44th Annual Meeting and Symposium of the Antenna Measurement Techniques Association

AMTA 2022
DENVER, COLORADO

October 9 - 14, 2022

FINAL PROGRAM

Hosted by

NIST

ANTENNA MEASUREMENT TECHNIQUES ASSOCIATION
AMTA
www.amta.org

Co-Hosted by

NVLAP

COLORADO SCHOOL OF MINES
EARTH • ENERGY • ENVIRONMENT

Welcome

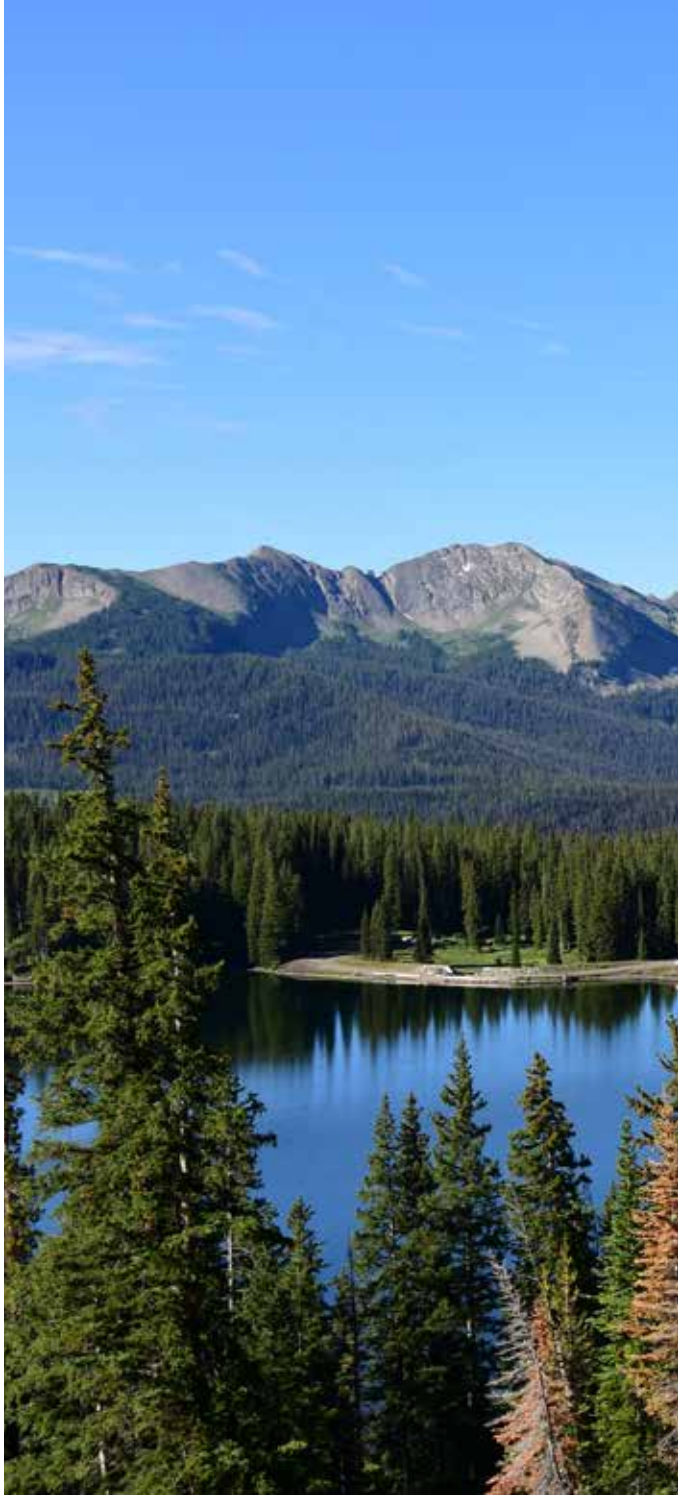
It is my pleasure to welcome you to Westminster, Colorado for the 44th Annual Symposium of the Antenna Measurement Techniques Association (AMTA). The venue for this year's event is the Westin Westminster Hotel. With the iconic Flatirons serving as its backdrop, The Westin is ideally positioned 15 minutes from both Denver and Boulder, providing convenient access to downtown attractions, as well as abundant outdoor recreation afforded by the Rocky Mountains. Located adjacent to the Westminster City Park and Promenade, there are also many attractions within just walking distance.

This year's technical program kicks-off on Sunday, October 9th with a one-day short course on "The Use of Robotics for Antenna Measurements," presented by the pioneers in developing robotic-based antenna measurement systems. On Monday morning the technical session will be launched by this year's keynote speaker Dr. Marla Dowell, the Director of the Communications Technology Laboratory at National Institute of Standards and Technology (NIST). Tuesday's IEEE invited speaker will be Erik Lier of Lockheed Martin, followed by our EurAPP invited speaker, Francesco D'Agostino from the University of Salerno, Italy on Wednesday. Dr. Chris Holloway of NIST will be presenting at Thursday's Lunch and Learn. On Friday we will close out the week with a technical tour of NIST's Boulder campus. The tour will include the new robotic based antenna measurement systems that have been recently listed as an NMI on-axis gain calibration service with BIPM.

The week's social program begins with the Sunday evening Welcome Reception, sponsored by NSI-MI Technologies. This event will be hosted in the Westin Lake House, offering a scenic sunset view over the Rocky Mountains. The Monday Night Outing, sponsored by MVG and NPM, will take us to the Wynkoop Brewing Company, Colorado's original craft brewpub located in downtown Denver. Companion tours will offer the opportunity to visit the Denver Botanical Gardens, Estes Park and the historic Stanley Hotel, made famous by Stephen King's "The Shining", and Denver's Meow Wolf Exhibition. And what would be a trip to Colorado without an opportunity to enjoy our scenic outdoors? Those arriving early are welcome to join my lovely wife for a leisurely hike Sunday morning on the nearby Flatirons, weather permitting.

On behalf of the AMTA 2022 Host Committee, the National Voluntary Laboratory Accreditation Program (NVLAP), National Institute of Standards and Technology (NIST), and the Colorado School of Mines, we look forward to seeing you in Colorado!

Jeff R. Guerrieri
National Voluntary Laboratory Accreditation Program (NVLAP)



Future Symposia

2023 October 8 - 13, Seattle, WA
Hosted by The Boeing Company

2024 October 27 - November 1, Cincinnati, OH
Hosted by Resonant Sciences

2025 Tucson, AZ
Hosted by Raytheon Missiles & Defense

2026 Austin, TX
Hosted by ETS-Lindgren

AMTA 2022 Schedule

7 a.m. 8 a.m. 9 a.m. 10 a.m. 11 a.m. noon 1 p.m. 2 p.m. 3 p.m. 4 p.m. 5 p.m. 6 p.m. 7 p.m. 8 p.m. 9 p.m. 10 p.m.

Sunday Oct. 9
- Sunday AM Hike
- SC Lunch
- Breakfast
- Short Course
- Registration
- Welcome Reception

Monday Oct. 10
- Exhibits
- Registration
- Companion Suite Breakfast
- Breakfast
- Companion Tour, Denver Botanical Gardens & Pearl St. Mall
- Opening Keynote
- Session 1
- Break
- Session 2
- Exhibitors' Sponsored Lunch
- Session 3
- Break
- Session 4
- Monday Night Outing at Wynkoop Brewing Company

Tuesday Oct. 11
- Registration
- Exhibits
- Exhibits
- IEEE 1720 Near- field Measurement Std Working Group
- Companion Suite Breakfast
- Breakfast
- Companion Tour, Stanley Hotel & Downtown Estes Park
- Student Day Activities
- Invited Talk
- Session 5
- Break
- Session 6
- AMTA Business Lunch
- Session 7
- Break
- Session 8 Poster Session
- Exhibitors' Reception

Wednesday Oct. 12
- Registration
- Exhibits
- Breakfast
- Companion Suite Breakfast
- IEEE Antenna Standard 1128
- Companion Tour, Meow Wolf
- Invited Talk
- Session 9
- Break
- Session 10
- Lunch
- Session 11
- Break
- Session 12 Poster Session
- Reception
- Banquet

Thursday Oct. 13
- Registration
- Breakfast
- Companion Suite Breakfast
- Session 13
- Break
- Session 14
- Lunch & Learn
- Session 15
- Break
- Session 16
- Closing Remarks, Door Prizes

Friday, Oct. 14
- Technical Tour National Institute of Standards and Technology

Stay up to date with the latest conference information!

At the conference, look for the link to download the **AMTA 2022 mobile app.**

You'll have instant access to awesome features like:

- The full event schedule
- Contact info of other attendees
- Detailed info about speakers, exhibitors, and sponsors
- Notifications of important activities, updates, and more

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AMTA 2022 Host: Jeff Guerrieri

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Amanuel Haile, The Boeing Company

Fernando Las-Heras, Oviedo University

Teh-Hong Lee, The Ohio State University

Edward Urbanik, Applied Research Associates

Social Calendar

Sunday, October 9

Welcome Reception
6 - 7:30 p.m.

Sponsored by NSI-MI Technologies
Cost: Complimentary with registration

Enjoy drinks and appetizers with friends and colleagues in the Westin Lake House, while enjoying a scenic sunset view of the Rocky Mountains. This event is complimentary to all registered symposium participants and their guests.

Monday, October 10

Wynkoop Brewing Company
6:30 - 9:30 p.m.
Sponsored by Microwave Vision Group (MVG) and Next Phase Measurements (NPM)

Cost: $65
Housed in what was the J.S. Brown Mercantile Building, built in 1899 to support the city's mining and railroad expansion, the Wynkoop Brewing Company is Denver's first brewpub. Enjoy handcrafted beer and great food while sharing a game of pool with friends. Buses will depart the hotel at 6 p.m.

Tuesday, October 11

Student Day
11 a.m. - 7 p.m.

Dinner sponsored by STAR Dynamics
Cost: Complimentary to all student attendees

Student Day will provide an opportunity for local university students to get a taste of antenna engineering and related disciplines by interacting with practicing engineers in a variety of venues. As in previous years, students will be able to tour vendor exhibits, sit in on papers, and enjoy a complimentary meal while listening to a presentation targeting issues relevant to those soon entering the engineering profession. In addition, AMTA will host a hands-on Student Day Design Contest. This will give students an opportunity to show off their engineering skills to recruiters (students should bring their resumes!) and have fun at the same time.

Wednesday, October 12

Banquet Reception
6:30 - 7:30 p.m.

Banquet Dinner & Awards
7:30 - 9:30 p.m.

Banquet wine sponsored by the Microwave Vision Group (MVG)

Cost: Included In full registration; $90 per additional ticket.
We will start the Awards Banquet with a reception in the Legacy Foyer at 6:30, then at 7:30 move into the Legacy Ballroom for dinner and awards ceremony. The banquet is included with full registration.

Friday, October 14

Technical Tour – NIST
8 a.m. - Noon.

The tour will include the new robotic based antenna measurement systems that have been recently listed as an NMI on-axis gain calibration service with BIPM.

Other stops on the tour will include the National Broadband Interoperability Test Bed, and the Public Safety Communications Research and National Advanced Spectrum and Communications Test Network programs.

- Meet in the hotel lobby at 8 a m. Buses will depart at 8:15 a.m.
- All attendees will be required to provide an approved form of identification on-site in order to enter facility.
- Foreign nationals will need to submit additional information several weeks in advance.
- Limited to 45 attendees

Companion Tours

Denver Botanic Gardens at York Street plus the Pearl Street Mall

Monday, October 10

9 a.m. - 4 p.m.

Join this docent-led tour and encounter a wide range of distinctive gardens on 24-acres that celebrate a Western identity and the unique high-altitude climate and geography. Other gardens include a Japanese Garden, Scripture Garden, and Sensory Garden. The tour is approximately 60 minutes. Next we'll travel to Boulder's Pearl Street Mall. Grab lunch at one of the famed local eateries with some time for shopping or visit the Boulder Museum of Modern Art. Meet in lobby at 8:45 a.m.

Stanley Hotel and Downtown Estes Park

Tuesday, October 11

8:30 a.m. - 4:30 p.m.

Immerse yourself in the rich story of the history of The Stanley Hotel! This one hour tour will introduce you to Mr. F.O. Stanley, his wife Flora, Stephen King, and other noteworthy visitors since 1909. The Stanley Hotel Historic Day Tour is a unique way to experience the hotel's history, architecture, folklore, and pop culture with a knowledgeable storyteller. Then visit Downtown Estes Park to have lunch and explore the village. Peaks rise all around, from 8,500 feet to more than 14,000 feet, for gorgeous views in every direction. Galleries and shops present a variety of practical to whimsical. Wildlife is still so plentiful that elk wandering downtown seem like the official welcoming committee. Meet in lobby at 8:15 a.m.

Meow Wolf

Wednesday, October 12

9 a.m. - 3 p.m.

"Come as you are. Leave transformed." Convergence Station is Meow Wolf's third permanent exhibition. Discover immersive, mind-bending art and an underground rich narrative as you journey through 4 floors of 70+ installations, rooms, and portals. Together they tell an unforgettable, cathartic tale of converged worlds. Have lunch at the Meow Wolf café before our return to the Westin.

Please meet in the Westin lobby at 8:15 a.m.
Comfortable walking shoes recommended.
Lunch is on your own. Please bring money for lunch and gratuities.

Short Course

Sunday, October 9
7:30 a.m. - 4:30 p.m.
Standley Ballroom

Application of Robotics for Antenna Measurements

Robotic arms, often referred to as an industrial robot, are designed to emulate a human arm using multiple joints that either move along an axis or can rotate in certain directions. They can be programmed to perform a specific task quickly, efficiently, and extremely accurately. For these reasons, they are commonly used for manufacturing, fabrication, and industrial applications. However, their motion flexibility makes them highly reconfigurable and adaptable to numerous applications. In recent years, there has been much developmental work applying this technology for antenna measurements as robotic arms provide antenna positioning that would be constrained by conventional measurement systems. This year's short course provides an introduction into this exciting new area in antenna measurement technology. Our subject matter experts will provide a brief introduction to the world of robotics and discuss how robots might be used for electromagnetic measurements in general and antenna measurements in particular.

Course Outline and Schedule:

7:30 - 8:30 a.m.	Registration and Breakfast
8:30 - 8:45 a.m.	Introduction
8:45 - 9:00 a.m.	Why Robots in Antenna Metrology
9:00 - 10:00 a.m.	Math and Language of Robotics
10:00 - 10:15 a.m.	Break
10:15 - 11:00 a.m.	Calibration of Robot Position and Orientation
11:00 - 11:45 a.m.	Programming, Planning and Control
11:45 a.m. - 12:00 p.m.	Considerations for Antenna Ranges
12:00 - 1:00 p.m.	Lunch
1:00 - 1:30 p.m.	Safety Aspects
1:30 - 1:45 p.m.	Conventional Antenna Measurements (Summary)
1:45 - 2:30 p.m.	Robot-Based Antenna Measurements
2:30 - 2:45 p.m.	Break
2:45 - 3:15 p.m.	NIST Robotic Measurement System
3:15 - 3:45 p.m.	Boeing Robotic Measurement System
3:45 - 4:15 p.m.	IHF Robotic Measurement System
4:15 - 4:30 p.m.	Conclusion

Instructors:

Dennis Lewis
Boeing Technical Fellow
The Boeing Company

Dr. Joshua Gordon
Project Leader for the NIST Antenna Metrology Project
National Institute of Standards and Technology

Roland Moch
PhD Student
RWTH Aachen University

Greg Masters
Vice President & Chief Technology Officer
Next Phase Measurements

Benjamin Moser
PhD Student
Colorado School of Mines

Dr. Andrew Petruska
Associate Professor of Mechanical Engineering and Robotics
Colorado School of Mines

Keynote Speaker

Marla Dowell

NIST Communications Technology Laboratory (CTL) and NIST Boulder Laboratory

NIST: Driving Advanced Communications Technology through Partnerships and R&D

Monday, October 10, 8:15 - 8:55 a.m.

Marla Dowell is Director of the NIST Communications Technology Laboratory (CTL) and NIST Boulder Laboratory. NIST has a long role in advanced wireless communications going back over 100 years, to the development of the first radios running on AC electricity and radio triangulation techniques used during World War I. Today, NIST CTL serves as the leader for advanced communications standards and measurements, enabling dramatic changes in how consumers, manufacturers, governments, and others provide and consume information, transact business, provide and use essential services, among many other tasks. NIST CTL works closely with its partners in industry, academia, and across the federal government to address the insatiable societal demand for connectivity, one that requires significant advancements in communication technologies.

Dr. Dowell has served the broader NIST community as a member of the NIST Assessment Review Board, NIST Safety Council, and the NIST People Council. For over 15 years, she has served as a mentor in NIST leadership programs and has learned a great deal from mentees on the changing workforce needs. In addition, she has represented NIST on national and international standards committees for optics and photonics as well as external advisory committees on research innovation, photonics, and communications.

Dr. Dowell's breadth of technical expertise and superior people management skills have been recognized by several prestigious awards: Department of Commerce Silver Medal, NIST Equal Employment Opportunity/Diversity Award, Judson C. French Award, Allen V. Astin Award, and the Arthur S. Flemming Award from George Washington University.

Dr. Dowell is a senior member of IEEE, as well as a member of AAAS, AAUW, APS, and SPIE.

IEEE AP-S Invited Speaker

Erik Lier

Lockheed Martin

Metamaterials – A Manipulation of Waves

Tuesday, October 11, 8 - 8:30 a.m.

Erik Lier received his M.Sc. and Ph.D. from the Norwegian University of Science and Technology, Trondheim, Norway. He started working as a research scientist at the university and later Electronics Laboratory (ELAB/SINTEF), carrying out national and international research on microwave antennas. He co-invented the concept of "Soft and Hard electromagnetic surfaces," which is related to the field of electromagnetic bandgap (EBG) structures and complex surfaces. He spent a year at UCLA as a visiting scholar. Since 1990 he has been with Lockheed Martin Space, where he has been involved in developing new spacecraft antennas and payload technologies. He has been instrumental in building up internal technology on shaped reflector and active phased array design and calibration. He has been involved in the development and modernization of the GPS satellite payload for 25 years. He was the phased array architect for two antenna payloads launched into space. He headed up the internal metamaterials research collaboration effort, including university collaboration, which has led to several groundbreaking and practical metamaterial-enhanced antennas for space and ground applications.

He is granted 37 US patents, has authored and co-authored over 140 journal and conference papers, including two papers in the journal Nature, co-authored one book and authored a book chapter. He received the 2014 IEEE AP-S Harold A. Wheeler Applications Prize Paper Award. He is an IEEE AP-S Distinguished Lecturer, a Lockheed Martin Senior Technical Fellow, a Life Fellow of IEEE and a Fellow of IET.

EurAAP Invited Speaker

Francesco D'Agostino

University of Salerno

The Application of the Non-Redundant Sampling Representations of the Electro-magnetic Fields in Antenna Measurement

Wednesday, October 12, 1:30 - 2 p.m.

Francesco D'Agostino (Senior Member, IEEE) was born in Salerno, Italy, in 1965. He received a bachelor's degree in electronic engineering and Ph.D. degree in information engineering from the University of Salerno in 1994 and 2001, respectively. From 2002 to 2005, he was an Assistant Professor with the Faculty of Engineering, University of Salerno. In October 2005, he was appointed as an Associate Professor of Electromagnetics and joined the Department of Industrial Engineering, University of Salerno, where he is currently working. His research activity includes application of sampling techniques to electromagnetics and to innovative NF-FF transformations, diffraction problems, radar cross section evaluations, electromagnetic compatibility. In this area, he has co-authored four books and over 260 scientific papers, published in peer-reviewed international journals and conference proceedings. He is a regular reviewer for several journals and conferences. He has chaired some international events and conferences. He is a member of AMTA and EurAAP.

Lunch & Learn

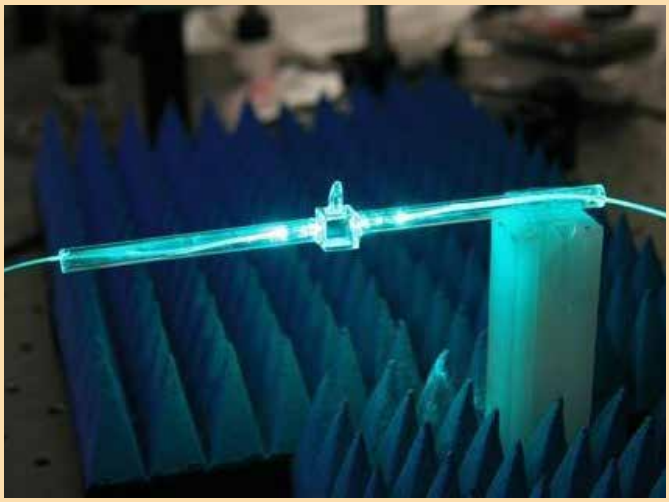
Dr. Christopher Holloway

NIST

Rydberg Atom-Based Sensors:
The Quest for Fundamentally New SI-Traceable Measurement Techniques and the Development of New Sensing Capabilities

Thursday, October 13, Noon - 1:30 p.m.

Dr. Christopher Holloway is a Fellow of the IEEE and has been at NIST for over 25 years. He is also on the Graduate Faculty at the University of Colorado at Boulder. He received his B.S.E degree from the University of Tennessee, and his master and PhD degrees from the University of Colorado at Boulder. He is an expert in electromagnetic theory and metrology, quantum-optics, Rydberg-atom systems, and atom-based sensors. He has a publication h-index of 55 with over 300 technical publications (including 143 refereed journal papers and 130 conference papers) and has over 12,000 citations of his papers. He also has 10 patents in various fields in engineering and physics. He is the project leader for the Rydberg-Atom-Sensor Project and is the group leader for the Electromagnetic Fields Group.



Rydberg Probe © NIST

AMTA 2022
Distinguished Achievement Award

Antenna Measurement Techniques Association
Distinguished Achievement Award
Presented to

Dr. Vince Rodriguez

The AMTA hereby cites Dr. Vince Rodriguez for:

- Leadership in driving anechoic material and anechoic chamber design, EMC measurements, and antenna design and measurement.
- Leadership in developing antenna designs, antenna measurement standards, recommendations, procedures, and best practices.
- The design and development of novel antenna, feed, and probe designs including the introduction and development of the open-boundary quad-ridged and dual-ridged horn antennas.
- Contributions to the introduction, design, and development of hybrid absorber.
- Fostering education and technical growth of the next generation of engineers and scientists in the area of antenna measurements by serving as Distinguished Lecturer for the EMC Society, Adjunct Research Professor of Electrical Engineering at the University of Mississippi and presenting in numerous short courses.
- Contributions through publication by authoring or co-authoring over seventy conference papers, thirty journal publications, and three books on anechoic range design for electromagnetic measurements.
- For his many ongoing years of AMTA support including serving on the Board of Directors from 2010-2012 in the positions of Secretary and Vice President.
- For outstanding and pioneering contributions to the practice of material design, analysis, and measurements.

For exemplifying and promoting the goals and objectives of the Antenna Measurement Techniques Association.

Dr. Vince Rodriguez was born in Madrid, Spain to a family of Cuban exiles. His parents gave him the opportunity to study in the United States where he attended The University of Mississippi (Ole Miss) and obtained his B.S.E.E. in 1994. There, he was introduced to electromagnetic theory by Professors Elsherbeni, Kajfez, Kishk, and Glisson, after which he decided to continue his studies in electrical engineering. Following graduation, Dr. Rodriguez joined the Department of Electrical and Computer Engineering at Ole Miss as a research assistant. During his tenure there, he earned his M.S. and Ph.D degrees, both in engineering science with an emphasis in electromagnetics, in 1996 and 1999, respectively.

Dr. Rodriguez joined EMC Test Systems (now ETS-Lindgren) as an RF and electromagnetics engineer in June 2000. In this position, he was involved in e-field generator design and the RF design of several anechoic chambers, including rectangular and tapered antenna pattern measurement chambers operating from 100MHz to 40GHz. He was also the principal electromagnetics engineer for the anechoic chamber project at the Brazilian Institute for Space Research (INPE). INPE has the largest anechoic chamber in Latin America capable of testing vehicles, EMC and satellites.

In September 2004, Dr. Rodriguez was promoted to senior principal antenna design engineer with responsibilities in developing new antennas for different applications and improving on the existing antenna line. During this period, he introduced the concept of the open-boundary quad-ridged horn at AMTA in 2005. In the fall of 2010, he became ETS-Lindgren's antenna product manager, where he oversaw all technical and marketing aspects of the antenna products. While mainly dedicated to antenna design, Dr. Rodriguez continued his involvement in anechoic chamber design.

Dr. Rodriguez joined MI Technologies (now NSI-MI Technologies) as senior applications engineer in November 2014. In this role, Dr. Rodriguez worked on antenna design, RCS, HWiL, and radome measurement systems, as well as designing several associated anechoic ranges. In 2017, Dr. Rodriguez was promoted to staff engineer, positioning him as the resident expert of RF absorber and indoor antenna ranges at NSI-MI. He continued to be involved in the design of antennas and special RF absorbers to meet the necessary specifications of large systems. In 2019, he was promoted to senior staff engineer given his stature in the industry. He was most recently appointed manager of the newly created chamber engineering group, where he directs the design of anechoic ranges.

Dr. Rodriguez is the author of more than 30 journal publications and over 70 conference papers, including over 25 AMTA papers. He is the author of a very well-received book on anechoic chamber design and has authored chapters in two other books. He is a senior member of the IEEE and several of its technical societies. Among these, he is a EMC Society member, where he served as distinguished lecturer from 2013 to 2014 and on the IEEE-EMC Board of Directors. Dr. Rodriguez also served as secretary in the IEEE AP-S Standards Committee and as secretary for the IEEE STD 149 and IEEE STD 1128 Working Groups. He currently serves as co-chair for the IEEE STD 1720 Working Group. Dr. Rodriguez is also a member of the Applied Computational Electromagnetic Society (ACES), where he served on its board of directors from 2014 to 2017. In 2019, he was elevated to an ACES Fellow. He has served as a reviewer for the ACES Journal, the IEEE Transactions on Antennas and Propagation, Electronic Letters and for the Journal of Electromagnetic Waves and Applications (JEWA). He has also served as reviewer for several IEEE, AMTA, ACES and EuCAP conferences and as chair of sessions at several conferences of the IEEE, AMTA, and CPEM (Conference on Precision Electromagnetic Measurements). Dr. Rodriguez has been Adjunct Research Professor of Electrical Engineering at Ole Miss since 2017 and is a full member of the Sigma Xi Scientific Research Society and Eta Kappa Nu Honor Society. Dr. Rodriguez holds patents for hybrid absorber and a dual ridge horn antenna.

Vince has been a member of the Antenna Measurement Techniques Association (AMTA) since 2000. On the Board of Directors of AMTA, he served as Meeting Coordinator (2010-2011) and Vice President during 2012. In 2014, he was named a Edmond S. Gillespie Fellow.

AMTA 2022
Distinguished Service Award

Antenna Measurement Techniques Association
Distinguished Service Award
Presented to

Peter J. Collins

The 2022 AMTA Distinguished Achievement Award is presented to Dr. Peter Collins, who throughout his career has exemplified and promoted the goals and objectives of the Antenna Measurement Techniques Association.

The AMTA hereby cites Dr. Peter Collins for:

- Fostering education and technical growth of the next generation of engineers and scientists in the area of antenna measurements through his extensive involvement with the AMTA Student Day, including mentoring, lectures and instituting the first Student Day Design Contest in 2013.
- Contributions through service on the Antenna Measurement Techniques Association Board of Directors in the positions of Secretary (2013-2014), President (2015) and Past President (2016).
- Serving as Co-host of AMTA 2013 Symposium in Columbus, Ohio.
- Contributions to the Technical Program Committee, Student Paper Award Committee, and Session Chair at numerous AMTA Symposia.
- Many years of service on the AMTA Web Oversight Committee (WOC).
- Serving on the AMTA Awards Committee and AMTA Nominating Committees in 2015 and 2016.
- For his many ongoing years of AMTA support.
- For outstanding contributions to AMTA in numerous areas of service.

Peter J Collins is currently a senior staff engineer with Resonant Sciences (RS), Dayton. Ohio. He is a Fellow of the Antenna Measurement Techniques Association (AMTA), Senior Member of the IEEE, and member of the Eta Kappa Nu and Tau Beta Pi honor societies. With over 35 years of government subject matter expert experience, Dr. Collins has served in many positions throughout the Department of Defense (DoD). Highlights include a term as commander of the National RCS Test Facility (NRTF), where he led a diverse team of government and contractor scientists, engineers, and technicians to ensure testing and upgrades at the Air Force's premiere outdoor static RCS range. Upon retirement from active duty, Dr. Collins joined the Air Force Institute of Technology (AFIT) where he served as Professor of Electrical Engineering. In addition to advising over 50 graduate students, Dr. Collins was the Low Observables (LO) Curriculum Chair responsible for ensuring AFIT's LO program met the needs of the Air Force and broader DoD. While at AFIT, Dr. Collins received the 2013 Secretary of the Air Force Harold Brown Award for survivability technology development including efforts to develop low frequency noise radar enabled RCS measurement systems and a patented low clutter bistatic measurement concept for indoor RCS measurement. In addition to his academic service, Dr. Collins served the National RCS Measurement Facility Certification Program as an Executive Committee Member for five years, pushing for balance in QA best practices and test cost. His long association with the certification program includes time as an RCS range reviewer for the Air Force Research Laboratory's Advanced Compact Range, the AFRL Mobile Diagnostic Laboratory, Northrop Grumman's SAF II Compact Range, and the Tejon Outdoor Far-field Range.

Dr. Collins has been a member of AMTA since 2002 and was elected a member of the Board of Directors in 2012. He served as co-host of AMTA 2013, AMTA Secretary (2012-2014), President (2015), and Past President (2016), as well as serving on the Technical Program Committee, Student Paper Committee, AMTA web committee and Session Chair for many years. Dr. Collins' passion for students as the next generation of AMTA engineers is evident in his extensive involvement with the AMTA student day. Over the years he's served as a student day mentor, guest speaker, and lecturer. In 2013, Dr. Collins instituted AMTA's first student day design contest which drew a record number of students. Building on a tutorial introducing electromagnetic scattering and RCS reduction, the students are afforded an opportunity to put what they've learned into practice while working alongside AMTA vendors measuring their creations. This vendor involvement is a key motivator for the students and helps build mentor relationships that keeps AMTA vital year after year.

For outstanding contributions to AMTA in numerous areas of service.

Edmond S. Gillespie Fellows 2022

AMTA 2022 Fellows

The following outstanding contributors were awarded Fellow membership status in 2022:

Dirk Heberling **Scott McBride**

Dirk Heberling studied electrical engineering and graduated with a Dipl. Ing. degree from RWTH Aachen University, Aachen, Germany in 1987. There he also received the Dr. Ing. degree in 1993 for his thesis on conformal microstrip antennas.

From 1987 to 1993, Dirk was employed as a scientist at the Institute for RF- Technologies, RWTH Aachen University. In 1993, he joined IMST GmbH, Kamp-Lintfort, Germany to establish a new Antenna Section; and from 1995 to 2003 he was head of the Antennas Department, which was reorganized into the Department of Antennas and EMC in 1998. From 2003 to 2008, Dirk was Head of the Department of Information and Communication Systems of IMST GmbH. Since 2008, he has been employed with RWTH Aachen University where he is Head of the Institute and Holder of the Chair for High Frequency Technology. In addition, in 2016 he became Director of the Fraunhofer Institute for High Frequency Physics and Radar Techniques, FHR.

Prof. Dr. Ing. Heberling is a member of VDE and from 1998 to 2017, he was a member of the ITG expert group 7.1 “Antennen”, which he directed as a chairman from 2002 to 2003 and again from 2014 to 2017. During this time, he was responsible as General Chairman and organizer of the international antenna conference INICA 2003 and the German microwave conference GeMiC 2014. Since 1998, he has been a member of the European competence projects for antennas COST 260, COST 284, IC0603 and IC1102; from 2002 to 2007 he was the German delegate of COST 284; and from 2011 to 2016, the German delegate and Secretary of IC1102. From 2002 to 2003, he was co- organizer of the European network of excellence on antennas ACE. In 2016, Dirk was elected for 4 years in the technical decision board, Fachkollegiat, of the German Research Foundation DFG. From 2016 to 2019, he was member of the Board of Directors of the Antenna Measurement Techniques Association (AMTA) where he served as President in 2018 and has been a Senior Member since 2020. He is also a member of the steering committee and organizing committee for the European Conference on Antennas and Propagation (EuCAP).

Scott McBride received his BEE and MSEE degrees from Georgia Tech in 1986 and 1992, respectively. He first set foot on an antenna-measurement range as a co-op student with the Georgia Tech Research Institute (GTRI) in 1982. He has been working in and around the field of radiated-RF measurements and analysis in the 40 years since with GTRI (1986), AEL/Cross Systems (1993), Boeing (1996), and then NSI-MI Technologies (1999-present).

Scott’s first AMTA membership was in 1988, when he was on the Host Committee for the symposium in Atlanta. He was elevated to Senior Member status in AMTA in 2009. His 25+ AMTA papers have covered several topics including: quantifying, localizing and/or attenuating stray signals; high-fidelity radome measurements; real-time active probe-position correction; and multi-channel steerable plane-wave generators. He has also been involved in four revisions of international standards for testing antennas and radomes including updating the ANSI/IEEE Standard 149-1979 and developing the IEEE Standard 1720-2012.

Board of Directors Candidates

Lawrence Louis Mandeville

Lawrence has been a continuous attendee to the AMTA since 1979. Lawrence has been a presenter, session chair, technical paper submittal evaluator, and a Board of Directors member (2004-2008), where he held positions as AMTA Secretary, AMTA President, and AMTA Past President. Lawrence has received the AMTA Distinguished Service Award, and the Outstanding Service Award and is an Edmond S. Gillespie Fellow and a Senior member of the AMTA.
Lawrence attended Northeastern University and holds a Master of Science in Electrical Engineering Technology from Alameda University. Lawrence has been in the aerospace industry since his early years at MIT Lincoln Laboratory (1968 -1978), Scientific Atlanta Instrumentation Division (Now NSI-MI Technologies) (1978-1987), as an operations manager at the McDonnell Douglas Radar Measurement Center in Rancho Bernardo, CA (1989-1991), a US Navy consultant at both the China Lake Weapons Systems Center and Point Mugu Weapons Systems, and facility chief scientist at Diatech Engineering Inc. (1991-1996). Lawrence held positions at Raytheon Missile Systems as a design engineer, manufacturing engineer, test systems engineer, and a supply chain consultant for Supplier Engineering (1996-2018), specializing in RF and antenna technologies. Lawrence is presently a consulting engineer for Northrop Grumman Defense Electronic Systems in Northridge, CA.

As a member of the AMTA Board of Directors, Lawrence was responsible for establishing the Senior Membership Award and the Edmond S. Gillespie Fellowship Award. Lawrence was also the Local Host for the very first local Technical Exchange Meeting in Tucson, AZ in 2009 and the Co-Host of the 2014 AMTA Symposium in Tucson, AZ.

As a member of the AMTA Board of Directors, if elected, Lawrence plans to continue in promoting the AMTA as one of the significant professional organizations for the betterment of antenna technology, antenna test measurement techniques, radar cross section measurements, antenna design, and antenna modeling. Lawrence would like to champion efforts for the AMTA towards furthering the inclusion of more electromagnetic and antenna students and young engineers. He appreciates your vote for the 2023 Board of Directors.

Michelle Lepage

North American Sales Manager for AP Americas Inc.
Edmonton, Alberta, Canada

Michelle grew up in the shielding and anechoic chamber industry starting from the young age of 12. Consistently learning new products, industry standards and keeping up with evolving technologies kept her interested and engaged in the subjects of shielding, EMC, and antenna measurement. As an employee of a prominent shielding and anechoic chamber solutions company, she has matured and evolved into multiple different roles along the way, which has led her to becoming an enthusiastic and successful contributing member in business development within the industry. These roles have included operations, customer service and responsibility for direct sales to important clients in the EMC and antenna measurement industries. While constantly striving for positive growth, her determination to improve and develop complex offerings as well as a commitment to supporting industry organizations in different environments does not go unnoticed.

Michelle attended Carleton University to complete a Bachelor of Arts Degree in Economics and has continued her knowledge base in shielding, EMC, and antenna measurement industries for over 14 years.

Michelle has been involved on the AMTA Host committees for the past two years. She holds the position of Exhibits Coordinator. While working alongside the Conference Management Team, she is responsible for organizing, coordinating, and communicating with the exhibitors, host committee members and board members as required regarding exhibitor and sponsorship topics. She hopes to continue to grow her role in the AMTA community by proudly becoming an AMTA Board Member. If chosen for this role, she will continue to put her best efforts forward to grow with the AMTA community and assist the dedicated team in expanding and achieving new goals. Thank you for your consideration.

Daniel N. Aloi

Daniel N. Aloi has over 23 years of experience in antenna design and antenna measurement experience. He received his B.S. (1992), M.S. (1996) and Ph.D. (1999) degrees in electrical engineering from Ohio University, located in Athens, Ohio, USA. He served as a Research Assistant from 1995–1999 in the Avionics Engineering Center within the School of Engineering and Computer Science at Ohio University; Summer Intern at Rockwell International in Cedar Rapids, Iowa, and Senior Project Engineer at OnStar, Incorporated, a subsidiary of General Motors from 2000–2002. He has been employed in the Electrical and Computer Engineering Department at Oakland University in Rochester, Michigan from 2002 until present. He is currently a full professor, Director of the Applied Electromagnetics and Wireless Lab, and the Director of Research for the School of Engineering and Computer Science. He has garnered over 12 years of academic administrative leadership as department chair (9.5 years) and Director of Research (2.5+ years) throughout his career.

Dr. Aloi received a National Science Foundation Major Research Instrumentation Award in 2005 for the acquisition of an on-campus, outdoor, Automotive Spherical Quasi/Near-field Antenna Measurement System. He has authored/co-authored over 46 journal papers, 75 conference papers and is an inventor on 6 patents.

His research has been predominantly in antenna design and antenna measurements and has relied on advancing his knowledge in these technical areas via his membership in AMTA. Specifically, he has relied on AMTA's digital library and its annual symposium to contribute technical papers and grow his technical network of colleagues and vendors. He finds it amazing that AMTA started in 1979 and has grown from 40 to 500 members during that time. With the proliferation of new wireless technologies and sensing systems there is significant opportunities to grow its membership further. If elected, he will collaborate with the BoD to do the following: 1) Grow AMTA membership; 2) Attract papers from emerging industries to AMTA conferences, and 3) Increase attendance by diverse audiences at AMTA conferences. His experience as an academic based at a public university in Southeast Michigan in the heart of the US automotive industry, along with my experience in automotive antenna measurements and design for the past 20 years, will be utilized to help AMTA achieve the three aforementioned goals. In addition, his leadership and technical experience along with his collaborative approach will be a good fit with other AMTA BoD members. Please support him with your vote to serve on the AMTA BoD and to contribute to its continued growth.

2022 Outstanding Service Awards

Jeffrey Bean, 2020 President

Stuart Gregson, 2021 Vice President

Dave Pinnell, 2021 Host Chair

National Institute of Standards and Technology (NIST), AMTA 2022 Host

National Voluntary Laboratory Accreditation Program (NVLAB), AMTA 2022 Co-Host

Colorado School of Mines, AMTA 2022 Co-Host

2022 Senior Members

Stephen Blalock, NSI-MI Technologies

Ryan Cutshall, Raytheon Missiles and Defense

Wei Fan, Aalborg University

Andrea Giacomini, Microwave Vision Group (MVG)

Amanuel Haile, The Boeing Company

Randy "Jerry" Jost, STAR Dynamics Corp.

Ron Lavin, The Boeing Company

John Locke, Molex Connected Mobile Solutions

John McKenna, NSI-MI Technologies

Adam Mehrabani, NSI-MI Technologies

DVB (Raja) Murthy, Altair Engineering Inc.

Patrick Pelland, NSI-MI Technologies

Louis Sheffield, STAR Dynamics Corp.

2022 Student Travel Scholarship Recipients

You Hua Lin
National Taiwan University of Science and Technology

Jorge Calatayud Maeso
Universidad Politécnica de Madrid

Exhibitors

412TW Benefield Anechoic Facility

The Benefield Anechoic Facility (BAF) is a uniquely large anechoic chamber that provides comprehensive, robust and scalable radio frequency tests and evaluation infrastructure with the capability to ensure weapons system survivability and mission effectiveness for the DoD, industry (military and commercial) and our allies. In addition, we provide laboratory facilities and modeling and simulation capabilities that include man-in-the-loop simulators, hardware-in-the-loop labs and digital integrated air defense M&S. Lastly, we offer invaluable resources and technical expertise as uniquely required for each customer and their specific program.

7GAA

7G aa Co. Ltd. is a startup company of AIST. Recent research topics are electromagnetic field (EM-field) measurement using mobile robots, and antenna measurement technologies for 5G frequency bands and millimeter-wave bands up to 110 GHz. Further, we have already developed the RoF (Radio over fiber) systems for microwave devices, antenna measurements, and millimeter-wave generator using RoF technology more than 50 GHz (up to 320 GHz in near future). We can totally support your antenna measurements and microwave measurement.

Agile RF Systems

The Agile RF Systems mission is to apply state-of-the-art expertise in mechanically and electrically steered antennas for RF through mmW applications. ARS specializes in four business segments: tactical radars for weather and counter UAS, SATCOM AESA's, MMW Antennas for communications and remote sensing, and a variety of Space Deployable antennas for comm, radar and remote sensing. ARS recently completed construction of a facility in Berthoud, CO (between Fort Collins and Denver) housing a state of the art Robotic Near Field Antenna Range developed by Next Phase Measurement (30×20 ft in planar mode). Test services are available (info@agilerfsystems.com)

Advanced Test Equipment Corp

Advanced Test Equipment Corp. (ATEC) is a leading provider of test & measurement equipment rentals, sales, calibration, and service. Since 1981, test engineers, government agencies, and Fortune 500 companies have relied on ATEC to guide them to the right equipment, ship it quickly, and offer them the industry's best technical expertise and customer care. ATEC's broad inventory includes EMC, Power Supplies & Loads, RF Safety, Electrical, NDT, Environmental, Communications, and General Purpose test equipment. Explore the ATEC inventory at www.atecorp.com.

Altair

Altair is a global leader in computational science and artificial intelligence (AI) that provides software and cloud solutions in simulation, high-performance computing (HPC), data analytics, and AI. Altair enables organizations across all industries to compete more effectively and drive smarter decisions in an increasingly connected world – all while creating a greener, more sustainable future. For more information, visit https://www.altair.com/.

Exhibitors

AMTA 2023

Host The Boeing Company and Co-Host ETS-Lindgren welcome you to the 45th Annual AMTA Symposium in Seattle from October 8-13, 2023. Surrounded by water, mountains, and evergreen forests, Seattle is home to a large tech industry, with Microsoft and Amazon headquartered in its metropolitan area. Well-known companies SpaceX, T-Mobile US, Starbucks, Expedia, Costco, and of course, The Boeing Company, also have a presence. Join us for AMTA 2023 at the Hyatt Regency Lake Washington at Seattle's Southport. Located on the shores of Lake Washington, the Hyatt combines the beauty of the Pacific Northwest with modern amenities. Enjoy close proximity to Sea-Tac International Airport, downtown Seattle and Bellevue, Mount Rainier National Park, Gene Coulon Memorial Beach Park, and other scenic destinations. Hotel guests can walk the trails along the lake or venture over to The Landing – a family-friendly pedestrian village lined with unique and lively storefronts, over 25 restaurants and lounges, 14 screen cinema, day spas, and boutique shopping.

Anechoic Solutions

New, repurposing or relocating your chamber, we provide the best solutions for your chamber needs.

AP Americas

AP Americas is one of the leading global manufacturers of anechoic chambers and shielded rooms for various applications in EMC, antenna testing, 5G, wireless and high-frequency technology. Our successful solutions are based on the vast technical knowledge and expertise of our team, from sales to execution. We feature the Emerson & Cuming advanced WAVASORB® absorbers for a quality and high performing solution. AP Americas Inc., www.apamericas.com

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APS FireCo

Started in 1981, APS FireCo is a recognized leader in fire protection with unmatched inspection, service, design, and project installation capabilities. We are your single source for fire alarms, fire sprinklers, fire extinguishers, special hazard fire systems and more. APS FireCo has 25+ years designing, installing, and maintaining fire systems in the Anechoic Chamber industry sustaining a strong relationship with 3rd party authority having jurisdictions and property insurance companies satisfying the client's needs. We work with end-users from our five regional operating office locations in Oklahoma and Texas, along with our domestic and international special hazard affiliate network.

Chamber Services

Chamber Services, Inc. is a forward – thinking, Anechoic Facility Design, Construction and Services Company committed to delivering the highest level of service and superior quality products to valued customers.Our services include Anechoic Chamber Design, Consultation and Construction. Including Architectural, Modular and Welded RF Shielded Enclosure Installations/Relocations, RF Shielded Enclosure Maintenance, RF Absorber Material Removal/Installation, RF Absorber Material Maintenance, RCM and Pneumatic RF Shielded Door Installation and Maintenance, Zinc and Copper Coatings Flame Spray Service. Chamber Services Inc. association with the leading RF Shielding and RF Absorber manufactures provides a factory direct source for RF Shielded Enclosures, RF Shielded Doors, RF Absorber Materials, Power and Signal Line Filters, Waveguides, Pipe Penetrations, Custom Test Fixtures, Portable RF Absorber Panels and much more.

Exhibitors

Delta Sigma Company

Delta Sigma has RF Measurement Systems, Automation Systems, and Mixed Reality Systems operating in over 60 Government facilities and aerospace companies in 15 countries, on 5 continents. Delta Sigma is first and foremost an RF measurement systems developer. Our capabilities include complete turnkey RCS and Antenna Test Systems, Near-Field or Far-Field, Indoor or Outdoor. Additionally, we can augment your existing range with advanced 21st century hardware and software to bring modern capacities to an aging facility.

Diamond Microwave Chambers Ltd.

DMC manufactures and supply Anechoic chambers, Antenna measurement system with various positioners and Robotic arm for Near field and Far field system and RF absorbers as turnkey solution

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Dutch Microwave Absorber Solutions BU

What if we told you that there is a broadband RF absorber that doesn't leak carbon particles, contains no toxic chemicals, complies with international fire-retardant standards, offers great EM performance and comes with a 25-year warranty. Sounds incredible right? Except Dutch Microwave Absorber Solutions (DMAS) offers exactly that. We have developed a next generation absorber using EPS that addresses all the shortcomings of absorbers that came before. Furthermore, thanks to excellent and stable performance over a wide range, DMAS absorbers are perfectly suited to incorporate in various EMC and Microwave testing applications.

The IEEE Electromagnetic Compatibility (EMC) Society

is committed to advancing technology through engineering related to the electromagnetic environmental effects of systems - to be compatible with themselves and their intended operational environment. Founded in 1957, the EMC Society addresses standards, measurement techniques and test procedures, instrumentation, equipment and systems characteristics, interference control techniques and components, education, computational analysis, and spectrum management, along with scientific, technical, industrial, professional or other activities that contribute to this field. With more than 3,500 members around the world, over 80 chapters globally, active Young Professionals and Women in Engineering communities, an annual symposium, as well as five peer-reviewed publications available on IEEE Xplore, the EMC Society welcomes your involvement! Visit www.emcs.org for more information.

ETS-Lindgren

ETS-Lindgren offers innovative EMC, Wireless, RF and Microwave test systems, including far-field, near-field, and compact range chambers for RCS and antenna measurement testing. Our global customers represent the automotive, defense/aerospace and wireless industries. Quality components include RF and Microwave absorber, multi-axis positioners, high performance antennas in standard and custom designs, among others. Wireless Systems enable 5G, OTA, MIMO, and CATR testing of mobile and mmWave devices featuring EMQuest™ software for fully automated antenna pattern measurement for passive antennas and active wireless devices. Services include calibration at our A2LA accredited lab and wireless testing at our CTIA Authorized Test Lab (CATL).

Exhibitors

EuCAP 2023

Visit us at the EuCAP 2023 stand to know about plans for next year's European Conference on Antennas and Propagation, which will take place in the amazing city of Florence, Italy from 26th to 31st March. EuCAP 2023 will go back to the classical format having the opportunity to exchange of knowledge and experience and to invigorate the field with young and senior engineers from everywhere. The focus for 2023 will be the link of antennas and propagation with new terrestrial and satellite communication networks. Looking forward to seeing you in Florence!

Hiller Fire Protection

Hiller offers fire protection and life safety products and services that are preserving lives and property around the world. Headquartered in Mobile, Alabama, Hiller extends its reach globally as well as in domestic markets with offices across the United States. For more than 100 years, we have been laser-focused on one goal – making the world a safer place. We are proud to be on the forefront of technology and innovation by creating adaptable safety solutions.

Keysight Technologies

Keysight Technologies, Inc. is a leading technology company that helps its engineering, enterprise and service provider customers accelerate innovation to connect and secure the world. Keysight's solutions optimize networks and bring electronic products to market faster and at a lower cost with offerings from design simulation, to prototype validation, to manufacturing test, to optimization in networks and cloud environments. Customers span the worldwide communications ecosystem, aerospace and defense, automotive, energy, semiconductor and general electronics end markets.

MVG

MVG is a premier supplier of antenna measurement and EMC testing solutions. OUR MISSION : To support the leading edge of advancing companies with the most innovative test and measurement solutions. Dedicated to the Aerospace & Defense, Satellite, Telecommunications, Automotive, EMC&CE industries as well as research institutes, we are the one-stop shop for turn-key systems, solutions and services for near-field and far-field antenna measurement, CATR, RCS, radar, 5G OTA test solutions, and EMC testing. MVG comprises the technical expertise, product portfolios and infrastructures of : SATIMO, Orbit/FR, AEMI, & Rainford EMC. MVG: fast, accurate and reliable test and measurement solutions.

Next Phase Measurements

Next Phase Measurements (NPM) is a California-based US company with a management team comprised of pioneers in the industry, recognized all over the world, having over 100 man-years of experience in antenna measurements. NPM leverages world class established products like industrial robots and integrates them with its state-of-the-art software, NPM-AMS 2.0, to provide turnkey antenna measurement systems and upgrades for Near-Field, Far-Field, CATR, and RADOME. NPM is also the distributor and Value-Added Reseller across both American continents for Antenna Systems Solutions, a leading supplier of antenna measurement systems to the worldwide Aerospace, Defense, Commercial, Automotive, Wireless, Academic and Research markets.

NIST

NIST will be showcasing the antenna calibration services at this booth.

Exhibitors

NSI-MI

NSI-MI Technologies is the premier source for advanced RF measurement solutions for aerospace, defense, satellite, wireless applications and beyond. Our elite team of experts oversee every step of the design, construction, and system integration process, with a broad customer service network for long-term support. Whether investing in a turnkey system, a precision component, or a customized solution, we take your specific RF measurement requirements and execute a solution unparalleled in accuracy, performance, and quality. You can always Test with Confidence™ at NSI-MI.

NVLAP

The National Institute of Standards and Technology (NIST) administers the National Voluntary Laboratory Accreditation Program (NVLAP). NVLAP provides accreditation services through various laboratory accreditation programs (LAPs). Accreditation requirements are established in accordance with the U.S. Code of Federal Regulations (CFR, Title 15, Part 285), National Voluntary Laboratory Accreditation Program, and encompass the requirements of ISO/IEC 17025. Each LAP includes specific test or calibration standards and related methods and protocols assembled to satisfy the unique needs for accreditation in a field of testing or calibration. NVLAP accredits public and private laboratories based on evaluation of their technical qualifications and competence.

OPHIR RF Inc.

Since 1992, OphirRF has been designing and manufacturing High Power RF/Microwave Amplifier Systems and Modules for Defense Applications, EMC, and Test & Measurement purposes. Our capabilities include broadband, multi-octave amplifiers from 10 KHz to 40 GHz. Power ranges up to thousands of watts are achievable CW, and pulsed power in the tens of thousands of watts are no problem. All Ophir RF Amplifiers are made in the USA. Contact us with your most difficult requirement!

PPG Cuming Microwave & Cuming Lehman Chambers

PPG Cuming Microwave Corporation is an ISO 9001:2015, US manufacturer of C-RAM® RF/Microwave absorbers, C-STOCK® low-loss dielectric materials, and C-SHIELD™ conductive materials, serving military & aerospace and commercial market segments for over 40 years. With a full range of RF and power testing capabilities, our materials are tested and validated to meet industry standards. Cuming Lehman Chambers, a wholly owned subsidiary, provides project management and installation of newly designed anechoic chambers, host facilities, and specialty test boxes. In addition, when your project calls for a retrofit, refurbishment or relocation of an existing chamber our expert staff will guide you through all of the considerations. Call 508-521-6700 or point browsers to www.cuminglehman.com www.cumingmicrowave.com

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QuadSAT ApS

QuadSAT is a Danish company founded in 2017 that supplies drone-based antenna testing and tracking solutions to the satellite, defense, wireless and broadcast markets. QuadSAT's system combines advanced drone technology with a custom RF pointing payload. As a compact system, it is transported directly to site and when launched as a mission it will provide customers with insitu testing capabilities, resulting in a cost-effective, operationally flexible, and timesaving solution.

Exhibitors

Quantic PMI

Quantic PMI has been in business for over 31 years as a manufacturer of electronic components for defense applications. Since its founding in November 1989 by Dr. Ash (Ashok) Gorwara, Quantic PMI has become a leading supplier of High Reliable, Low-Cost Systems offering unique innovations in RF, Microwave Components, and integrated Assemblies from DC to 63 GHz. Most recently, PMI was acquired by Quantic Electronics that will lead a team of Technocrats and Management experts that possess the technology and talent to develop unique products for applications in space, military, communications, telecommunications, commercial, and consumer electronics systems.

Quarterwave Corporation

Quarterwave Corp. is a manufacturer of traveling wave tube amplifiers that are used in a variety of applications including: a) Special purpose radar test systems, b) Microwave telecommunication relay systems, c) EMI test equipment, d) University, industrial and commercial laboratory use.
Quarterwave's products are used to measure stealth characteristics of various targets such as aircraft, tanks, and ships. The amplifier's performance enables customers to make very accurate measurements. The significance of these measurements relates to targets that are designed to become more invisible to radar, and the measurement system to prove the design results that require higher sensitivity.

Raymond EMC

Raymond EMC specializes in the design, fabrication, installation, and testing of custom radio frequency (RF) shielded enclosures, reverb, and anechoic chambers. Raymond EMC prides itself on being an industry leader in product quality, performance and innovation while providing unmatched client care and product support throughout the design, fabrication, and installation process.

Resonant Sciences

Resonant Sciences LLC is a growing leader in the defense industry with world-class experts in six focus areas: Advanced Apertures, EM Measurement Systems & Analysis, Aerospace Manufacturing, Integrated Electronics, EO/IR, and Instrumentation Radars. Resonant Sciences' facilities include an electronics lab, a 60-foot anechoic chamber, a pick and place machine, and a variety of specialized test equipment. Our team also has significant experience supporting down range installations and flight testing. With our vertical integration and dynamic culture, Resonant Sciences is able to move quickly from prototypes to fully fielded operational systems.

Rohde & Schwarz USA

As a strategic partner of the wireless communications industry, Rohde & Schwarz has supported the rollout of new technologies and standards with a complete, unmatched portfolio of test and measurement instruments and systems for every stage of the wireless design cycle – from new technology standardization, product design and production to the integration of new technologies into network operation. Our products help all market players – chip designers, consumer equipment and infrastructure suppliers, test houses, network operators – to bring their solutions to market quickly and with the quality and performance their customers expect.

Exhibitors

STAR Dynamics

STAR Dynamics Corporation has an extensive history within the international, defense-related Research Development, Test and Evaluation (RDT&E) community, leveraging a product legacy of ultra-wideband (UWB) RCS/Imaging and precision Time Space Position Information (TSPI) tracking Instrumentation Radar systems. Established in 1988, STAR Dynamics was built on innovation of state-of-the-art electromagnetic technology. With a strong pedigree of more than thirty years of development, manufacturing, sales and aftermarket support of high-technology radar systems, STAR Dynamics is now globally recognized as the industry leader of these instrumentation systems for both commercial and military applications. STAR Dynamics is also registered with the U.S. Department of Defense as a Veteran-Owned Small Business (VOSB), which has facilitated the company to expand its instrumentation technology base within the international defense community. STAR Dynamics is focused on providing the best support possible to its domestic and international customers, and investing in development of future technologies to maintain market superiority.

TDK

TDK RF Solutions is a world leader in the design, development, and manufacture of technical solutions for the electromagnetic compatibility testing and antenna measurement industries. We offer a complete range of solutions including automated test systems, TDK anechoic chambers, RF absorbers, antennas, software, and a wide range of test products. We call it Total System Technology®, and it means TDK RF Solutions is your best choice of partner for proven solutions and services backed by internal technical expertise. If you are in the market for a complete turnkey solution or looking to expand your test capabilities with a new antenna, contact us to see what TDK can do for you.

Virginia Diodes

VDI manufactures state-of-the-art test and measurement equipment for mm-wave and THz applications. These products include Vector Network Analyzer, Spectrum Analyzer and Signal Generator Extension Modules that extend the capability of high-performance microwave measurement tools to higher frequencies.

WavePro

WavePro was established in1993, the first microwave test system integration company in Taiwan. Led by the founder, Dr. Richard Liu with his R&D Team, by inherent with MIL- spec Radar system emulation simulation and phased array antenna boresighting system of the high-precision cutting-edge technology, WavePro has successfully got contract award with DirectTV project , QUALCOMM, NI, Hanover University in Germany on 5G/LEO CATR, Taiwan Space Center (NSPO), Industry Technology Research Institute (ITRI), NCSIST, National Taiwan University, National Central University and many famous companies such as WNC, acradyan, Cyntec, Huawei Communications, ZTE Communications... etc. WavePro offers the service on design and manufacturing of the radar emulation simulation system, microwave equipment calibration, boresighting system and antenna system. Till now, WavePro has installed over 170 microwave testing ranges and 50 CATRs around the world. WavePro holds AS9100D/ ISO9001 Aerospace Quality Management Certificate and ISO27001 IT Security System Management Certificate in 2022 and moving towards the low orbit (LEO) satellite communication industry in response to the government policy aggressively.

Final Technical Program

Monday, October 10

8 - 9:06 a.m. Meeting Opening/Keynote Address

8 - 8:10 a.m. Welcome and Introduction of Keynote Speaker: CJ Reddy (AMTA President)

8:10 - 8:50 a.m. Keynote Speaker: Marla Dowell, NIST, "NIST: Driving Advanced Communications Technology through Partnerships and R&D"

8:50 a.m. - 9:00 a.m. Opening Remarks and Technical Session Overview: Cosme Culotta-López (Technical Coordinator)

Session 1

9:00 - 9:54 a.m. 5G and Wireless Design and Applications
Chair: John Locke, Molex Connected Mobile Solutions

9:00 - 9:18 a.m. 0664_0931_000014 Optimization of In-Vehicle Connectivity through Simulation-Augmented Antenna Measurements, Benoit Derat[1], Mert Celik[1], Winfried Simon[2], David Schaefer[2], Adrian Fleidl[3], Konstantin Schorp[3], [1]Rohde & Schwarz GmbH & Co. KG, [2]IMST GmbH, [3]BMW Group

9:18 - 9:36 a.m. 0664_0931_000097 5G Base-station Network Optimization in Urban Wireless Scenario using Machine Learning, Jaehoon Kim, Altair Engineering Inc.

9:36 - 9:54 a.m. 0664_0931_000011 Tunable Cellular Desensitization using SD Card Data Transfer, Michael Foegelle, ETS-Lindgren

9:54 - 10:30 a.m. **MORNING BREAK**

Session 2

10:30 - 12.00 p.m. Standards and Characterization
Chair: Jeff Fordham, NSI-MI Technologies

10:30 - 10:48 a.m. 0664_0931_000066 Antenna Gain Calibration with Improved Accuracy Modeling of Pyramidal Standard Gain Horns, Andrea Giacomini[1], Domenic Belgiovane[2], Justin Dobbins[2], Francesco Saccardi[1], Lars Foged[1], [1]Microwave Vision Italy, [2]Raytheon Technologies

10:48 - 11:06 a.m. 0664_0931_000033 A Benchmark Biconical Antenna for Standardized Antenna Measurement and Simulation: Contribution to IEEE P2816,Satyajit Chakrabarti[1], Vikass Monebhurrun[2], Ashim Chakraborty[1], [1]Society for Applied Microwave Electronics Engineering and Research, Kolkata Centre, [2]Paris UMR CNRS – Centrale Supélec – Université Paris-Saclay

11:06 - 11:24 a.m. 0664_0931_000088 Calibration and Cross-Polarization Measurement Standard Requirements for Focus Beam Material Characterization Systems, Jeffrey Massman[1], Michael Havrilla[2], [1]Sensors Directorate Air Force Research Laboratory, [2]Air Force Institute of Technology

11:24 - 11:42 a.m. 0664_0931_000044 Revision of IEEE Std. 1720-2012: Recommended Practice for Near-Field Antenna Measurements, Lars Foged[1], Justin Dobbins[2], Vince Rodriguez[3], Jeff Fordham[3], Vikass Monebhurrun[4], [1]MVG, Microwave Vision Italy, [2]Raytheon Technologies, [3]AMETEK / NSI-MI Technologies, [4]CentraleSupélec

11:42 a.m. - Noon 0664_0931_000023 Compact Range Measurements of Digital Arrays Leading to Outdoor RADAR Experiments, Thomas Pemberton, Thomas Kendo, George Kakas, Andrew Braun, Air Force Research Laboratory, Sensors Directorate

Noon - 1:30 p.m. **EXHIBITOR SPONSORED LUNCH**

Session 3

1:30 - 2:42 p.m. UAV and Robotic Antenna Measurements
Chair: Marion Baggett, NSI-MI Technologies

1:30 - 1:48 p.m. 0664_0931_000001 Use of UASs for Outdoor Diagnostics of Large Antennas, Cosme Culotta-López, Snorre Skeidsvoll, Andrian Buchi, Joakim Espeland, QuadSAT

1:48 - 2:06 p.m. 0664_0931_000041 Cylindrical Near-Field Measurement and Far-Field Characterization of 300-GHz Band Antenna Based on an Electrooptic Measurement Technique, Yusuke Tanaka, Shintaro Hisatake, Gifu University

2:06 - 2:24 p.m. 0664_0931_000087 Path Optimization in Robotic Antenna Test Ranges through Spline-Based Measurement Sequences and Pointwise Probe Correction, Roland Moch[1], Dirk Heberling[1,2], [1]Institute of High Frequency Technology, RWTH Aachen University, [2]Fraunhofer Institute for High Frequency Physics and Radar Techniques FHR

2:24 - 2:42 p.m. 0664_0931_000085 Radiation Pattern Measurements Using an Active Radar Module, Anna Granich[1], Roland Moch[1], Amar Al-Bassam[1], Dirk Heberling[12], [1]Institute of High Frequency Technology, RWTH Aachen University, [2]Fraunhofer Institute for High Frequency Physics and Radar Techniques FHR

2:42 - 3:10 p.m. **AFTERNOON BREAK**

Session 4

3:10- 4:58 p.m. **Chamber Design, Measurement, and Instrumentation**
Chair: Zhong Chen, ETS-Lindgren

3:10 - 3:28 p.m. 0664_0931_000071 Genetic Optimization of Edge Treatments of Single Offset Reflector Compact Antenna Test Ranges, Vince Rodriguez[1], Marc Dirix[1], Stuart Gregson[23], [1]Antenna Systems Solutions, [2]Next Phase Measurements, [3]Queen Mary, University of London

3:28 - 3:46 p.m. 0664_0931_000079 Using a Higher-Order Basis Function based Method of Moments Analysis for Designing Compact Antenna Test Ranges, Vince Rodriguez[1], Anil Tellakula[1], Branko Mrdakovic[2], Daniel Janse van Rensburg[1], [1]NSI-MI, [2]WiPl-D d.o.o.

3:46 - 4:04 p.m. 0664_0931_000109 Low Frequency Solutions in a Compact Range, Marlow Rumreich, Sean Raffetto, Boeing

4:04 - 4:22 p.m. 0664_0931_000046 Investigation of Inhomogeneity of Material Characteristics on the Hybrid-Absorber Performance, Amin Enayati, E&C Anechoic Chambers

4:22 - 4:40 p.m. 0664_0931_000035 Comparison of Angle-Dependent Scattering of Convoluted and Straight Microwave Absorbers, Willi Hofmann, Andreas Schwind, Christian Bornkessel, Matthias Hein, RF & Microwave Research Group, Thuringian Center of Innovation in Mobility, Technische Universität Ilmenau

4:40 - 4:58 p.m. 0664_0931_000099 RCS Compact Range Focal Plane Array Antenna Feed Design Concept, William Carter[1], Jerry Jost[1], Gabriel M. Rebeiz[2], [1]STAR Dynamics, [2]Extreme Waves, Inc.

Tuesday, October 11

8 - 8:30 a.m. Invited AP-S Speaker: Dr. Erik Lier, Lockheed Martin, "Metamaterials – A Manipulation of Waves"

8:30 - 8:36 a.m. Daily Annoucements and Technical Session Overview by Technical Coordinator

Session 5

8:36 - 9:30 a.m. **RCS Measurements**
Chair: Paul Vizcaino, Reliance Test and Technology (RT&T) - Atlantic Test Range (ATR)

8:36 - 8:54 a.m. 0664_0931_000039 Analytical and Experimental Studies of Ground Reflections on Bi-static Radar Signal Propagation, Andreas Schwind, Isabella Varga, Willi Hofmann, Matthias Hein, RF & Microwave Research Group, Thuringian Center of Innovation in Mobility, Technische Universität Ilmenau

8:54 - 9:12 a.m. 0664_0931_000106 RCS Calculations and Measurements of a Spherical Drone Based Calibration Device, Spencer Wallentine[1], CJ Reddy[2], Joel Cannon[3], R. Jerry Jost[1], [1]STAR Dynamics Corporation, [2]Altair, [3]National Radar Test Facility (NRTF)

9:12 - 9:30 a.m. 0664_0931_000021 Stepped-Frequency CW RCS measurement in Semi-Anechoic Chamber, Papa Ousmane Leye, David Martinez, Shaikha Aldhaheri, Chaouki Kasmi, Nicolas Mora, Directed Energy Research Centre, Technology Innovation Institute

9:30 - 10:00 a.m. **MORNING BREAK**

Session 6

10:00 - 10:30 p.m. **Antenna Measurements I**
Chair: Kenneth W. Allen, Georgia Tech Research Institute

10:00 - 10:18 a.m. 0664_0931_000060 Arbitrary Rigid Translation of the Spherical Vector Wave Functions Kyriakos Kaslis[1], Samel Arslanagic[1], Olav Breinbjerg[2], [1]Technical University of Denmark, [2]ElMaReCo

10:18 - 10:36 a.m. 0664_0931_000034 Electromagnetic Field Transformations of Near-Field Data Without Global Reference for Magnitude and Phase Alexander Paulus, Jonas Kornprobst, Thomas Eibert, Technical University of Munich

10:36 - 10:54 a.m. 0664_0931_000069 Spectrum-analyzer-based Radar System Measurements in a Compact Antenna Test Range, Florian Reher[1], Anna Granich[1], Dirk Heberling[12], [1]Institute of High Frequency Technology, RWTH Aachen University, [2]Fraunhofer Institute for High Frequency Physics and Radar Techniques FHR

10:54 - 11:12 a.m. 0664_0931_000102 Evaluating the RF Performance of a 3D Printed Millimeter-Wave Helical Antenna for Operations in Harsh Conditions, Ljubodrag Boskovic, Mohamed Elmansouri, Dejan Filipovic, University of Colorado Boulder

11:12 - 11:30 a.m. 0664_0931_000022 Antenna Far-Field Characterization from Small Phaseless Dataset, Nicolas Mézières[1], Laurent Le Coq[1], Benjamin Fuchs[2], [1]IETR - UMR CNRS 6164, [2]Federal Office of Communications

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Noon - 1:30 p.m. **BUSINESS LUNCH**

Session 7

1:30 - 3:36 p.m. **Near-field Measurements I**
Chair: Amedeo Capozzoli, University of Naples Federico II

1:30 - 1:48 p.m. 0664_0931_000043 Testing of a 60 MHz Cubesat in an Electrically Small Environment with the Synthetic Probe Array Technique, Francesco Saccardi[1], Rubén Tena-Sánchez[1], Enrico Tartaglino[1], Andrea Giacomini[1], Lars Foged[1], Paul Moseley[2], Luis Rolo[2], [1]Microwave Vision Italy SRL, [2]European Space Agency, ESTEC

1:48 - 2:06 p.m. 0664_0931_000084 Phaseless Spherical Near-Field Antenna Measurements Using an Arbitrary Oriented Translation Axis, Adrien Guth[1], Dirk Heberling[12], [1]Institute of High Frequency Technology, RWTH Aachen University, [2]Fraunhofer Institute for High Frequency Physics and Radar Techniques FHR

2:06 - 2:24 p.m. 0664_0931_000012 Full-Sphere Characterization of Low-Gain Antennas via Truncated Field Pattern Stitching, Jure Soklic, Holger Arthaber, TU Wien

2:24 - 2:42 p.m. 0664_0931_000019 Single-Cut Phaseless Near-Field Measurements using Specialized Probes, Fernando Rodriguez Varela, Belén Galocha-Iragüen, Manuel Sierra-Castañer, Universidad Politécnica de Madrid

2:42 - 3:00 p.m. 0664_0931_000008 Highly Efficient Near-Field to Far-Field Transform for Polar Near-Field Scanned Data, Stuart Gregson[12], Clive Parini[1], [1]Queen Mary University of London, [2]Next Phase Measurements

3:00 - 3:18 p.m. 0664_0931_000010 A New Valid Angle Equation for PNF Measurements, Ryan Cutshall, Justin Dobbins, Jacob Freking, Brandon Hertneky, Raytheon Technologies

3:18 - 3:36 p.m. 0664_0931_000051 Reduced Distance OTA Testing Methodologies for Automotive Applications, Alessandro Scannavini[1], Francesca Mioc[1], Francesco Saccardi[1], Kim Rutkowski[2], Lars Foged[1], [1]Microwave Vision Italy SRL, [2]MVG Industries

3:36 - 4:00 p.m. **AFTERNOON BREAK**

Session 8

4 - 5:30 p.m. **Poster Session I**
Chair: Nathaniel Roman, The Boeing Company

0664_0931_000054 Reinstatement of the NIST Field Strength Probe Calibration Service, Matthew Simons, Christopher Parks, Vincent Neylon, Galen Koepke, Christopher Holloway, National Institute of Standards & Technology

0664_0931_000062 Numerical Modeling of Deployable Crossed-Dipole Antennas, Zachary Myrtle, Ashanthi Maxworth, University of Southern Maine

0664_0931_000076 Antenna Characterization from Spherical Spiral Near-Field Measurements Acquired Over an Infinite Perfectly Conducting Ground Plane, Francesco D'Agostino, Flaminio Ferrara, Claudio Gennarelli, Rocco Guerriero, Massimo Migliozzi, D.I.In. - University of Salerno

0664_0931_000103 Estimating Shale Maturity from Ultra-Fast Microwave Heating, Jose Alvarez, David Jacobi, Poorna Srinivasan, Aramco Americas: Aramco Research Center - Houston

0664_0931_000027 Design and Measurements of a Small End-fed Normal Mode Helical Antenna with Integrated Microstrip Structure, Sri Lekha Srimat Kilambi, Herbert Aumann, Mauricio Pereira da Cunha, University of Maine

0664_0931_000045 A Near to Far-Field Transformation with Planar Wide-Mesh Scan from Near-Field Measurements Affected by 3-D Probe Positioning Errors, Florindo Bevilacqua, Francesco D'Agostino, Flaminio Ferrara, Claudio Gennarelli, Rocco Guerriero, Massimo Migliozzi, D.I.In. - University of Salerno

Wednesday, October 12

8 - 8:30 a.m. **Invited Talk (EurAAP): Prof. Francesco D'Agostino,** University of Salerno, "The Application of the Non-Redundant Sampling Representations of the Electromagnetic Fields in Antenna Measurement"

8:30 - 8:36 a.m. Daily Annoucements and Technical Session Overview by Technical Coordinator

Session 9

8:36 - 9:30 a.m. **RF Material Design and Characterization**
Chair: Domenic Belgiovane, Raytheon Technologies

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8:36 - 8:54 a.m. 0664_0931_000104 A Loss Tangent Measurement Surface for Free Space Focused Beam Characterization of Low-Loss Dielectrics, Christopher Howard[1], Kenneth Allen[1], Bill Hunt[2], [1]Georgia Tech Research Institute, [2]Georgia Institute of Technology

8:54 - 9:12 a.m. 0664_0931_000040 Metal Mesh Selection Guide for Shielding Effectiveness and Optical Visibility, Nika Amralah, AP Americas Inc.

9:12 - 9:30 a.m. 0664_0931_000078 A New Handheld Sensor for Measuring Intrinsic Dielectric Properties at 100 to 1000 MHz, John Schultz, Ren Geryak, Compass Technology Group

9:30 - 10 a.m. **MORNING BREAK**

Session 10

10 - 11:48 a.m. **Antenna Measurements II**
Chair: Lydell Frasch, The Boeing Company (Retired)

10 - 10:18 a.m. 0664_0931_000056 Three-Antenna Polarization Measurements Again, Ronald Wittmann[1], Michael Francis[1], David Novotny[2], Allen Newell[3], [1]NIST, Retired, [2]SpaceX, Inc., [3]Newell Near-Field Consultants

10:18 - 10:36 a.m. 0664_0931_000057 Ground Penetrating Radar Antenna Evaluation, Joseph Friedel, David Oyediran, David Rohde, EOD Electronic Protection Systems

10:36 - 10:54 a.m. 0664_0931_000050 Numerical considerations to improve the Reduced-Order Model Approach for Antenna Measurements, Benjamin Fuchs[1], Laurent Le Coq[2], Michael Mattes[3], Nicolas Mézières[2], Samuel Corre[2], [1]Federal Office of Communications, [2]IETR - UMR CNRS 6[1]6[4], [3]DTU

10:54 - 11:12 a.m. 0664_0931_000031 Millimeter-Wave S-Parameter Measurements with a Vector Field Analyzer in Antenna Measurement Systems, Niyati Sanandiya, Bruce Williams, Steve Nichols, NSI-MI Technologies

11:12 - 11:30 a.m. 0664_0931_000055 Additional Insights into Chamber Effects in the Gain Extrapolation Data using Empirical Mode Decomposition, Zhong Chen, Yibo Wang, ETS-Lindgren

11:30 a.m. - 11:38 p.m. 0664_0931_000018 Huffman Radar Site: Far Field Calibration and Testing Range, Tomas Kendo[1], Ryan Thompson Thompson[1], Thomas Corigliano[1], Chad Shaffer[2], Thomas Steffen[2], [1]Air Force Research Laboratory (AFRL), [2]Defense Engineering Corporation (DEC)

Noon - 1:30 p.m. **LUNCH**

Session 11

1:30 - 3:18 p.m. **Near-Field Measurements II**
Chair: Francesco Saccardi, Microwave Vision Group (MVG)

1:30 - 1:48 p.m. 0664_0931_000052 Design and Verification of Innovative Wideband Spherical Near Field Probes with High Modal Purity, Andrea Giacomini[1], Vincenzo Schirosi[1], Francesco Saccardi[1], Lars Foged[1], Jean-Marc Baracco[2], Anders Jernberg[3], Kazi Alam[3], Joseph Byström[4], Dan Karlsson[4], [1]Microwave Vision Italy SRL, [2]MARDEL, [3]MVG Germany GmbH, [4]CellMax Technologies AB

1:48 - 2:06 p.m. 0664_0931_000030 Experimental Validation of Non Invasive SAR Evaluation from Measurements and Numerically Assisted Post Processing, Lucia Scialacqua[1], Shoaib Anwar[2], Francesca Mioc[1], Jerome Luc[2], Aurelien Lelievre[2], Mohamad Mantash[2], Nicolas Gross[2], Lars Foged[1], [1]Microwave Vision Italy, [2]Microwave Vision Group

2:06 - 2:24 p.m. 0664_0931_000047 Numerical and Experimental Validation of Near-Field Power Density Reconstruction from Radiative Field Measurements, Benoit Derat[1], Martin Wittmann[1], Mert Celik[1], Walid El Hajj[2], Davide Colombi[3], [1]Rohde and Schwarz GmbH & Co. KG, [2]Intel Corporation SAS, [3]Ericsson Research

2:24 - 2:42 p.m. 0664_0931_000094 Methodology and Practical Considerations for the Implementation of the Three-Antenna Method in a Spherical Near-Field Range, Bennett Gibson-Dunne[1], Jill Smithson[2], Ken Oueng[2], Greg Brzezina[2], Adrian Momciu[2], [1]University of Waterloo, [2]Canadian Space Agency at the David Florida Lab

2:42 - 3 p.m. 0664_0931_000110 Reflectivity reconstruction from only amplitude non-redundant near-field data: numerical validation, Florindo Bevilacqua[1], Amedeo Capozzoli[2], Claudio Curcio[2], Francesco D'Agostino[1], Flaminio Ferrara[1], Rocco Guerriero[1], Angelo Liseno[2], Massimo Migliozzi[1], Yiannis Vardaxoglou[3], [1]University of Salerno, [2]University of Naples "Federico II", [3]Loughborough University

3:00 - 3:18 p.m. 0664_0931_000091 Antenna gain determination by spherical near-field substitution method without full-sphere measurement of reference gain antenna, Sergiy Pivnenko, Antenna Systems Solutions

3:18 - 4 p.m. **AFTERNOON BREAK**

Session 12

4 - 5:30 p.m. **Poster Session 2**
Chair: Adam Mehrabani, NSI-MI Technologies

0664_0931_000042 Emulation of LTE Link Scenarios Reproducibly Derived from Field-Operational Tests, Philipp Berlt, Berk Altinel, Christian Bornkessel, Matthias Hein, RF & Microwave Research Group, Thuringian Center of Innovation in Mobility, Technische Universität Ilmenau

0664_0931_000086 A Trade Study on Quasi Far Field Accuracies and Measurements, Marion Baggett, NSI-MI Technologies

0664_0931_000100 Initial Development of Low-cost Custom Spherical Measurement Range, Songyi Yen, Ljubodrag Boskovic, Dejan Filipovic, University of Colorado Boulder

0664_0931_000082 Look Through Hygroscopic Indoor Materials at Frequencies from 750 GHz to 1.1 THz, Fawad Sheikh, Aman Batra, Andreas Prokscha, Dien Lessy, Thomas Kaiser, University of Duisburg-Essen

0664_0931_000077 Free-space One-/two-port Calibration Using Planar Offset Short for Material Parameter Measurement, Jin-Seob Kang, Safety Measurement Institute, Korea Research Institute of Standards and Science

0664_0931_000074 Activities within the EurAAP Working Group on Antenna Measurements, Lucia Scialacqua[1], Tian Hong Loh[2], Michael Mattes[3], Javier Fernandez Alvarez[3], Lars Foged[1], Manuel Sierra-Castañer[4], [1]Microwave Vision Italy, [2]National Physical Laboratory, [3]Technical University of Denmark, [4]Technical University of Madrid

Thursday, October 13

Session 13

8:15- 9:27 a.m. **Computational Electromagnetics and Numerical Methods**
Chair: Brian Fischer, Resonant Sciences

8:15 - 8:33 a.m. 0664_0931_000049 Antenna Diagnostics of a Large Deployable Reflector Antenna, Andreas Ericsson[1], Oscar Borries[1], Martin Haulund Gaede[1], Peter Meincke[1], Erik Jørgensen[1], Cecilia Cappellin[1], Erio Gandini[2], [1]TICRA, [2]European Space Agency, ESTEC

8:33 - 8:51 a.m. 0664_0931_000081 Co-Site Interference Analysis on Aerospace and Naval Platforms using Advanced Simulation Tools, V B Murthy D, CJ Reddy, Altair Engineering Inc

8:51 - 9:09 a.m. 0664_0931_000036 EMF simulation of base station antennas in real sites using Spherical Wave Expansion and diffracted fields, Celia Fontá Romero[1], Alicia Auñón Marugán[1], Fernando Rodríguez Varela[1], Pablo Bielza López-Manterola[1], José Luis Alcolea Coronel[2], José Ignacio Alonso Montes[1], Manuel Sierra Castañer[1], [1]Universidad Politécnica de Madrid, [2]Vantage Towers

9:09 - 9:27 a.m. 0664_0931_000093 Determination of the Number of Valid Scan Pairs in a Multielement Waveguide Simulator, Collin Wallish, Dejan Filipovic, University of Colorado Boulder

9:27 - 10 a.m. **MORNING BREAK**

Session 14

10 - 11:48 a.m. **Antennas and Measurements for 5G and Future Communication Systems**
Chair: Jonathan Frasch, The Boeing Company

10:00 - 10:18 a.m. 0664_0931_000025 Acceleration of Over-The-Air Measurements Under Extreme Temperature Conditions Through Optimization of Air Flow and Thermal Efficiency, Benoit Derat, Ralf Meissner, Anes Belkacem, Guenter Pfeifer, Constantin Sinn, Markus Herbrig, Jose Fortes, Rohde & Schwarz GmbH & Co. KG

10:18 - 10:36 a.m. 0664_0931_000048 Extension of Single-Cut NFFFT to Multi-Cut Fresnel-Field FFT Depending on Antenna Height, Masanobu Hirose[1], Satoru Kurokawa[2], [1]7G aa Co., Ltd., [2]AIST

10:36 - 10:54 a.m. 0664_0931_000038 Experimental validation of Plane Wave Generator for 5G New Radio FR2 applications, Shoaib Anwar[1], Evgueni Kaverine[1], Fabien Henry[1], Nicolas Gross[1], Francesco Scattone[2], Darko Sekuljica[2], Andrea Giacomini[2], Francesco Saccardi[2], Alessandro Scannavini[2], Per Iversen[1], Lars Foged[2], [1]MVG Industries France, [2]MVG Industries Italy SRL

10:54 - 11:12 a.m. 0664_0931_000075 Design of a Thermal Testbed for Metrology of Active Antennas, Bryan Schoenholz, James Downey, Marie Piasecki, NASA Glenn Research Center

11:12 - 11:30 a.m. 0664_0931_000083 A Novel Reduced-Complexity Low-Profile Beam Steerable Risley Prism Antenna, Junbo Wang, Yahya Rahmat-Samii, University of California, Los Angeles

11:30 - 11:48 a.m. 0664_0931_000037 Using a VNA Based Spherical Near Field Antenna Measurement System for Active Antenna System Performance Verifications, Chang-Lun Liao[1,2], You-Hua Lin[3], Ike Lin[3], Bo-Cheng You[1], Chang-Fa Yang[1], De-Xian Song[1], Wen-Jiao Liao[1], Yuan-Chang Hou[1], Tswen-Jiann Huang[2], [1]National Taiwan University of Science and Technology, [2]Telecommunication Laboratories Chunghwa Telecom Co., Ltd., [3]WaveFidelity Inc.

Final Technical Program

Noon - 1:30 p.m. **LUNCH: "Lunch & Learn" Speaker: Chris Holloway,** National Institute of Standards and Technology (NIST), "Rydberg Atom-Based Sensors: The Quest for Fundamentally New SI-Traceable Measurement Techniques and the Development of New Sensing Capabilities"

Session 15

1:30 - 3 p.m. **Imaging, Algorithms, and Processing Techniques**
Chair: Joshua Gordon, National Institute of Standards and Technology (NIST)

1:30 - 1:48 p.m. 0664_0931_000068 Investigation of THz SAR Through-Wall Sensing in Indoor Environment, Aman Batra[1], Fawad Sheikh[1], Michael Wiemeler[1], Diana Göhringer[2], Thomas Kaiser[1], [1]Institute of Digital Signal Processing, Universität Duisburg-Essen, [2]Chair of Adaptive Dynamic Systems, Technische Universität Dresden

1:48 - 2:06 p.m. 0664_0931_000020 ISAR Image Gating Using Backprojection and Smoothed Reweighted L1-optimization, Christer Larsson[1, 2], Andreas Gällström[1, 2], [1]Saab, [2]Lund University

2:06 - 2:24 p.m. 0664_0931_000028 Further Exploration of the Holographic PNF Filter, Scott McBride, NSI-MI Technologies

2:24 - 2:42 p.m. 0664_0931_000090 A Technique of Holographic Projection from Far Field Pattern to an Unconstrained Planar Surface, Yibo Wang, Zhong Chen, ETS-Lindgren

2:42 - 3 p.m. 0664_0931_000059 Diffraction from Rotating Absorber Array and Field Probe Using Long Vertical Objects, Pax Wei, The Boeing Company

3 - 3:30 p.m. **AFTERNOON BREAK**

Session 16

3:30 - 5 p.m. **Antenna Design and Analysis**
Chair: Randy Jost, Ball Aerospace (Retired)

3:30 - 3:48 p.m. 0664_0931_000080 Equivalent Multipole Source Models for the TE/TM-R Spherical Wavefunctions, James McLean, TDK Corp.

3:48 - 4:06 p.m. 0664_0931_000029 Compact Ultra-wideband Ground Penetrating Radar Antenna Design, Cole Harlow, Chi-Chih Chen, The Ohio State University Electroscience Laboratory

4:06 - 4:24 p.m. 0664_0931_000063 Crosstalk is Good: Antenna Design to Enable Polarimetric Compressive Sensing, Jeffrey Massman[1], Julie Jackson[2], John Becker[12], [1] Air Force Research Laboratory, [2] Air Force Institute of Technology

4:24 - 4:42 p.m. 0664_0931_000061 Ultra-thin EBG backed flexible antenna for 24 GHz ISM band WBAN, Mubasher Ali[1], Irfan Ullah[2], John Batchelor[1], Nathan Gomes[3], [1]University of Kent, [2]University of Southampton, [3]University College London

4:42 - 5 p.m. 0664_0931_000098 A 77 GHz Microstrip Comb Line Antenna Array for Automotive RADAR application, Neha Pazare, Vivek Kamble, University of Colorado Boulder

5 - 5:20 p.m. Closing Remarks and 2023 Vision for AMTA

Exhibit Hall

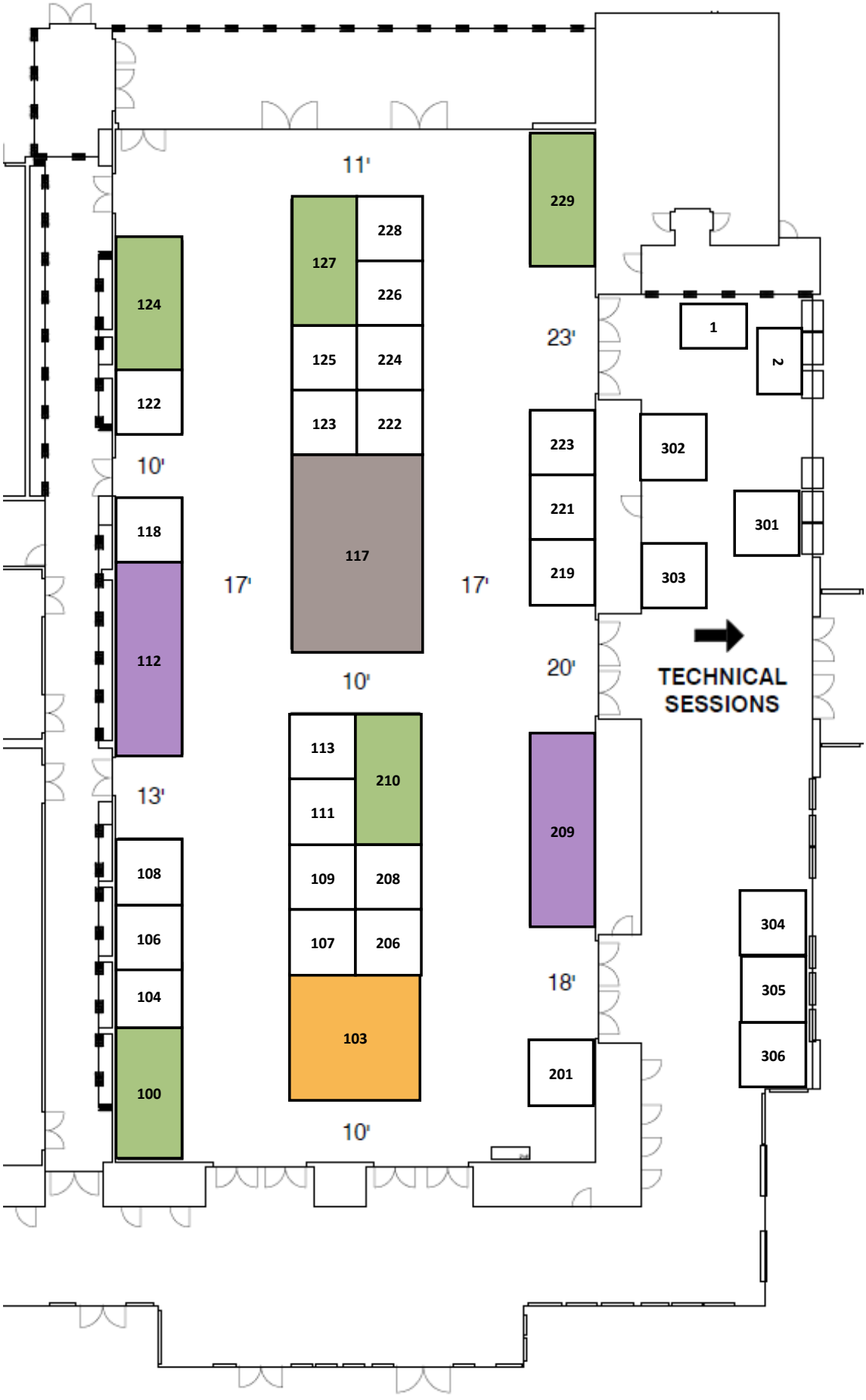

Exhibit Hall

Booths

100 – AP Americas

103 – MVG

104 – WavePro

106 – Agile RF Systems

107 – 412TW Benfield Anechoic Facility

108 – Diamond Microwave Chambers

109 – Virginia Diodes, Inc.

111 – Quarterwave

112 – Resonant Sciences

113 – Quantic PMI

117 – NSI-MI Technologies

118 – Ophir RF

122 – Chamber Services, Inc.

123 – In Compliance Magazine

124 – Next Phase Measurements

125 – PPG

127 – Hiller Fire Protection

201 – 7G aaa

206 – Rohde & Schwarz

208 – Dutch Microwave Absorber

209 – ETS-Lindgren

210 – STAR Dynamics

219 – APS Fire Co.

221 – Advanced Test Equipment Corp.

222 – QuadSat ApS

223 – Delta Sigma

224 – Keysight Technologies, Inc

226 – Altair

228 – Raymond EMC

229 –TDK

301 – NVLAP

302 – NIST

303 – APS-URSI 2023

304 – EuCAP 2023

305 – EMC Society

306 – AMTA 2023

Exhibits Dates and Hours

Monday, October 10	10 a.m. - 5 p.m.
Tuesday, October 11	9 a.m. - 5 p.m.
(Business Lunch from	11:30 a.m. - 1:30 p.m.)
Wednesday, October 12	9 a.m. - 5 p.m.

Table Tops

1 – Microwave Journal

2 – Anechoic Solutions

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