

ThoR H2020 814523



Horizon 2020 Grant Agreement no: 814523

**Terahertz end-to-end wireless systems supporting ultra-high data
Rate applications**

ThoR

Deliverable D7.8

Final ThoR workshop (Europe)

Coordinator (EU): Thomas Kürner
 Organisation: Technische Universität Braunschweig

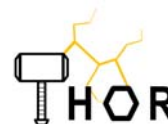
Coordinator (Japan): Tetsuya Kawanshi
 Organisation: Waseda University

Start date of project: 01-Jul-2018

Date of issue: 14-Jul-2022
 Due date: 30-Jun-2022
 ThoR Ref: ThoR_VIV_220705_A_WP7

**Leader in charge of deliverable: Thomas Kürner
 TUBS**

Project co-funded by the European Commission within the Horizon 2020 programme and the National Institute of Information and Communications Technology in Japan (NICT)		
Dissemination level		
PU	Public	X
PP	Restricted to other programme participants (including the Commission Services)	
RE	Restricted to a group specified by the consortium (including the Commission Services)	
CO	Confidential, only for members of the consortium (including the Commission Services)	



Contents

STATEMENT OF INDEPENDENCE 2

1. EXECUTIVE SUMMARY 3

2. OVERVIEW..... 4

3. AGENDA 4

 3.1. Meteracom Workshop 28-Jun-2022..... 5

 3.2. ThoR Final Workshop Day 1: 29-Jun-2022 7

 3.3. ThoR Final Workshop Day 2: 30-Jun-2022 8

4. LINKS 9

Change register

Version	Date	Author	Organisation	Changes
A_DRAFT	05-Jul-2022	Bruce Napier	Vivid	Initial for comment
A	09-Jul-2022	Thomas Kürner	TUBS	Formatting only

Reviewed by Bo Kum Jung

TUBS

A_DRAFT

Statement of independence

The work described in this document is genuinely a result of efforts pertaining to the ThoR project. Any external source is properly referenced.

Confirmation by Authors:

Thomas Kürner
Bruce Napier

TUBS
Vivid



1. Executive summary

The ThoR final workshop and demo was held in person (and also online) on 29-30 Jun-2022 hosted by EU Coordinator, TU Braunschweig and co-located with the German national project DFG FOR 2863 Meteracom (<https://www.meteracom.de>) workshop (held the previous day; 28-Jun-2022). In addition to the presentations and networking poster sessions, in person visitors were able to see a software demo and the ThoR hardware demo: a 2×20 Gbps bidirectional 300 GHz THz link over 160 m between campus buildings complying with standard IEEE 802.15.3d, which defines the new state-of-the-art.

Details and links to presentations are available from the ThoR website:

<https://thorproject.eu/events/thor-final-workshop-and-demo/>

Videos of the hardware and simulation demos are also available at Youtube:

<https://www.youtube.com/watch?v=2c07gXJLvgI>

<https://www.youtube.com/watch?v=vEBfRHZGSyc>

2. Overview

ThoR final workshop and demo (29-30 Jun-2022; TU Braunschweig, Germany)

The ThoR final workshop and demo was held in person (and also online) on 29-30 Jun-2022 hosted by EU Coordinator, TU Braunschweig and co-located with the German national project DFG FOR 2863 Meteracom (<https://www.meteracom.de>) workshop (held the previous day; 28-Jun-2022). 22 visitors attended the workshop in person and a total of 88 participants registered for online attendance. In addition to the presentations and networking poster sessions, in person visitors were able to see a software demo, and the ThoR hardware demo: a record 2×20 Gbps bidirectional 300 GHz THz link over 160 m between campus buildings complying with standard IEEE 802.15.3d, which defines the new state-of-the-art.

Details and links to presentations are available from the ThoR website:

<https://thorproject.eu/events/thor-final-workshop-and-demo/>

Videos of the hardware and simulation demos are also available from Youtube:

<https://www.youtube.com/watch?v=2c07gXJLvql>

<https://www.youtube.com/watch?v=vEBfRHZGSyc>

3. Agenda

The joint METERACOM/ThoR workshop was held over three days. Attendance in person or online was possible.

These workshops included prestigious invited speakers and detailed presentations from the projects. The ThoR workshop and live demo also included a social event and poster/networking sessions.

Venue	<i>Aula, Haus Der Wissenschaft Pockelsstrasse 11, 38106 Braunschweig, German</i>
TUE 28-Jun-2022	<i>DFG FOR 2863 Meteracom workshop 1st International Workshop on Metrology for THz Communications</i>
WED 29-Jun-2022	<i>ThoR workshop Day 1 Including EU guest speakers ThoR hardware and software demos Posters and networking Evening social event</i>
THU 30-Jun-2022	<i>ThoR workshop Day 2 Including Japanese guest speakers Posters and networking</i>

3.1. Meteracom Workshop: TUE 28-Jun-2022



1st International Workshop on Metrology for THz Communications

Time	Session	Speaker
09.00-09.30	Introduction to DFG FOR 2863 Meteracom	Thomas Kürner, TU Braunschweig, Germany
09.30-10.00	Invited talk: Propagation measurements and models in the mmwave band	Sana Salous, Durham University
10.00-10.20	Metrology in wireless communication: Channel Sounder Measurement Verification Using Over-the-Air Artifact	Mohanad Al-Dabbagh, PTB, Germany
10.20-10.40	Mitigation of thermal crosstalk for integrated THz-photonic signal processing	Souvaraj De, PTB, Germany
10.40-11.00	Calibration and verification of multidimensional channel sounder for THz applications	Giovanni Del Galdo, Technische Universität Ilmenau, Germany
11.00-11.30	Coffee break	-
11.30-12.00	Invited Talk: From 5G to 6G: Key challenges from a 6G-RIC perspective	Slawomir Stanczak, HHI
12.00-12.20	Characterization of building materials in the THz range	Fatima Taleb, Philipps-Universität Marburg, Germany
12.20-12.40	Sensitivity Analysis of a 280 – 312 GHz Superheterodyne Terahertz Link Targeting IEEE802.15.3d Applications	Dominik Wrana, Universität Stuttgart, Germany
12.40-13.00	Invited Talk: Leveraging photonics techniques for THz communications: measurements of active passive functions in the 300 GHz range	Guillaume Ducournau, Lille University
13.00-14.00	Lunch break	-
14.00-14.30	Invited Talk: Key Challenges of THz Communications for 6G Era	Ho-Jin Song, Pohang University, Korea

Time	Session	Speaker
14.30-14.50	ENOB analysis in photonic orthogonal sampling systems for Terahertz signal reception	Younus Mandalawi, Technische Universität Braunschweig, Germany
14.50-15.10	Ultra-low phase noise frequency synthesis for THz metrology using low-jitter femtosecond lasers	Christoph Scheytt, Paderborn University, Germany
15.10-15.40	Coffee break	-
15.40-16.10	Invited Talk: THz Physical Layer Security	Edward Knightly, Rice University, Houston, USA
16.10-16.30	How image reconstruction can improve THZ communications – A compressed sensing-assisted device discovery approach	Tobias Doeker, Technische Universität Braunschweig, Germany
16.30-16.50	Challenges of Hardware Acceleration in THz Communication	Anouar Nechi, Universität zu Lübeck, Germany
16.50-17.10	A THz Control Plane for Adaptive Coding and Modulation	Cao Vien Phung, Technische Universität Braunschweig, Germany
17.10-17.20	Closing Remarks	Thomas Kürner, TU Braunschweig, Germany



In person attendees of the ThoR Final Workshop

3.2. ThoR Final Workshop Day 1: WED 29-Jun-2022



Time	Session	Speaker
08.15-08.30	Arrival	-
08.30-08.50	Introduction to ThoR by Coordinators	Prof. Tetsuya Kawanishi, Waseda University
08.50-09.10	Development of the ThoR 60 GHz transceiver module	Keitarou Kondou, HRCP R+D Partnership
09.10-09.30	Development of THz front-ends based on InGaAs mHEMT devices	Dr.-Ing. Laurenz John, Fraunhofer IAF
09.30-10.00	Sub-THz front ends for ubiquitous high data rate	Prof. Claudio Paoloni, Lancaster University

Time	Session	Speaker
10.00-10.30	Break (+posters)	-
10.30-11.00	Industry perspective on THz communication and associated technologies	Frederic Giancesello, ST Microelectronics
11.00-11.20	10 Gbps mm-Wave link and combing scheme for utilising THz frequencies	Yigal Leiba, Siklu
11.20-11.40	Fixed mm-wave and THz wireless system link performance degradation due to severe weather conditions	Eisaku Sasaki, NEC Corporation
11.40-12.10	Presentation and video of ThoR demo	ThoR demo team
12.10-12.15	Wrap-up	Prof. Tetsuya Kawanishi, Waseda University and Prof. Thomas Kürner, TU Braunschweig
12.15-14.00	Lunch and networking	-
14.00-16.00	Poster session, Software demonstrations, Visits to demo hardware	-
18.00	Evening event Rodizio	-

3.3. ThoR Final Workshop Day 2: THU 30-Jun-2022



Time	Session	Speaker
08.15-08.30	Arrival	-
08.30-09.00	Technology trends toward Beyond 5G in Japan	Yoshiaki Amano, KDDI R&D Laboratories
09.00-09.20	Overview of the assembly and test of front-end modules: ThoR lab demo	Prof. Guillaume Ducournau, University of Lille
09.20-09.50	THz phased-array transceivers for Beyond 5G	Prof. Kenichi Okada, Tokyo Institute of Technology

Time	Session	Speaker
09.50-10.15	Break (+posters)	-
10.15-10.35	Photonics-based antenna near-field measurement and far-field characterization in the 300 GHz band	Prof. Shintaro Hisatake, Gifu University
10.35-10.55	Short-range wireless transmission using a superheterodyne THz link	Dominik Wrana, University of Stuttgart
10.55-11.15	Study of terahertz antenna and propagation for Beyond 5G mobile communication	Prof. Akihiko Hirata, Chiba Institute of Technology
11.15-11.35	Automatic planning of 300 GHz backhaul links	Bo Kum Jung, TU Braunschweig
11.35-12.00	Break (+posters)	-
12.00-12.20	ThoR demo at Deutsche Telekom and future exploitation	Dr. Petr Jurčik, Deutsche Telekom
12.20-12.40	Wired and wireless seamless networks for beyond 5G	Prof. Tetsuya Kawanishi, Waseda University
12.40-12.55	A perspective for standards and regulation on THz communications	Prof. Thomas Kürner, TU Braunschweig
12.55-13.00	Wrap-up	Prof. Tetsuya Kawanishi, Waseda University and Prof. Thomas Kürner, TU Braunschweig

4. Links

Details and links to presentations are available from the ThoR website: <https://thorproject.eu/events/thor-final-workshop-and-demo/>

Videos of the hardware and simulation demos are also available from Youtube:

<https://www.youtube.com/watch?v=2c07gXJLvgl>

<https://www.youtube.com/watch?v=vEBfRHZGSyc>

