DON BOSCO INSTITUTE OF TECHNOLOGY, MUMBAI

DEPARTMENT OF ELECTRONICS AND TELECOMMUNICATION ENGINEERING

Report of Two Half-Day Symposium on: '5G: The Catalyst to Digital Revolution

Topic: Two Half-Day Symposium "5G: The Catalyst to Digital Revolution"

Date: 8th & 9th October 2021

Time: 11:00 a.m. - 2:45 p.m.

Venue: Zoom Meeting (Online Platform)

Speaker:

8th October 2021 :

i. **Mr. Hermes Joel** (Founder & Director, Taranga Systems Ltd., Leicester, United Kingdom)

ii. **Dr. Jaume Anguera** (Founder and CTO, Ignion. Associate Professor, Universitat Ramon Llull, Barcelona, Spain)

9th October 2021 :

i. **Dr. SaiDhiraj (**Principal Research Engineer, WiSig Networks. Adjunct Assistant Professor, IIT Hyderabad, India)

ii. **Dr. Jasmin Grosinger** (Associate Professor & DL Institute of Microwave & Photonic Engineering Graz University of Technology Graz, Austria)

No. of participants attended: 74

Description:

- IEEE-DBIT-MTTS Student Chapter organized a Two Half-Day Symposium on “5G: The Catalyst to Digital Revolution” on 8th & 9th October 2021 from 11 a.m. to 2:45 p.m. on both days.

- The Symposium commenced with the inauguration ceremony on 8th October 2021 at 11:00 am with a prayer by Fr. Mario followed by the introduction to the program highlights by Dr. Ashwini Kotrashetti. The inauguration session concluded with a welcome address by Principal Dr. Prasanna Nambiar by 11:30 am.

➢ Day1: Mr. Hermes Joel

- Following the inauguration, at 11:30 am Ms. Poonam C. introduced Mr. Hermes Joel, scheduled to deliver the session on “5G NR Point to Point systems Architecture - An Introduction”

- Mr. Hermes Joel explained the following points in great depth covering all the intricate details in a brief and lucid manner :

  i. Introduction to 5G Digital Revolution.

  ii. Point to Multi-Point network Architecture

  iii. 5G New Radio(NR) P2P/PMP Base Station Architecture .

  iv. Real World 5G Antennas field installation with practical considerations.

  v. Insights on practical antennas used for Potential 5G NR P2P and PMP Applications.

Following this, Mr. Hermes Joel advanced to the Q&A round with the participants wherein he answered all the queries paying scrupulous attention to details. Mr. Hermes’s session concluded with the proposal of vote of thanks by Ms. Poonam C. at 12:45 pm.

➢ Day1: Dr. Jaume Anguera

- The participants dispersed for a lunch break at 12:45 pm and assembled back at 1:30 pm for Dr. Jaume Anguera's talk on "Antenna Booster Technology -5G perspective in Design of IoT Devices embedding Antenna Boosters".

- Ms. Freda Carvalho formally introduced the speaker following which Dr. Jaume Anguera took over the session and covered the following points in great depth:

    i. Addressed terms like Antenna, Microwave, RF, Wireless systems and the applications of antennas in IoT, Smart cities, Smart agriculture, fleet management, etc.

    ii. Emphasized importance for electronics engineers to learn about Antenna Booster Technology.

    iii. Fundamentals of Antenna Booster Technology

    iv. Methodology to design wireless devices with antenna boosters, wireless devices (eg. IoT) embedding antenna boosters covering from single band to multi-band applications either using passive and active matching network-based architectures.

    v. Introduced the concept of virtual antenna and explained its importance to be a game changing technology due to modularity, versatility, miniature size, efficient performance and all this with no need for customization.

    Following this, Dr. Jaume Anguera advanced to the Q&A round with the participants wherein he answered all the queries assiduously pointing out every feature of the concept he covered while replying. Dr. Jaume's session concluded with the proposal of a vote of thanks by Ms. Freda Carvalho. at 02:45pm . With Dr.Jaume Anguera's talk, the session concluded for the day.

➢ Day2: Dr. SaiDhiraj Amuru

- On 9th October 2021, the Symposium commenced at 11:30 am sharp with Ms. Namita Agarwal introducing Dr. SaiDhiraj Amuru, scheduled to conduct a talk on “India's 5G Journey”. The session covered the following dimensions in detail :

  i. Journey of 5G in India starting from 2016 till present.

  ii. DoT allocation of spectrum for 5G trials to telecom operators and also mapped its results till date.

  iii. Present Indian Perspective of 5G and ways to bridge the 5G digital divide which holds the potential to transform the fate of remote Indian villages.

  iv. India’s efforts in standardization at ITU, 3GPP, and TSDSI.

  v. The various R&D efforts are being supported by various government organizations to steer India’s 5G journey forward to the future.

  Following this, Dr. SaiDhiraj advanced to the Q&A round with the participants wherein he answered all the queries diligently. Dr. SaiDhiraj’s session concluded with the proposal of vote of thanks by Ms.Namita Agarwal at 12:45 pm.

➢ Day2: Dr.Jasmin Grosinger

- Ms. Gejo George introduced the next speaker at 12:45 pm, Dr. Jasmin Grosinger for delivering talks on “RF Design for Ultra-Low- Power Wireless Communication in the Next Generation of 5G IoT Devices”. Dr.Jasmin Grosinger explained the following aspects in great detail:

    i. Introduced the concept of the development of miniaturized IoT nodes that operates in harsh climatic conditions.

    ii. Provided insights on how issues between IoT sensors and 5G deployments are solved in mass deployments.

    iii. Need for effective miniaturizing of components to improve ultra-low power operation of IoT nodes avoiding batteries so as to lower eco-toxicity..

    iv. Important for engineers to apply ultra-low-power operation of IoT nodes and to avoid batteries due to battery replacement.

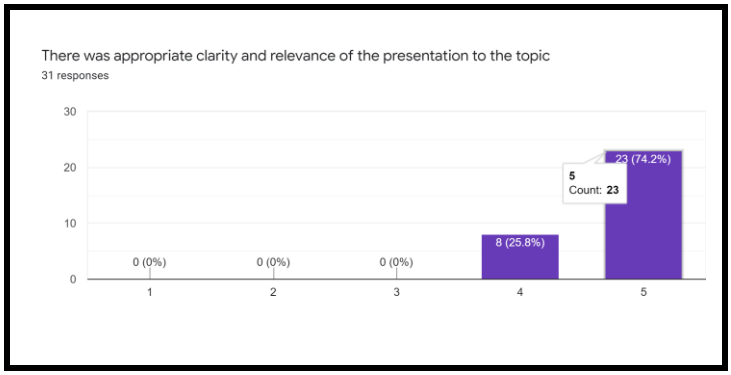
    v. Solutions for robust ultra-low power wireless communication based on HF and UHF RFID technologies

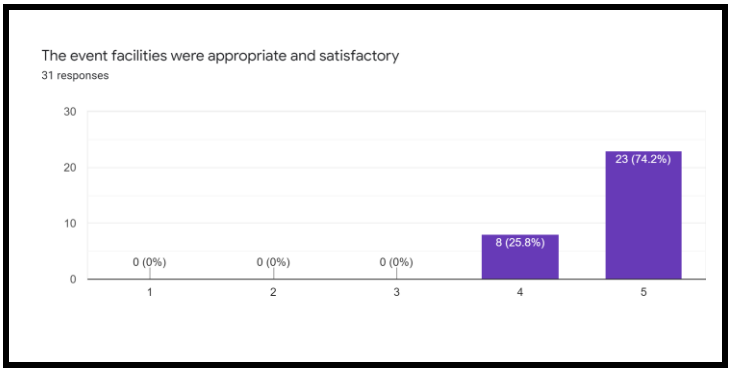
    Following this, Dr. Jasmin Grosinger advanced to the Q&A round with the participants wherein he answered all the queries with meticulous care and effort, catering to every aspect of the question asked. Mr. Jasmin’s session concluded with the proposal of vote of thanks by Ms. Gejo George at 02:00 pm.

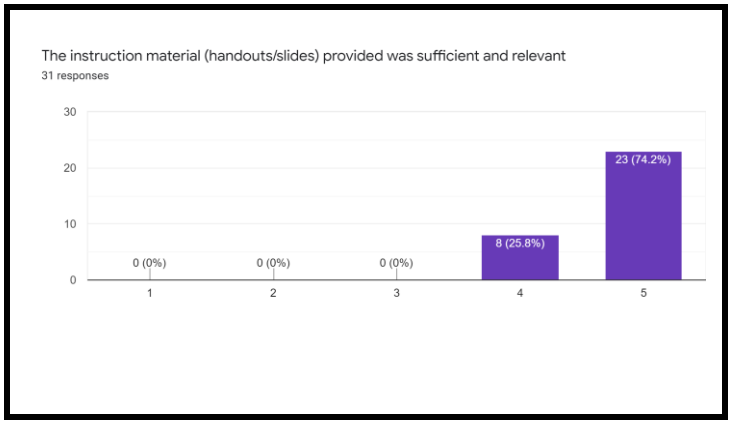
- The Two Half-Day Symposium concluded with the valedictory event where Dr. Ashwini Kotrashetti proposed the final vote of thanks, thanking all the speakers for shelling their valuable time from their busy schedule to deliver quality content and also the students for their participation and cooperation which rendered the event a grand success. The participants were told to give verbal feedback for the symposium, which was very encouraging and motivating for the student chapter to organize similar events in future. Finally, feedback forms were circulated amongst the students to make suggestions for further improvement.

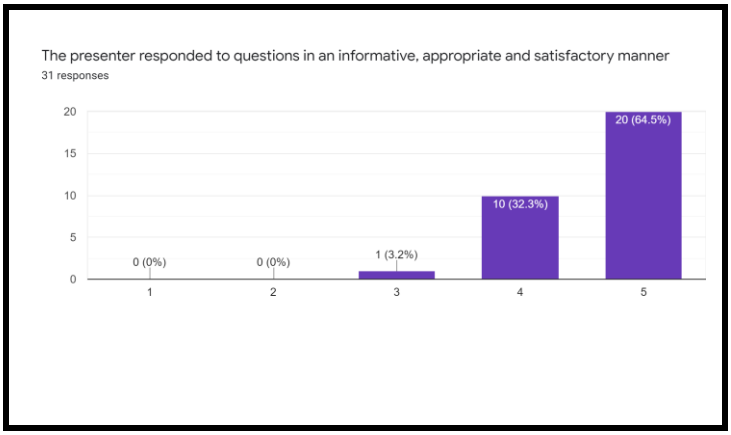
Feedback Analysis:

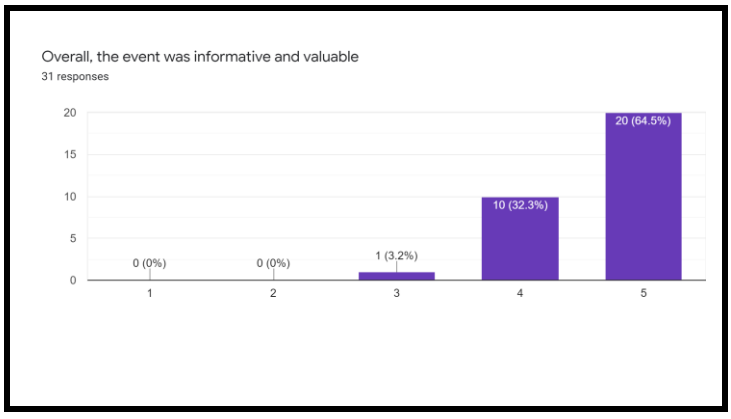
Day1: Mr. Hermes Joel



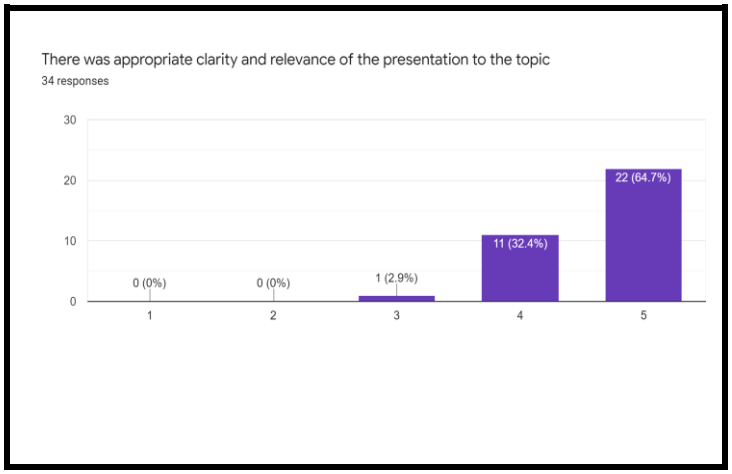


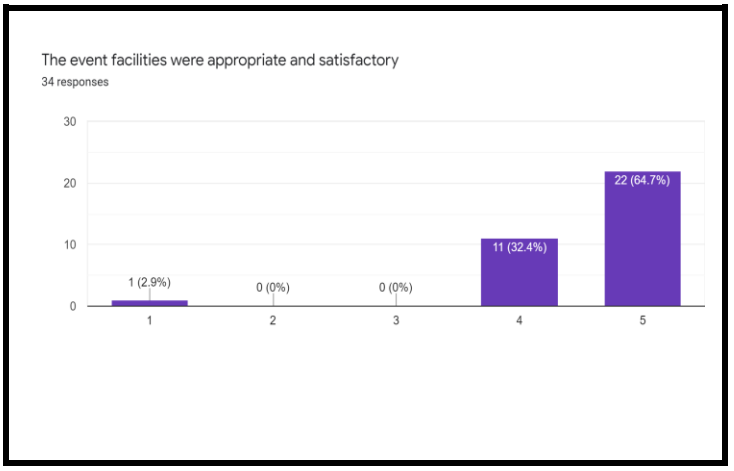


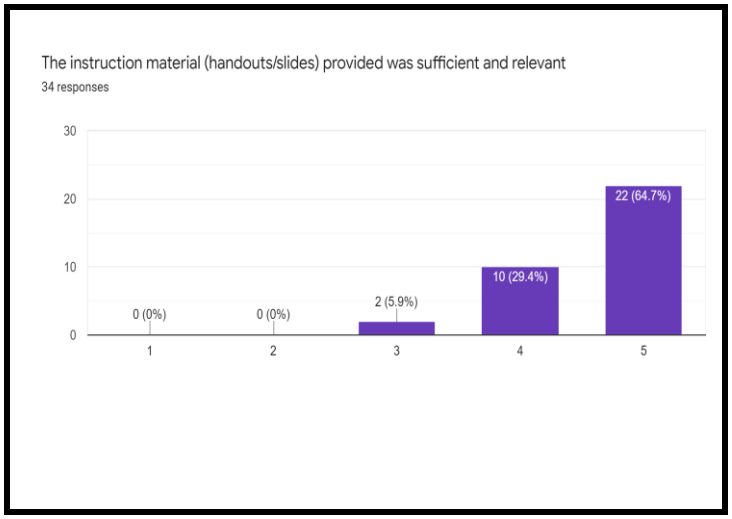


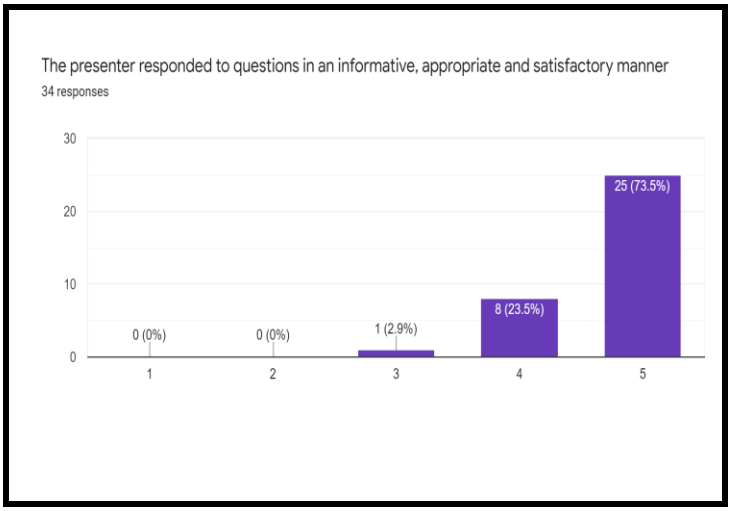


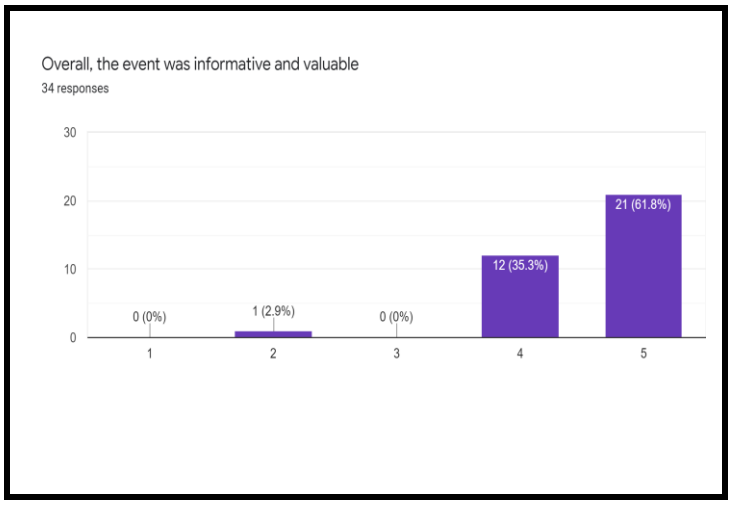
Day1: Dr.Jaume Anguera







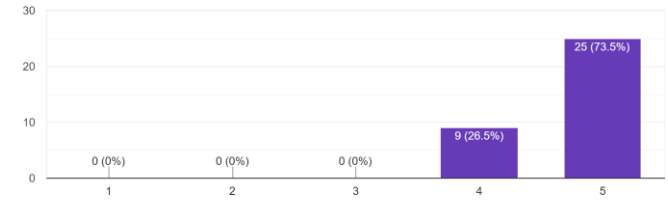




Day2: Dr. SaiDhiraj Amuru

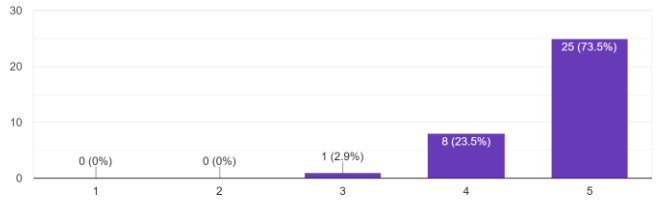
There was appropriate clarity and relevance of the presentation to the topic

34 responses



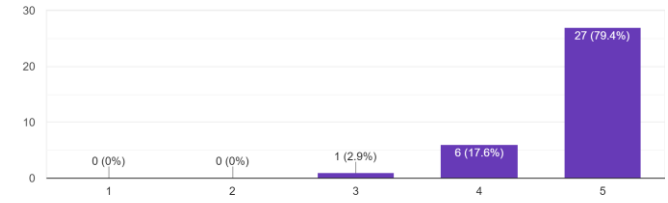
The event facilities were appropriate and satisfactory

34 responses



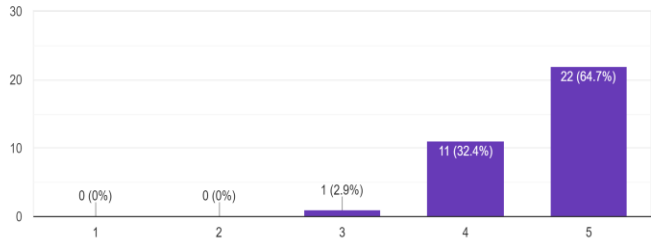
The instruction material (handouts/slides) provided was sufficient and relevant

34 responses



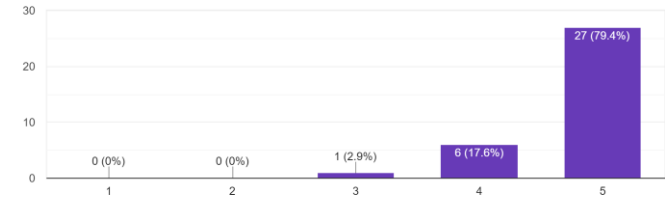
The presenter responded to questions in an informative, appropriate and satisfactory manner

34 responses



Overall, the event was informative and valuable

34 responses



Day2: Dr.Jasmin Grosinger

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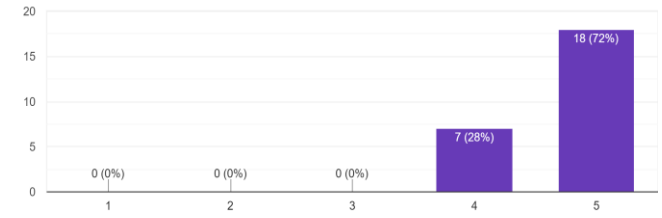
25 responses



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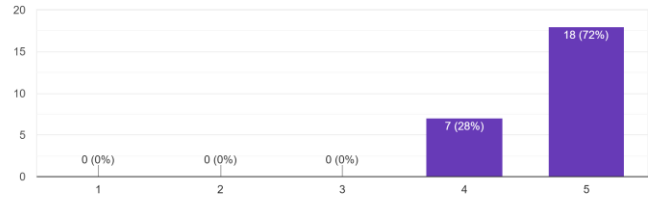

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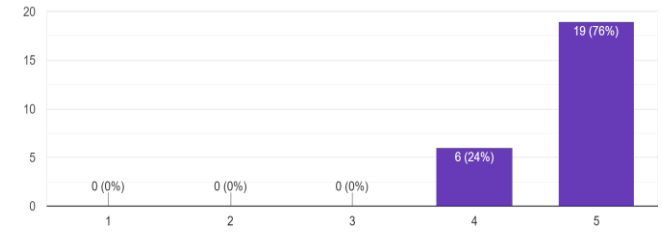

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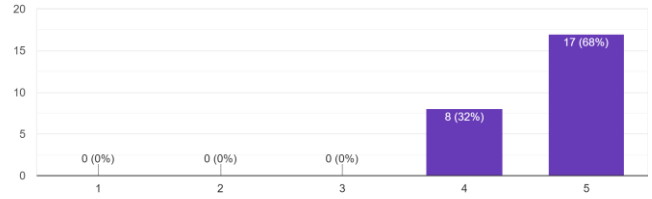

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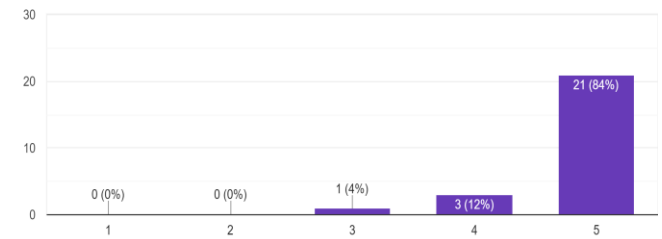


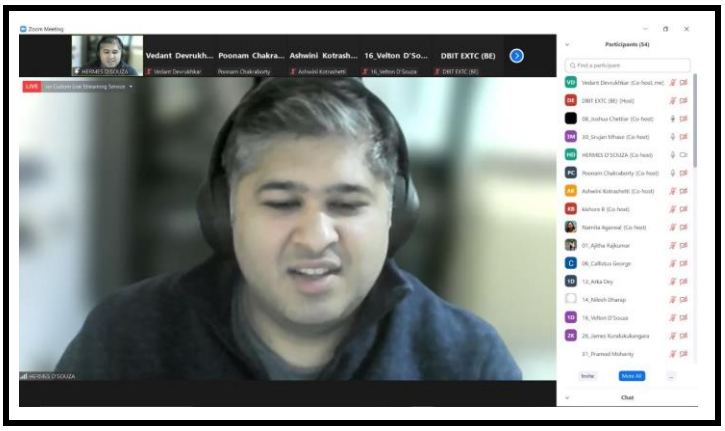
Feedback Summary:

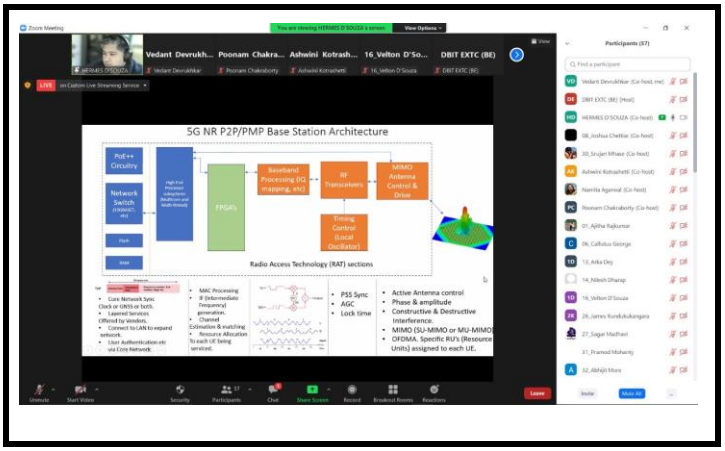
From the above analysis, we can infer that the overall reception to the Two Half-Day Symposium “5G: The Catalyst to Digital Revolution” was quite positive and the participants found the sessions to be very interesting, informative and extremely efficient as it made a successful attempt to demystify convoluted concepts easy enough to be understood by a student. Further, many participants were quite optimistic about attending such similar sessions in the future.

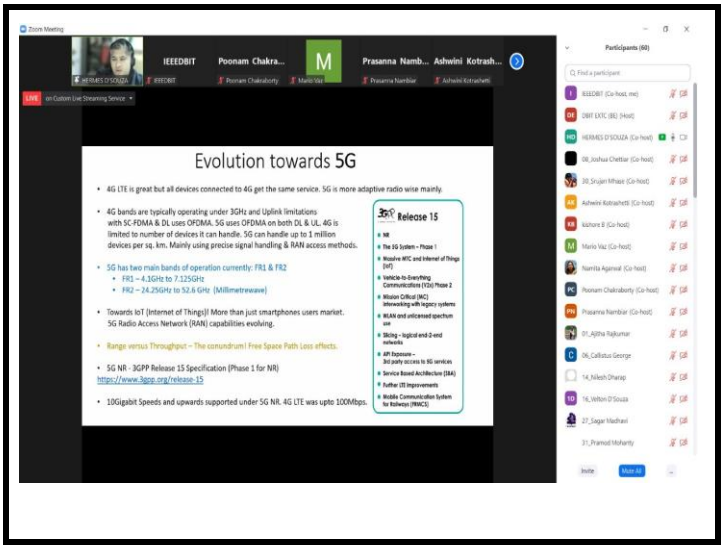
Event Poster:

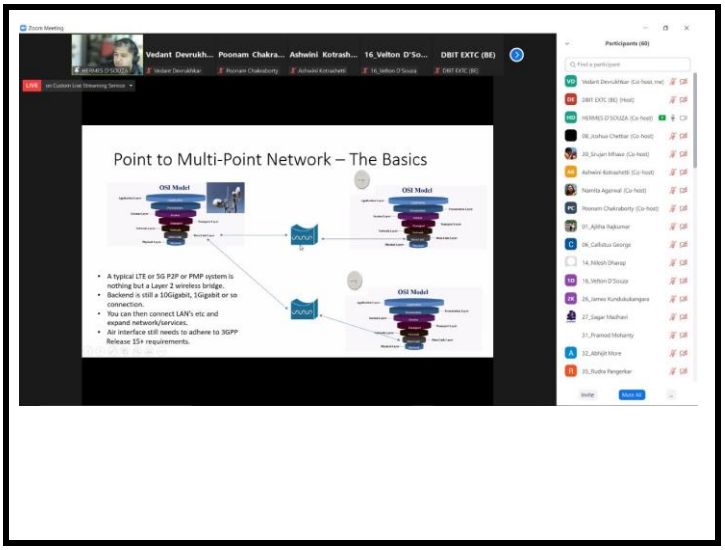
Event Photographs :

Day 1: Mr. Hermes Joel









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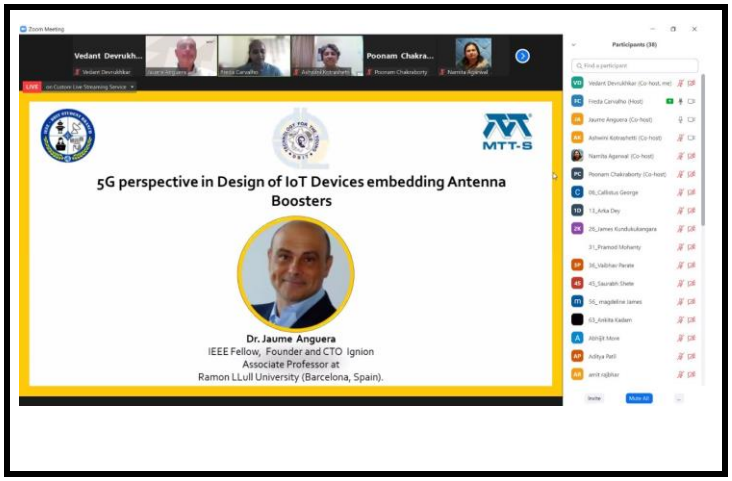
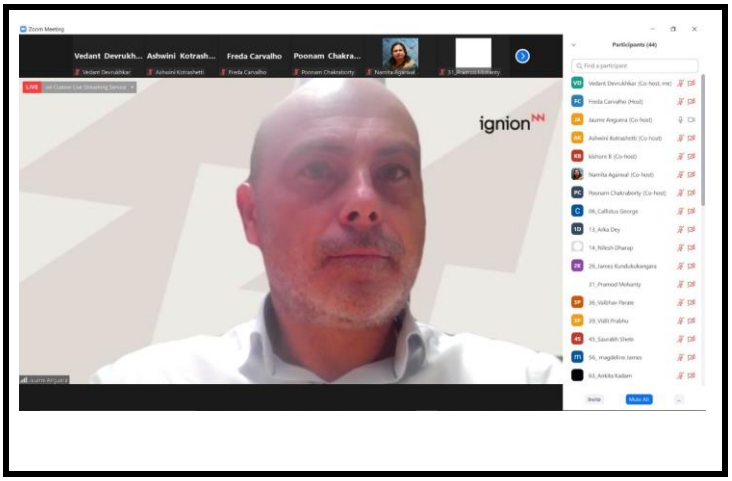
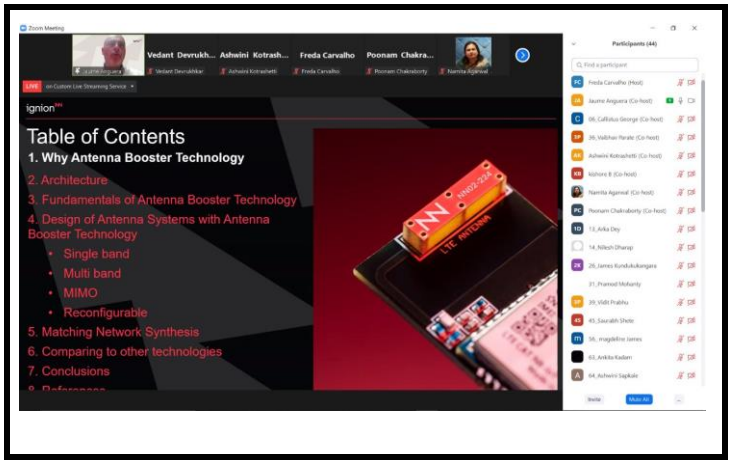
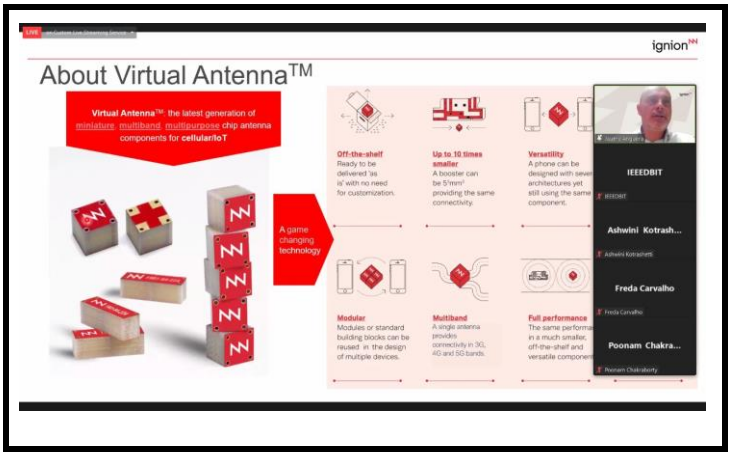
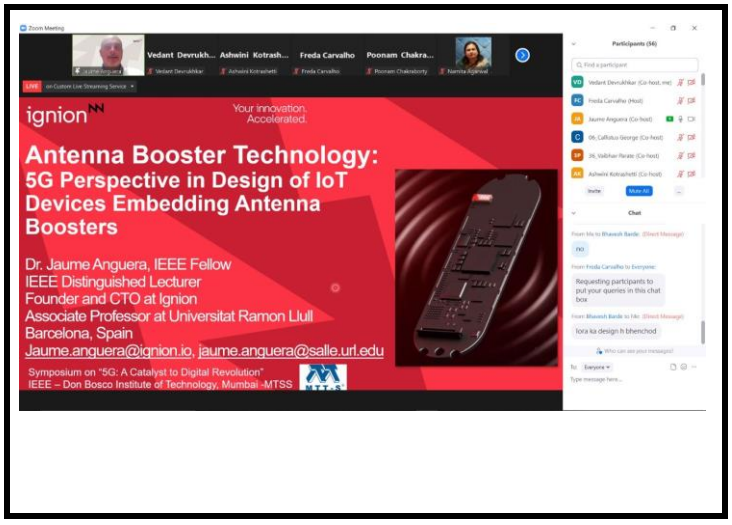
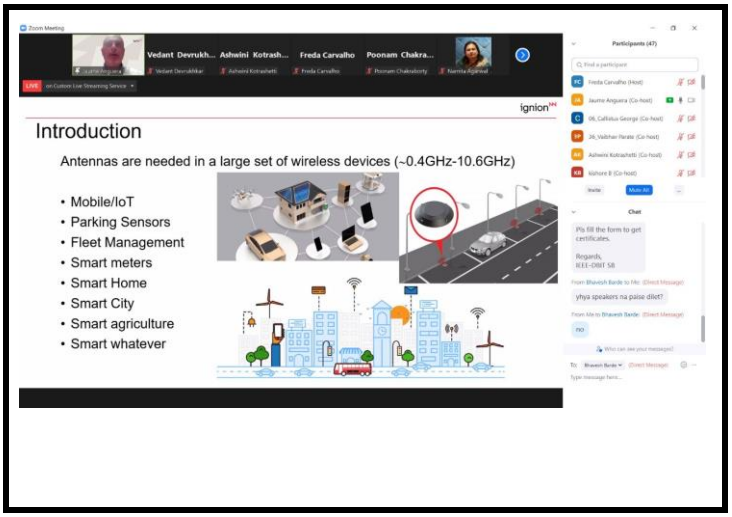




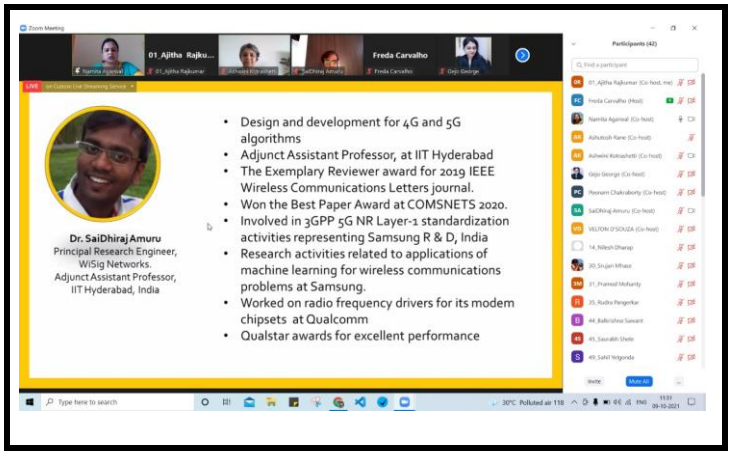


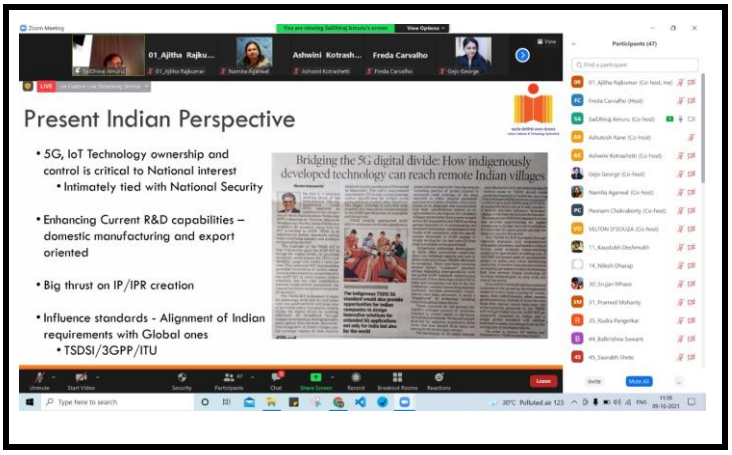


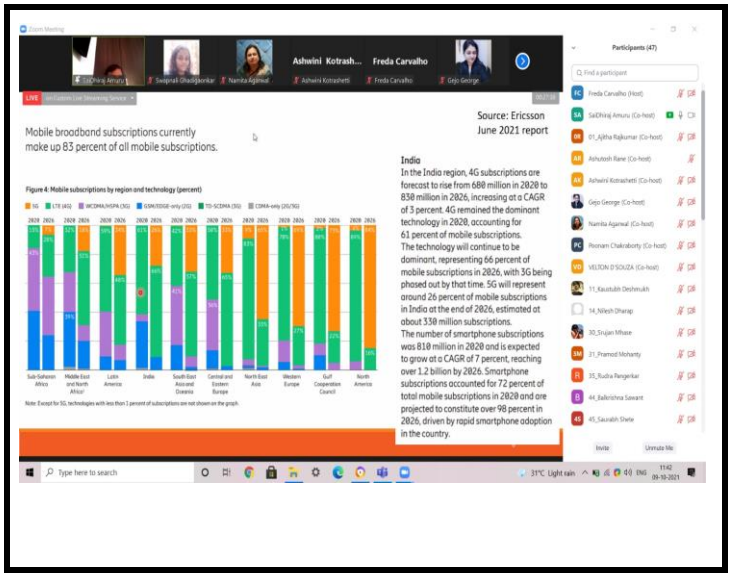


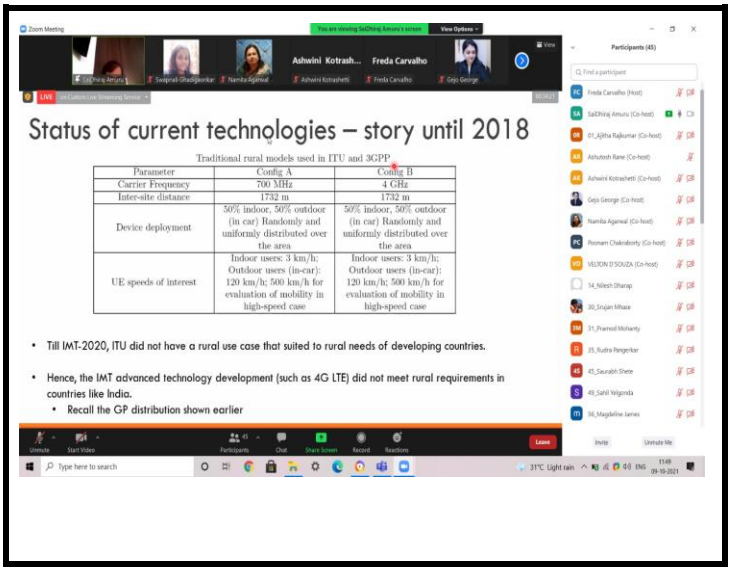


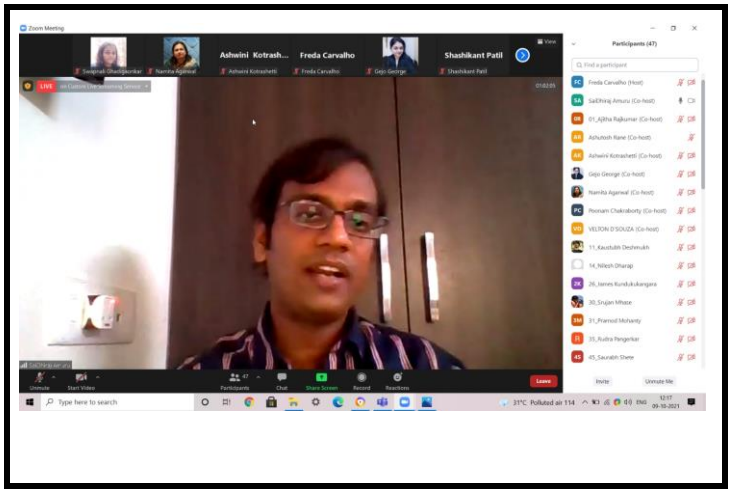
Day 2: Dr. SaiDhiraj Amuru



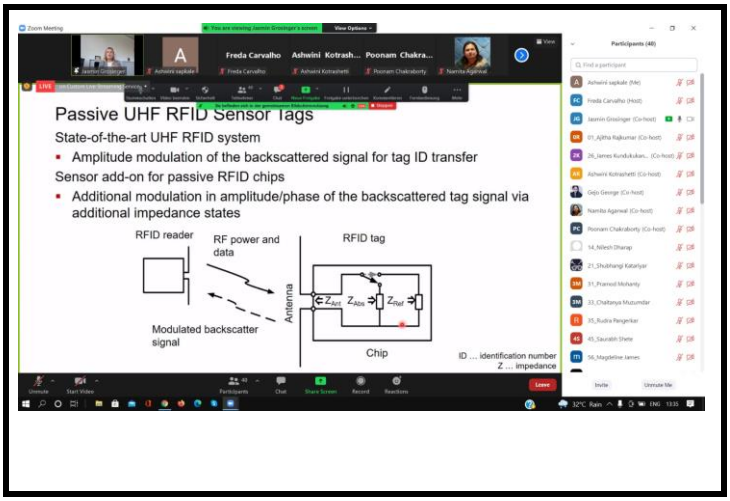


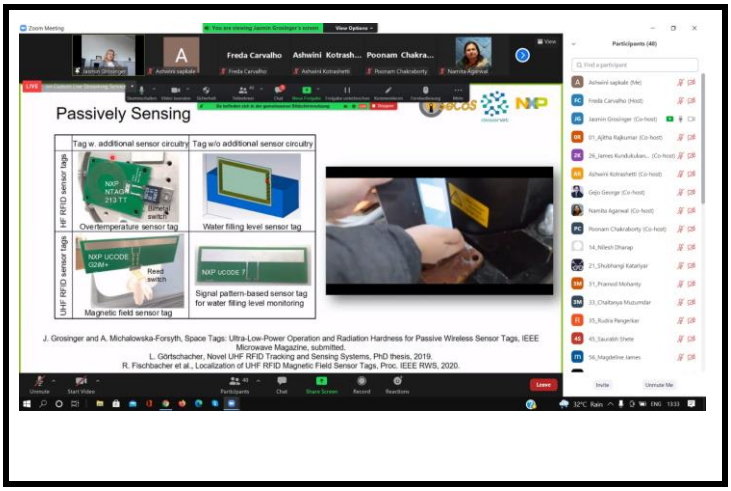


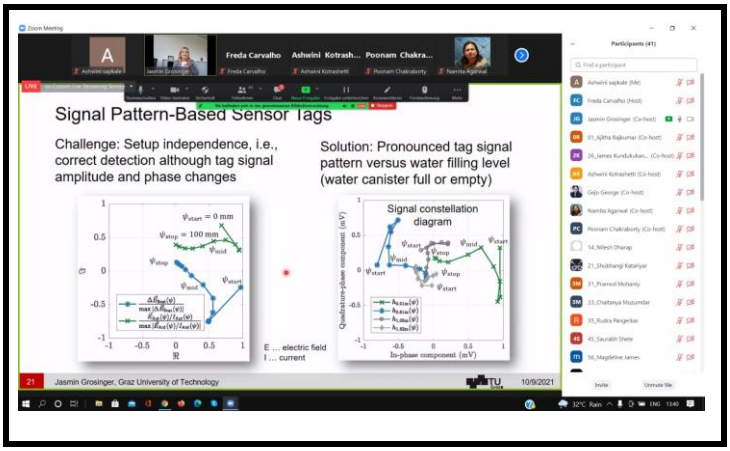


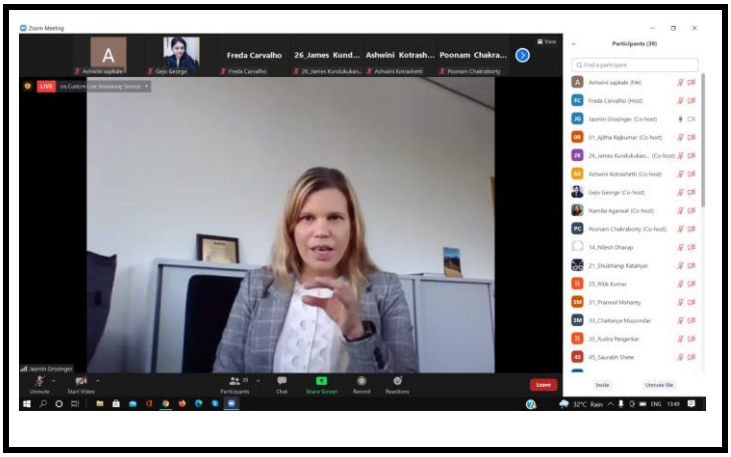


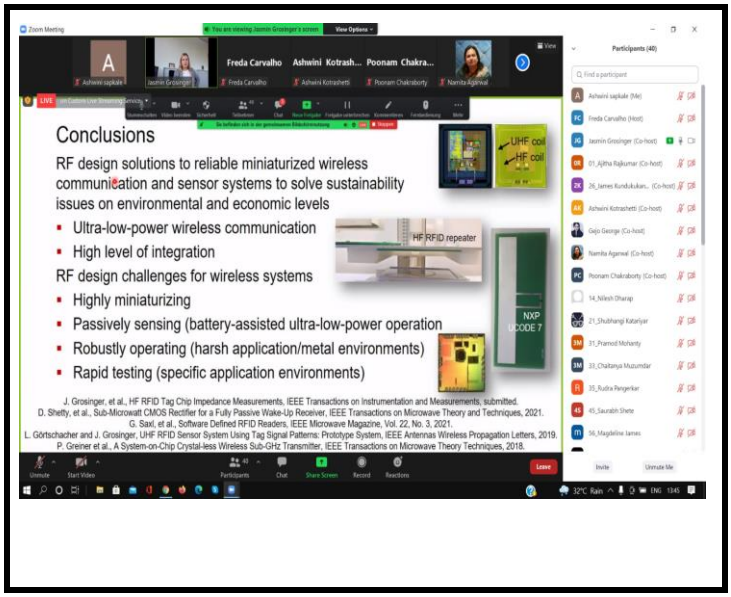
Day 2: Dr. Jasmin Grosinger










Conclusions
RF design solutions to reliable miniaturized wireless communication and sensor systems to solve sustainability issues on environmental and economic levels
Ultra-low-power wireless communication
High level of integration
RF design challenges for wireless systems
Highly miniaturizing
Passively sensing (battery-assisted ultra-low-power operation
Robustly operating (harsh application/metal environments)
Rapid testing (specific application environments)
UHF coil
HF coil
HF RFID repeater
NXP UCODE 7
J. Grosinger, et al., HF RFID Tag Chip Impedance Measurements, IEEE Transactions on Instrumentation and Measurements, submitted.
D. Shetty, et al., Sub-Microwatt CMOS Rectifier for a Fully Passive Wake-Up Receiver, IEEE Transactions on Microwave Theory and Techniques, 2021.
G. Saxl, et al., Software Defined RFID Readers, IEEE Microwave Magazine, Vol. 22, No. 3, 2021.
L. Görtschacher and J. Grosinger, UHF RFID Sensor System Using Tag Signal Patterns: Prototype System, IEEE Antennas Wireless Propagation Letters, 2019.
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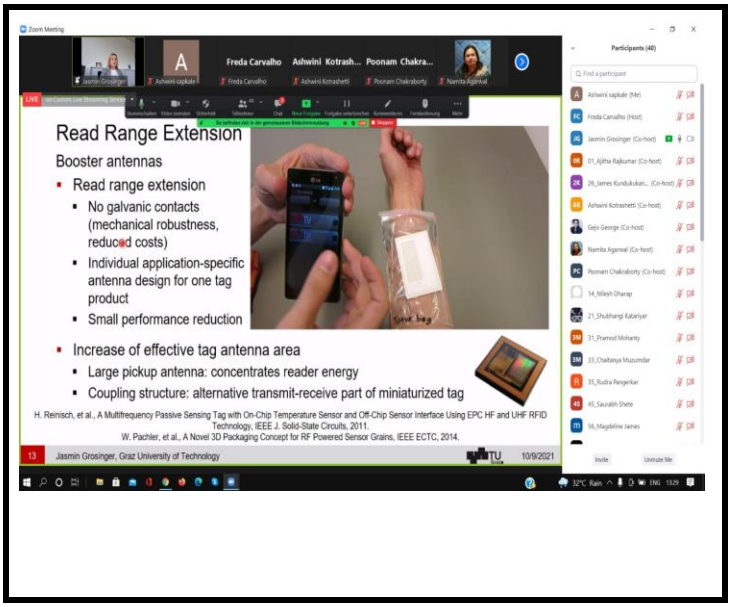
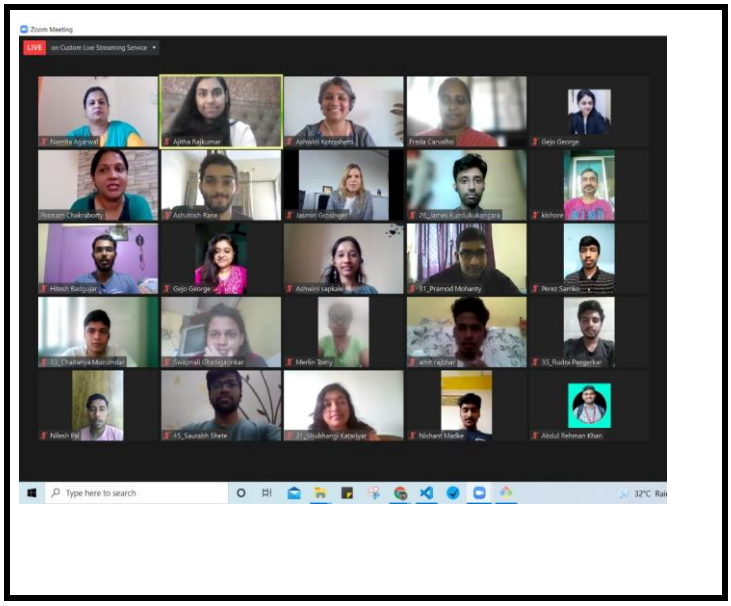
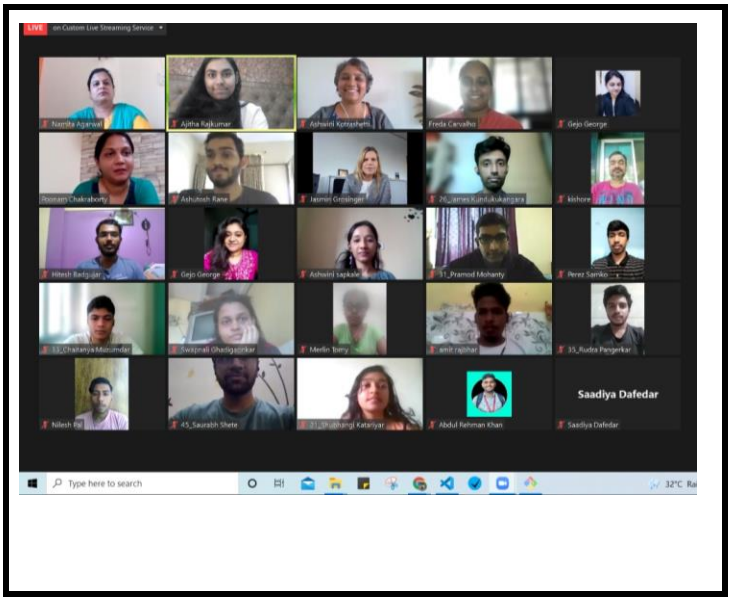
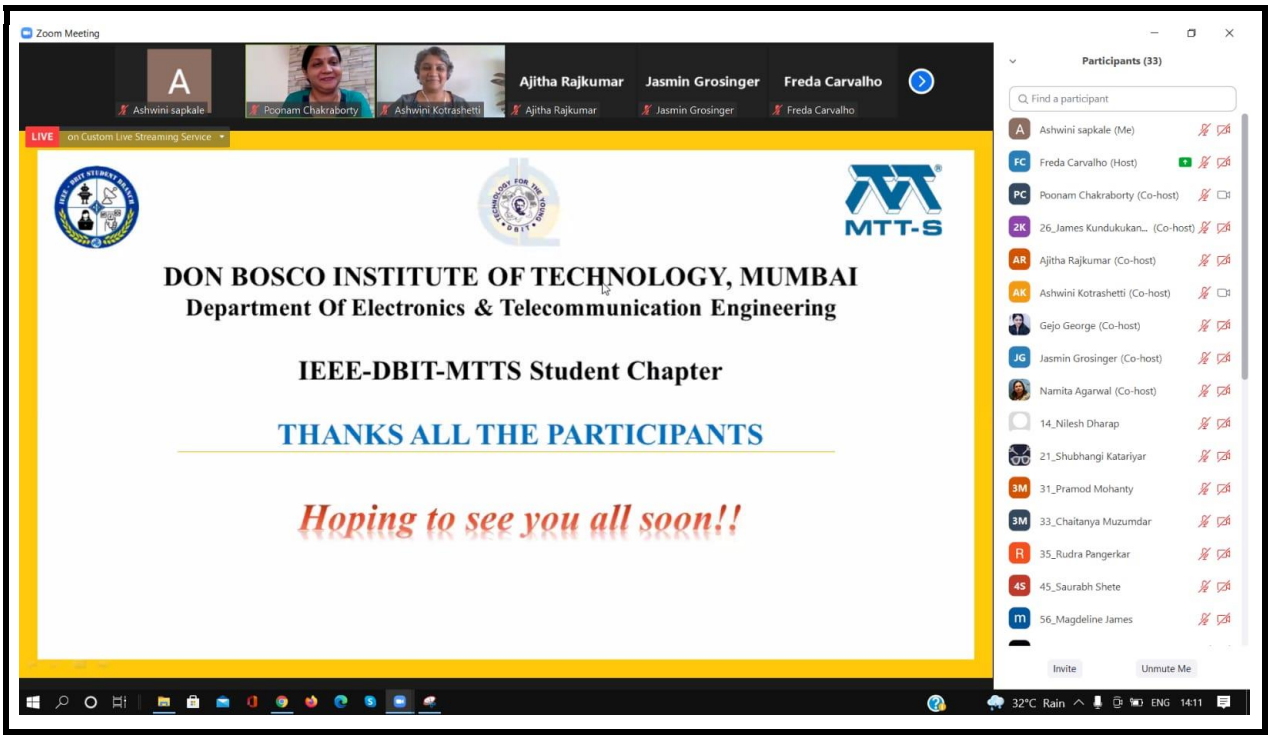

Read Range Extension
Booster antennas
Read range extension
No galvanic contacts (mechanical robustness, reduced costs)
Individual application-specific antenna design for one tag product
Small performance reduction
Increase of effective tag antenna area
Large pickup antenna: concentrates reader energy
Coupling structure: alternative transmit-receive part of miniaturized tag
H. Reinisch, et al., A Multifrequency Passive Sensing Tag with On-Chip Temperature Sensor and Off-Chip Sensor Interface Using EPC HF and UHF RFID Technology, IEEE J. Solid-State Circuits, 2011.
W. Pachler, et al., A Novel 3D Packaging Concept for RF Powered Sensor Grains, IEEE ECTC, 2014.
Jasmin Grosinger, Graz University of Technology
10/9/2021




Saadiya Dafedar



Report Prepared By:

Ria George (Secretary - IEEE DBIT)

Swapnali Ghadigaonkar (Documentation Head – IEEE DBIT)

Report Approved By:

Prof. Gejo George (IEEE-DBIT-SB Counselor)