent Surfaces.
- Founding and chairing of the Special Interest Group REFLECTIONS, activated within the SPCE technical committee.
- Participation to the panel "Reconfigurable Intelligent Surfaces for B5G wireless Communications", IEEE WCNC 2021.
- Vice-chair of the ETI on RIS of the IEEE Communication society.

## 1.2 Advertising

Creating awareness-reinforcing content for the general or specific groups of the public regarding the METAWIRELESS project.

- Advertising to the METAWIRELESS project in the presentation of the paper "RIS-aided Massive MIMO: Achieving Large Multiplexing Gains with non-Large Arrays", at the 25th International ITG Workshop on Smart Antennas (WSA 2021), Eurecom, French Riviera, France, Nov. 2021.

## 1.3 Organization of Workshops

Actively contributing to the logistics of the tasks needed for the set-up of different workshops related to the subjects of METAWIRELESS project.

- Organization of the workshop "Reconfigurable Intelligent surfaces for Wireless Communications for Beyond 5G", IEEE GLOBECOM 2020
- Organization of the workshop "Reconfigurable Intelligent surfaces for Wireless Communications for future wireless communications", IEEE ICC 2020

### 1.4 Research submissions, invited talks and tutorials

Submission of papers to high tier conferences, journals, to ensure the feasibility of the research by the scientific community making the specialized public aware of the technical advancements achieved in the field.

- Tutorial "Reconfigurable Intelligent Surfaces for Future Wireless Communications" in conjunction with CNRS

<b>Event targeted for the presentation of the paper:</b>	<b>Year / Edition</b>	<b>Organization</b>
<b>International Conference on Communications</b>	2021	IEEE
<b>Wireless Communications and Networking Conference</b>	2021	IEEE
<b>Vehicular Technology Conference</b>	2021 (Spring)	IEEE
<b>Vehicular Technology Conference</b>	2021 (Fall)	IEEE
<b>Consumer Communications &amp; Networking Conference</b>	2021	IEEE
<b>International Symposium on Wireless Communications Systems Conference</b>	2021	IEEE
<b>International Symposium on Personal, Indoor and Mobile Radio Communications</b>	2021	IEEE
<b>EuWireless</b>	2021	EU Commission / H2020
<b>International Conference on Communications in China</b>	2021	IEEE / CIC
<b>International Conference on Acoustics, Speech, and Signal Processing</b>	2021	IEEE
<b>European Signal Processing Conference</b>	2021	EURASIP
<b>International Workshop on Signal Processing Advances in Wireless Communications</b>	2021	IEEE
<b>5G World Forum</b>	2021	IEEE

## 2. Activities from NEC Laboratories Europe GmbH (NEC)

The NEC Laboratories Europe has contributed to the dissemination objectives through the elaboration and submission of a paper:

### 2.1 Research submissions, invited talks and tutorials

Submission of papers to high tier conferences, journals, to ensure the feasibility of the research by the scientific community making the specialized public aware of the technical advancements achieved in the field.

- Paper “RIS-Aware Indoor Network Planning: The Rennes Railway Station Case”

Event targeted for the presentation of the paper:	Year / Edition	Organization
International Conference on Communications (ICC): Wireless Communications Symposium	2022	IEEE

### 2.2 Keynote Presentations

In-depth explanation of an emerging tech topic related to METAWIRELESS given by a prominent figure to share knowledge in detail with the rest of the technical community.

- Keynote Presentation “The RIS revolution towards Open and Smart Radio Environments”, RIS for future wireless communications workshop @ IEEE GLOBECOM 2021, Madrid, Spain, Dec. 7<sup>th</sup>, 2021



## 3. Activities from Universitat Pompeu Fabra (UPF)

The Universitat Pompeu Fabra has presented a Keynote in the 5G Italy event.

### 3.1 Keynote Presentations

In-depth explanation of an emerging tech topic related to METAWIRELESS given by a prominent figure to share knowledge in detail with the rest of the technical community.

- Keynote Presentation “Line-of-Sight MIMO: An Old Theory Up to New Tricks”, 5G PhD School, Rome, Italy (<https://www.5gitaly.eu/phd-school-en/>) Dec. 1st 2021

## 4. Activities from Wave Up (WUP)

Wave Up has set up several means of dissemination regarding the METAWIRELESS project, in the form of sections of webpages

### 4.1 Website sections

Inclusion of METAWIRELESS information in previously existing corporate or organizational websites belonging to the members of the project, to advertise with the general public as target.

- **Wave Up corporate website:** an abstract of the project and the logos have been posted among the current projects of Wave Up. Both the MetaWireless and the European Commission logos contain dynamic links to the MetaWireless website.  
<http://www.wave-up.it/rd/>
- **Applied Electromagnetic Laboratory of the University of Siena website:** the description of the project as well as the logos have been posted among the current research project of the Laboratory of UNISI, as a partner of the project where Wave Up’s ESR will pursue the Ph.D. degree.  
<http://clem.dii.unisi.it/~aelab/wordpress/index.php/meta-wireless/>

### 4.2 Advertisement in social media

Creation of profiles and content related to the project shared on social media to promote it with the general public.

- **Wave Up's LinkedIn page:** the job advertisement and the link to the MetaWireless project were posted on this social media.  
<https://www.linkedin.com/feed/update/urn:li:activity:6768230307972833280>

### 4.3 Position public posting

Public posting of job positions to ensure the talent acquisition is done in an open way, attracting as many candidates as possible.

- **Euraxess:** the ESR job position was advertised on the Euraxess website.  
<https://euraxess.ec.europa.eu/jobs/606915>

## 5. Standardization activities

METAWIRELESS activities will have a direct impact on the main standardization bodies based on specific standard involvement of key-partners of the project. A specific focus will be posed onto 3GPP and ETSI-related standards activities. Such activities are the key to further recognize the work of each ESR within the industrial and business context.

### 5.1 ETSI RIS

A new ISG has been approved to provide an opportunity for all ETSI members to coordinate their pre-standards research efforts on RIS technology extended with relevant global initiatives towards paving the way for future standardization of the technology. The main mission of the ETSI ISG RIS is to explore RIS technology and corresponding applications across the wide spectrum of use cases and scenarios so as to identify specification needs that may be required.

The ETSI kickoff meeting has been held on 30 September 2021 with CNIT, NEC and CNRS as funding members. CNRS has been appointed as vice-chair of the ISG. Three work items have been initiated within the ETSI RIS context:

- RIS-001: RIS Use Cases and Deployment Scenarios (Rapporteur: Vincenzo Sciancalepore, NEC)

This work item will identify and define relevant use cases with corresponding general key-performance-indicators (KPIs), deployment scenarios wherein RIS technology will play a role and operational requirements for each identified use case with the aim of promoting interoperability with existing and upcoming work items. Aspects around system/link performance, spectrum, co-existence, and security will be analyzed as main input of the document. The deliverable for this work item will be an ETSI Group Report (GR), containing only informative elements, to be approved for publication by the ETSI ISG RIS.

- RIS-002: Study on Technological challenges and Impact on networks and standards (Rapporteur: Nan Zhang, ZTE)

The scope of the work item is to: a) analyze and describe technological challenges in terms of deploying RIS as a new network node b) analyze potential impacts to network architecture, protocol architecture, and framework of RIS controlling c) produce a set of recommendations for requirements and potential impact to specifications to support RIS as a new feature. The deliverable will be an informative report.

- RIS-003: Communication Models, Channel Models, and Evaluation Methodology (Rapporteur: Marco di Renzo, CNRS)

This work item is intended to specify (i) communication models that strike a suitable trade-off between electromagnetic accuracy and simplicity for performance evaluation and optimization, (ii) channel models that include path-loss and multipath propagation effects, as well as the impact of interference, and (iii) key performance indicators and the methodology for evaluating the performance of RISs for application to

wireless communications, including the coexistence between different network operators, and for fairly comparing different transmission techniques, communication protocols, and network deployments.

## Conclusions

This document summarized the Dissemination, Standardization and Outreach Activities of the first year for the project METAWIRELESS.

The first year of the project was devoted to the hiring process and for this reason only few ESRs contributed to the dissemination activities. In particular, the partners CNIT, NEC, UPF and WUP presented activities for dissemination purposes.

The focus of this document is to showcase the material achievements of the project in the time period covered, and the results of the efforts and resources dedicated to it.