2.1 SIW-Series Fed RDRA Array System for Millimeter-Wave Applications
Wael Abdel Wahab (University of Waterloo, Canada); Safieddin Safavi-Naeini (University of Waterloo, Canada); Dan. Busuioc (University of Waterloo, Canada)
A simple, low cost novel series feeding scheme to rectangular dielectric resonator antenna linear array (RDRA) is proposed at millimeter wave frequency range. The coupling to resonator is achieved through narrow slots cut on the substrate integrated waveguide (SIW) broad wall excited by the waveguide dominant mode.

2.2 Design of multilayer stacked patch array with waveguide feeding network for high power SAR system.
Saray Sanchez Sevilleja (INTA, Spain); Juan Ramón Larrañaga Sudupe (INTA, Spain)
A multilayer stacked patch antenna for high power SAR system has been designed. This antenna is fed by a waveguide feeding network. It works in Ku Band with a bandwidth of 2GHz. Expected results have been obtained.

2.3 A new astronomical receiver for ASTROPEILER
Stephan Stanko (FGAN-FHR, Germany); Anke Pagels (FGAN - Research Institute for Applied Science, Germany); Winfried Johannes (FGAN-FHR, Germany)
We describe the development and design of the new 21-cm Receiver for the 25-m ASTROPEILER radio telescope located on the Stockert, near Bad-Münstereifel, Germany.

2.4 Terahertz conical horn antenna
Di Li (University of Liverpool, UK, United Kingdom); Yi Huang (University of Liverpool, United Kingdom); Yao-Chun Shen (University of Liverpool, United Kingdom)
This paper presents a new structure of photoconductive antenna which consists of a photoconductive emitter and a conical horn antenna. This kind of structure can radiate THz wave into desired direction. The simulated and measured results are used to support the theory in this paper.

2.5 Elliptical Ring Slots Antenna for Wireless Personal Area Network
Abbas Ali Lotfi Neyestanak (Islamic Azad University, Shahr_e_Rey Branch, Iran); Arghavan Emami Forooshani (University British Columbia, Canada)
In this paper a novel design approach of the elliptical elliptical ring slots Antenna is presented. Details of the antenna design approach is presented and discussed. This Antenna has a stripline feed structure that eliminates the above limitations of probe-fed patch antennas. Simulation Result illustrates about 7.3% fractional bandwidth.

2.6 G-band Bowtie Dipole Antenna
Adel Emhemmed (Glasgow university, United Kingdom); Khaled Elgaid (Glasgow, United Kingdom)
we have proposed 3D micromachining 210GHz elevated bowtie dipole antenna fed by a coplanar waveguide. The antenna is designed for MMICs applications at G-band. The antenna is composed of coplanar waveguide (CPW) feed line, air-bridges, a feeding post, supporting posts, and a radiators.

2.7 Measurement of a 60 GHz Antenna Array fed by a Planar Waveguide-to-Microstrip Transition Integrated in Low-Temperature Co-fired Ceramics
Frank Wollenschläger (Ilmenau University of Technology, Germany); Matthias Hein (Ilmenau University of Technology, Germany)
The frequency range around 60 GHz imposes challenges for the experimental determination of the radiation patterns of the antennas. We have designed, fabricated, and applied a low-loss planar waveguide-to-microstrip transition for measurements of the radiation pattern of a 60 GHz 2x2 patch antenna array.

2.8 A Two Octave Bandwidth Dielectric Loaded Biconical Antenna with High Sidelobe Suppression
Marchcel Blech (Universität Stuttgart, Germany); Arndt Ott (Technische Universität München, Germany); Thomas F. Eibert (Technical University of Munich, Germany)
This omnidirectional antenna exhibits a two octave bandwidth of 2-8GHz. An input reflection below -10dB and a gain from 0.4-3.9dBi is achieved. Its pattern maintains almost constant in the E-plane and the shape of its normalized impulse response varies only in its scale in a wide angular range.

2.9 Small-Scale Variations of Cross-Polar Discrimination in Polarized MIMO Systems.
François Quitin (Université Libre de Bruxelles (ULB), Belgium); Claude Oestges (Université catholique de Louvain, Belgium); François Horlin (Université Libre de Bruxelles, Belgium); Philippe De Doncker (ULB, Belgium)

The small-scale variations of the XPD of dual-polarized MIMO systems is investigated. It is shown that the XPD has a doubly non-central F-distribution around its mean value. This distribution links the Ricean K-factors with the variations of the XPD. Measurements results are compared with the model and show good agreement.

2.10 A Textile Patch Antenna with Dual Polarization for Rescue Workers’ Garments
Luigi Vallozzi (Ghent University, Belgium)

In the context of wearable textile systems, antennas are needed that exploit diversity and exhibit robustness to harsh environmental conditions. A novel dual-polarized, textile patch antenna, on a fire-retardant and water-repellent substrate, was designed and realized. Extensive performance measurements and simulations in open-space and on-body situations showed promising results.

2.11 User’s Proximity Effects in Mobile Phones
Mauro Pelosi (Aalborg University, Denmark); Ondřej Franek (Aalborg University, Denmark); Mikael Knudsen (Infinion Technologies, Denmark); Gert Pedersen (Aalborg University, Denmark)

Thanks to a recent grip study, CAD models of the human hand have been generated, investigating user’s proximity effects in mobile phones. The hand exhibit a major contribution for total loss when compared to the head alone. The palm-handset gap influence both absorption and mismatch loss.

2.12 Statistical Analysis of Correlated MIMO Channels with A Pinhole
Tetsuki Taniguchi (University of Electro-Communications, Japan); Makoto Tsuruta (The University of Electro-Communications, Japan); Yoshiro Kárasawa (The University of Electro-Communications, Japan)

This paper presents statistical distributions of SNR (signal to noise ratio) in correlated double fading environments which is typically found in MIMO (multiple input multiple output) pinhole channels. The effectiveness of equations given in this work and natures of correlated pinhole channels are investigated through computer simulations.

2.13 Extremely Low-Profile, Wideband Spiral Antenna with Absorbing Material
Hisamatsu Nakano (Hosei University, Japan); Hiroshi Oyanagi (College of Engineering, Hosei University, Japan); Junji Yamauchi (College of Engineering, Japan)

This paper presents the radiation efficiency and other characteristics of a unidirectional spiral antenna, where the antenna height above a conducting reflector is chosen to be extremely small (0.07 wavelength) and a ring-shaped absorbing material is attached under the outer spiral arms.

2.14 Evaluation of Mutual Coupling Models for Calibrating the Antenna Arrays for DOA Estimation
Ali Mirkamali (Zanjan University, Iran); Jafar Nateghi (Iran Telecommunication Research Center, Iran); Lida Akhoondzadeh-Asl (Birmingham University, United Kingdom)

Performance of the mutual coupling models based on the estimation of the current distribution on the array element for DOA estimation are evaluated and compared with each other. It is shown that the model proposed by Hui for compensating the mutual coupling effect has a better performance than other models.

2.15 Measurement of Diversity Gain and Capacity on a MIMO-OFDM Channel Comparing Different Types of Antennas
Carlos Gómez Calero (Universidad Politecnica de Madrid, Technical University of Madrid, Spain); Jonathan Mora-Cuevas (UPM, Spain); Luis Cuéllar Navarrete (Polytechnic University of Madrid, Spain); Ramón Marchínz Rodríguez-Osorio (Technical University of Madrid. ETSI de Telecomunicacion, Spain); Leandro de Haro (Universidad Politecnica de Madrid, Spain)

Measurements of diversity gain and channel capacity of different types of MIMO antennas using a MIMO-OFDM Testbed at 2.45 GHz in indoor scenarios are presented in this paper.

2.16 Effect of Mutual Coupling and Human Body on MIMO Performances
Carlos Gómez Calero (Universidad Politecnica de Madrid, Technical University of Madrid, Spain); Nima Jamaly (Chalmers University of Technology, Sweden); Luis González Díaz (UPM, Spain); Ramón Marchínz Rodríguez-Osorio (Technical University of Madrid. ETSI de Telecomunicacion, Spain)

The effect of mutual coupling and user body on MIMO performances are presented in this paper. The results have been obtained from simulation ans measurement of a Planar Inverted-F Antenna.

2.17 Pattern and polarization reconfigurable circular patch for MIMO systems
Daniele Piazza (Drexel University, USA); Prathaban Mookiah (Drexel University, USA); Michele D'Amico (Politecnico di Milano, Italy); Kapil Dandekar (Drexel University, USA)
We propose a reconfigurable circular patch antenna (RCPA) for MIMO systems that can be reconfigured both in pattern and polarization. The performance offered by the proposed antenna design when used in 2x2 MIMO systems has been characterized in terms of channel capacity using experimental field-testing in an indoor environment.

### 2.18 New antenna diversity front-end using code multiplexing
Matthieu Gautier (Université de Lyon, INRIA, INSA-Lyon, CIR, France); Ioan Burciu (France Telecom R&D, France); Guillaume Villesmaud (Université de Lyon, INRIA, INSA-Lyon, CIR, France)

In this paper, we address the architecture of an antenna diversity receiver and we aim to reduce the complexity of the analog front-end. To this end, an innovative architecture is introduced based on code multiplexing. Simulation results show that the bit error rate doesn't increase with the multiplexing.

### 2.19 Performance Evaluation of the 802.11n Compact MIMO DRA in an Indoor Environment
Imran Shoaib (Queen Marchy, University of London, United Kingdom); Yue Gao (Queen Marchy, University of London, United Kingdom); Ying Zhon (Sony Ericsson Mobile Communications AB, Sweden); Katsunori Ishimiya (Tokyo Institute of Technology, Japan); Xiaodong Chen (Queen Marchy, University of London, United Kingdom)

This paper features some of the recent advances in study of the Compact MIMO DRA, developed at the Sony Ericsson Research Centre and Queen Marchy, University of London. The indoor channel capacity is analysed, and the performances of the 3-element DRA are compared with a 3-element dipole uniform linear array.

### 2.20 Enhancement of the Intelligent Quadrifilar Helix using MIMO Antenna Selection at a WLAN Access Point
Tim Brown (University of Surrey, United Kingdom)

The intelligent quadrifilar helix antenna (IQHA) is a compact antenna that can be used with multiple IQHAs to provide the benefit of antenna selection. Results are presented to show that having two IQHAs at the access point and a single IQHA at the mobile creates an improved 4x4 MIMO link.

### 2.21 An Extension of the 3GPP Spatial Channel Model in Outdoor-to-Indoor Environments
Shichuan Ma (University of Nebraska - Lincoln, USA); Deborah Duran-Herrmann (University of Nebraska-Lincoln, USA); Hamid Sharif (University of Nebraska-Lincoln, USA); Yaoqing (LaMarch) Yang (University of Nebraska-Lincoln, USA)

This paper proposes a novel outdoor-to-indoor MIMO statistical channel model which integrates the 3GPP SCME and a spherical power spectrum model at the mobile terminal. Simulation results based on the proposed model are presented, including the multipath intensity profile, the temporal and frequency correlation function, and the outage capacity.

### 2.22 Radiated Performance Testing of Diversity Enabled Terminals
Per Iversen (SATIMO, USA); Kim Krutkowski (SATIMO, USA); Stefan Issartel (SATIMO, France); Alessandro Scannavini (SATIMO, Italy); Lars Foged (SATIMO, Italy)

This paper discuss general methods for test and design engineers for testing radiated performances of multi-antenna enabled terminals in a controlled environment such as anechoic chambers. Methods for testing MIMO (Multi-input Multi-output) performances in both passive and active way are highlighted.

### 2.23 A Dual Circularly Polarised Contrawound Quadrifilar Helix Antenna for Land Mobile Satellite MIMO Terminal
Mohd Fais Mansor (University of Surrey, United Kingdom); Tim Brown (University of Surrey, United Kingdom); Barry Evans (CCSR, University of Surrey, United Kingdom)

A dual circularly polarised printed Contrawound Quadrifilar Helix Antenna (CQHA) with low mutual coupling and correlation is proposed for Land Mobile Satellite (LMS) MIMO terminal. Evaluation for its MIMO potential is investigated. A deployment configuration of the CQHA for vehicular rooftop antenna is also studied.

### 2.24 On the Capacity Evaluation of a Land Mobile Satellite System Using Multiple Element Antennas at the Receiver
Nektarios Moraitis (National Technical University of Athens, Greece); Péter Horváth (Budapest University of Technology and Economics, Hungary); Philip Constantinou (National Technical University of Athens, Greece); Istvan Frigyes (Budapest University of Technology, Hungary)

A satellite downlink is investigated and our goal is to determine the capacity. The investigated system is SIMO having one transmit antenna onboard the satellite and a uniform linear array receive antenna at the terminal. The study is performed at 1.8 GHz, 2.4 GHz and 14 GHz.

### 2.25 Characterisation of 4x4 Dual Polarised LOS MIMO
Sahaya Kulantai Raj Joseph (Technical University of Braunschweig, Germany); Schoebel Joerg (Technical University of Braunschweig, Germany)

we derive the distance criteria and minimum capacity expressions of a dual polarized 4x4 Line Of Sight MIMO channel with linear arrays. The effect of beamwidth of the individual elements on the capacity is analyzed.
2.26 Repeatable Performance Measurements of MIMO Systems in Connected Reverberation Chambers with Controlled Keyhole Effect

Charlie Orlenius (Bluetest AB, Sweden); Mats Andersson (Bluetest AB, Sweden)

The present paper describes an extended MIMO measurement setup utilizing reverberation chambers, where the so called keyhole effect can be controlled by varying the connection between the two chambers.

2.27 Doubling MIMO Capacity for handset MIMO using true polarization diversity

Juan Valenzuela-Valdes (Emite Ing, Spain); Miguel Garcia-Fernandez (Technical University of Cartagena, Spain); Antonio Marchínez-González (Universidad de Cartagena, Spain); David Sanchez-Hernandez (Universidad de Cartagena, Spain)

Results to be presented in this contribution demonstrate that under Rayleigh-fading scenarios TPD can be effectively combined with spatial diversity to nearly double the diversity gain and MIMO capacity for the same available volume.

2.28 Antenna diversity measurements in an urban Single Frequency Network at S band

Frederic Lacoste (CNES, France); Lionel Rudant (CEA-LETI, France); Gaël Scot (CNES, France); Françoise Carvalho (CNES, France); Christophe Delaveaud (CEA-LETI, France)

This paper presents a new concept of compact multi antenna system that has the same diversity performances than a more voluminous classical spatial diversity system. These performances have been measured in an actual urban environment.

2.29 A new method to increase the port-to-port isolation of a compact two-antenna UMTS system

Anissa Chebihi (University of Nice-Sophia Antipolis, France); Cyril Luxey (University of Nice, France); Aliou Diallo (University of Nice, France); Philippe Le Thuc (University of Nice-Sophia Antipolis, France); Robert Staraj (University of Nice-Sophia Antipolis, France)

In this paper, We propose a new method to increase the port-to-port isolation of a compact system composed by two very closed PIFAs (Planar Inverted-F Antenna) integrated on the same PCB (Printed-Card Board) of a mobile phone and operating in the UMTS band [1.92-2.17] GHz.

2.30 Magnetic Resonance Imaging Compatible Ultra-Wideband Antennas

Ulfich Schwarz (Ilmenau University of Technology, Germany); Florian Thiel (PTB Berlin, Germany); Ralf Stephan (Technische Universität Ilmenau, Germany); Matthias Hein (Ilmenau University of Technology, Germany); Frank Seifert (Physikalisch-Technische Bundesanstalt Berlin, Germany)

We have studied the performance of ultra-wideband (UWB) antennas for biomedical imaging inside the 3-Tesla magnetic resonance imaging (MRI) system of PTB Berlin. This approach opens the potential for using UWB radar as a navigator technique for improved magnetic resonance imaging.

2.31 A MIMO WiMAX-OFDM based System Measurements in Real Environments

Adil Belhouji (Xlim, France); Cyril Decroze (XLIM, France); David Carsenat (3IL, France); Moctar Mouhamedou (XLIM-UMR 6172-CNRS, University of Limoges, France); Sébastien Reynaud (CISTEME, France); Thierry Monediere (XLIM-UMR 6172-CNRS, University of Limoges, France)

Performances of a MIMO OFDM system based on the 802.16d (WiMAX) specifications is studied in reverberation chamber and outdoor to indoor context at 3,5GHz.

2.32 A Comparative Study of WiMAX Subscriber Equipment Antennas

Umesh Navsariwala (Motorola, Inc., USA); Matthew Schirmacher (Motorola, Inc., USA); Nicholas Buris (Motorola, Inc., USA); Marchk Schamberger (Motorola, Inc., USA)

MIMO antenna systems can take advantage of rich multipath and offer significant cost-performance benefits. This paper presents a study of WiMAX MIMO antenna modules in various multi-path environments. It is shown that lower gain antennas in rich multipath environments offer cost efficient alternatives to higher gain antennas.

2.33 Mutual Coupling in Multi-Antenna Systems: Figures-of-Merit and Practical Verification

Christian Volmer (Ilmenau University of Technology, Germany); Jörn Weber (Technische Universität Ilmenau, Germany); Ralf Stephan (Technische Universität Ilmenau, Germany); Matthias Hein (Ilmenau University of Technology, Germany)

The simple evaluation of mutual coupling effects is essential to the optimisation of antenna arrays for small mobile communications devices. We propose novel figures-of-merit in terms of the scattering matrix of the array that quantify the impact on diversity reception. The practical signification is proved by diversity measurements.

2.34 Channel Capacity Maximization in MIMO antenna system by Genetic Algorithm

Andrea Farkasvolgyi (Budapest University of Technology and Economics (BME), Hungary); Róbert Dady (BUTE, Hungary); Lajos Nagy (Budapest University of Technology and Economics, Hungary)

We present our results of channel capacity maximization by indoor environment. We investigated a 3×3 MIMO system. In this simulation antenna structure isn’t fixed, but they can be taken free position within fixed space. We looked for antenna structure for maximal channel capacity by analysis with genetic algorithm.

2.35 On the realization of 4-Port Antennas for MIMO Antenna Systems
A multiport antenna for MIMO systems will be presented. It consists of elementary antenna types such as a patch, a monopole and a magnetic dipole. The return loss coefficient, the decoupling between the ports and the radiation pattern are some of the results that will be given in this paper.

2.36 Polarization Diversity Analysis in Rural Scenarios Using 3D Method-Of-Images Model
Koby Shoshan (Tel-Aviv University, Israel); Ofer Amrani (Tel Aviv University, Israel)
Polarization diversity analysis of co-located dipoles antenna configurations in Rural scenarios using 3D Ray-Tracing Method-Of-Images model.

Tue-Poster: Poster Session-Large Antennas-1

Lobby 1 Chair: Tudor Palade (Technical University of Cluj-Napoca, Romania), Simon Otto (IMST GmbH, Germany)

2.37 Non-Linear Waveguide-Fed Slot Antenna Array: Analysis and Synthesis
Elias Rachid (Saint Joseph University, USJ, Lebanon); Dalia Mattar (ESIB, Lebanon); Michele Rouhana (ESIB, Lebanon)
Proposed antennas have a symmetric and uniplanar geometry with both curved convex and concave microstrips for 4 slots etched on the conducting plane. They are excited by a coplanar-waveguide (CPW) and placed in the direction perpendicular to the transmission line. Numerical results are compared to those for the linear CPW.

2.38 Hybrid Particle Swarms Applied to the Synthesis of Planar Array Feeds
Marchta Lanza Diego (University of Cantabria, Spain); Jesus Perez Lopez (University of Cantabria, Spain); Ivan Lopez (University of Cantabria, Spain); Jose Basterrechea (University of Cantabria, Spain)
Classical PSO schemes have been modified by introducing one of the most effective selection strategies commonly used in genetic algorithms (GA), the tournament selection strategy, and the new hybrid schemes have been applied to several planar array synthesis problems in order to weigh up the improvements achieved.

2.39 Synthesis and Optimization of Microstrip Antennas Array using Minimax Method
Bouyeddou BenaMarch (Abou Bekr Belkaid university Tlemcen, Algeria); Harrou Fouzi (Université de technologie de troyes, France); Sidi Ahmed Djennas (Télécom laboratory, Algeria); Lotfi Merad (CNTS algeria, Algeria)
This paper present a Minimax approach for the synthesis and optimization of linear and planar microstrip antennas array. This approach allows to seek the law of optimal feed and the space distribution of the radiant elements so that the synthesised diagram is closed as possible as an optimal desired diagram.

2.40 Single-Layer Unit Cells with Optimized Phase Angle Behavior
Sabine Dieter (University of Ulm, Germany); Christoph Fischer (University of Ulm, Germany); Wolfgang Menzel (University of Ulm, Germany)
Single-layer coupled FSS reflection type structures for reflectarrays are investigated resulting in an increased range and smaller slope of their phase angle performance as a function of structure size. Their improved performance is also demonstrated with three test reflectarrays using these novel structures.

2.41 Analysis, Design and Measurement of a Series-Fed Microstrip Array Antenna for X-band INDRA: The Indonesian Marchitime Radar
Mostafa Hajian (TU Delft, The Netherlands)
Linear series center-fed patch array antenna as sub-array feed of a cylindrical reflector is presented. The design of a 1x8-elements sub-array is performed. Number of arrays have been built and measured. Return loss of -25dB, with a maximum gain of 16dBi were simulated and measured over a bandwidth of 200MHz.

2.42 Reconfigurable Reflectarray Antenna Loaded With Active Varactor
Mostafa Hajian (TU Delft, The Netherlands)
The design of an active reconfigurable reflectarray antenna has been proposed. The radiators are hollow patch loaded with varactor-diode. The phase alteration is based on the variation of the capacitance. The active reflectarray has been built and tested at 6 GHz. Good agreement between the simulations and measurements are observed.

2.43 Dual Polarized Subarray for Spaceborne SAR at X-band
Marchía Isabel Marchtín (EADS CASA Espacio, Spain); Fernando Monjas (EADS CASA Espacio, Spain)
Following EADS CASA Espacio heritage on spaceborne SAR radiators, the technology is applied to the antenna of the SEOSAR/PAZ SAR instrument. It consists of 384 subarrays working at X-band
and performing in dual linear polarization. Tests on first subarray breadboards show low losses, good polarization purity and good bandwidth performances.

2.44 A Linear Microstrip Antenna Array Having Low Sidelobe Level
Yoseaf Asad (Sami Shamoon, Israel); Najeb Fahoum (Sami Shamoon, Israel); Haim Matzner (HIT-Holon Institute of Technology, Israel)
A microstrip antenna array having 5 elements, fed by Dolph-Chebyshev amplitude weights is proposed. The antenna elements and the divider strips are located in opposite sides of a common ground. The antenna array was simulated and measured, having approximate measured bandwidth of 18% and sidelobe level of about 17 dB.

2.45 A Dual-Frequency Series-Fed Patch Array Antenna
Simon Otto (IMST GmbH, Germany); Andre Rennings (University of Duisburg-Essen, Germany); Oliver Litschke (IMST GmbH, Germany); Klaus Solbach (Universität Duisburg-Essen, Germany)
A novel dual-frequency concept for series-fed microstrip patch array antennas is proposed. An identical near field distribution following an identical far field characteristic was achieved at two different frequencies.

2.46 A Deployable Reflector Antenna with a Simplified X/Ka Simultaneous Feed-System
Christophe Granet (BAE Systems Australia Ltd, Australia); Ian Davis (BAE Systems Australia Ltd, Australia); John Kot (BAE Systems Australia Ltd, Australia); Greg Pope (BAE Systems Australia Ltd, Australia)
A lightweight, low-cost, simultaneous X-band and Ka-band feed-system has been designed and matched to a deployable flyaway SATCOM antenna. The performance of the complete antenna assembly has been simulated and the results show that very good performance can be achieved in both X and Ka-band from a relatively small antenna.

2.47 A Simultaneous S/X Feed-System for a LEO-Satellite-Tracking Reflector Antenna
Christophe Granet (BAE Systems Australia Ltd, Australia); Ian Davis (BAE Systems Australia Ltd, Australia); John Kot (BAE Systems Australia Ltd, Australia); Greg Pope (BAE Systems Australia Ltd, Australia)
S-band has been used for satellite Telemetry, Tracking and Control (TT&C) applications for many years and more recently X-band has also been deployed. A theoretical design for a new dual S/X-band feed-system for a ground station with S-band transmit and receive capabilities and X-band receive capabilities is presented.

2.48 Novel Phased Array Antenna for mobile satellite communications
Yasuhiro Kazama (Japan Aerospace Exploration Agency, Japan)
Mobile station points a satellite in elevation range from 30deg. to 60deg. with its radiation beam. We propose a solution against the problem to use an element antenna which has the main beam in the satellite direction.

2.49 Array Antenna Composed of Bent Four-Leaf Elements
Hisamatsu Nakano (Hosei University, Japan); Yoshiki Ogino (College of Engineering, Hosei university, Japan); Junji Yamauchi (College of Engineering, Japan)
This paper presents a one-dimensional array composed of newly developed bent four-leaf antennas. A fan-beam is obtained with a gain of 19 dBi: the radiation pattern in the x-z plane is wide (HPBW = 68 deg) and that in the x-y plane is narrow (HPBW = 6 deg).

2.50 Design and demonstration of an X-band transmit-array
Hamza Kaouach (CEA-Léti / Minatec, France); Laurent Dussopt (CEA-léti / Minatec, France); Ronan Sauleau (University of Rennes 1, France); Thierry Koleck (CNES Toulouse, France)
This article presents the design, realization and experimental characterization of a new planar transmit-array at 9.6 GHz with a 10% -3dB gain bandwidth. Beam-steering up to 30° is demonstrated by shifting the feed source. This work is a first step toward the development of future reconfigurable transmit-arrays.

2.51 High-performance Uniformly Excited Linear and Planar Arrays Based on Linear Semiarrays Composed of Subarrays with Different Uniform Spacings
Marchcos Álvarez-Folgueiras (University of Santiago de Compostela, Spain); Juan Rodríguez-González (University of Santiago de Compostela, Spain); Francisco Ares-Pena (University of Santiago de Compostela, Spain)
This work shows that linear arrays with the design described in the title can outperform both uniformly and nonuniformly spaced arrays designed by other published methods. Furthermore, the linear model can be extended to planar arrays in ways that achieve excellent antenna performance.

2.52 Ku band active transmitarray based on microwave phase shifters
Alfonso Muñoz-Acevedo (Universidad Politécnica de Madrid, Spain); Pablo Padilla de la Torre (Technical University of Madrid, Spain); Manuel Sierra-Castaner (Universidad Politécnica de Madrid, Spain)
The aim of this paper is to introduce a novel 12 GHz transmitarray antenna. This structure can flexibly reconfigure incident radiation with microwave circuitry based on phase shifters. Circuits and radio interface design are presented in the article.
2.53 Narrow-band microstrip antenna array for a robust receiver for navigation applications
Marchcos Heckler (German Aerospace Center (DLR), Germany); Wahid ElMarchissi (German Aerospace Center (DLR), Germany); Lukasz Greda (German Aerospace Center (DLR), Germany); Manuel Cuntz (German Aerospace Center (DLR), Germany); Achim Dreher (German Aerospace Center (DLR), Germany)
This paper discusses the design of a microstrip antenna array for navigation applications operating at the L1 band of the Galileo system.

2.54 An active, C-band array antenna with integrated electronics
Magnus Eriksson (Saab Microwave Systems, Sweden); Klas Axelsson (Saab Microwave Systems, Sweden); Andreas Wikström (Saab AB, Sweden); Bengt Svensson (Saab Microwave Systems, Sweden)
A concept of building a low cost integrated AESA has been investigated. A C-band active array antenna board has been designed, built and tested. Measurements of the C-board antenna agree well with the simulated results.

2.55 Unit cells for dual-polarized and polarization-flexible reflectarrays with scanning capabilities
Julien Perruisseau-Carrier (Centre Tecnologic de Telecomunicacions de Catalunya (CTTC), Barcelona, Spain, Spain); Pablo Pardo (Centre Tecnologic de Telecomunicacions de Catalunya (CTTC), Barcelona, Spain, Spain)
This paper presents dual-polarized and polarization-flexible reflectarray (RA) unit cells with phase reconfiguration capabilities. A RA using such cells could scan/form independently two beams corresponding to each linear polarization. The proposed element could also be used as a reflective cell simultaneously providing phase control and full linear/dual/circular polarization flexibility.

2.56 Scanning Performances of Wide Band Connected Arrays of Slots and Dipoles
Daniele Cavallo (TNO, The Netherlands); Andrea Neto (TNO, The Netherlands); Giampiero Gerini (TNO - Defence, Security and Safety, The Netherlands); Giovanni Toso (ESA/ESTEC, The Netherlands)
The scanning performances of connected arrays with backing reflectors are investigated. A comparison between connected dipoles and slots reveals that dipoles are better suited for wide scan (45º), retaining the minimal number of Transmit/Receive modules. Eventually, the design of a 40% bandwidth planar array of dipoles is presented.

2.57 A Compact Rx/Tx Dual Polarization Antenna Array Element Including Diplexers
Per Magnusson (Ruag Aerospace Sweden AB, Sweden)
New systems for satellite based Personal Mobile Communication are expected to use the S-band in addition to the L-band systems used today. Ruag Aerospace Sweden (previously Saab Space) is currently developing a novel compact antenna element for such an application at the S-UMTS frequencies.

2.58 Efficient optimization of the phase diagram in digitally-controlled reflective cells
Julien Perruisseau-Carrier (Centre Tecnologic de Telecomunicacions de Catalunya (CTTC), Barcelona, Spain, Spain); Apostolos Georgiadis (CTTC, Spain)
We present an efficient method to optimize the phase states distribution, or phase diagram, of a digitally-reconfigurable reflective cell (e.g. application: reflectarray). The method is based on a genetic algorithm and a least-squares optimization, and solely requires running a very small number of full-wave simulations prior to the optimization.

2.59 Onset & Offset Configuration for Ka-Band Reflectarray Antenna
Juri Zuccarelli (INAF-IASF Bologna, Italy); Valerio Marchtorelli (INAF-IASF Bologna, Italy); Ocleto D'Arcangelo (IFP CNR Milano, Italy); Adriano De Rosa (INAF-IASF Bologna, Italy); Enrico Pagana (Radio engineer consultant, Italy); Nazzareno Mandolesi (INAF-IASF Bologna, Italy); Luca Valenziano (INAF-IASF Bologna, Italy)
This paper presents the first results of the study for the best configuration of a reflectarray antenna developed for a radiometer system working at 35 GHz named ViKy project.

2.60 Substrate Effect on X-band Design of End-Wall Double Slit Microstrip-to-Waveguide Splitter
Hadi Aliakbarian (ESAT, Katholieke Universiteit Leuven, Belgium); Amin Enayati (ESAT, Katholieke Universiteit Leuven, Belgium); Guy Vandenbosch (Katholieke Universiteit Leuven, Belgium); Walter Raedt (IMEC, Belgium)
The paper investigates the effect of different types of substrates on the performance of a new kind of end-wall transition between waveguide and microstrip line which is favorable for feeding of series fed microstrip arrays.

2.61 On the Design of a Direct Radiating Array by Using the Fractal Technique
Katherine Siakavara (Aristotle university of Thessaloniki, Greece); John Sahalos (Aristotle University of Thessaloniki, GR-54124, Thessaloniki, Greece, Greece); Elias Vafiadis (Aristotle University of Thessaloniki, Iceland)
The fractal technique is introduced as an efficient method for the design of Direct Radiating Arrays (DRAs) which produce multiple beams for satellite communications systems. High directivity, low SLL and small number of control points were obtained, by further modification of the geometry and the feeding of the array.

2.62 Design of a Ka-band wide scanning phased array antenna

Thomas Lambard (I.E.T.R., France); Olivier Lafond (IETR, France); Mohamed Himdi (Université de Rennes 1, France, France); Herve Jeuland (ONERA, France); Sylvain Bolioli (ONERA, France); Laurent Le Coq (University of Rennes 1, France)

The general issue of this paper deals with the design of a Ka-band phased array antenna. This paper presents a comparative study of possible antenna element candidates. It presents also a new low loss analog phase shifter. This will lead to the conception of a phased array antenna.

2.63 Fast Calculation of Wide Angle ARC for Broadband Antenna Arrays Based On Interpolation Techniques

Sheng Wang (Queen Marchy, University of London, United Kingdom)

The polynomial and Padé rational function fitting models were employed to interpolate the scanned wide-angle ARC of radiating element in array environments as spatial dependence. Its efficiency and applicability was also proved in the calculation of mutual coupling between elements in large arrays with sparse samples of scanned ARC.

2.64 Adjustable High Impedance Surface for Active Reflectarray Applications: Performances Optimisation of the Unit Cell

Philippe Ratajczak (Orange Labs, France); Jean-Marche Baracco (Marchdel, France); Patrice Brachat (France Telecom, France); Jean-Marche Fargeas (Orange Labs, France)

In this paper, the latest developments concerning the design of the unit cell of one adjustable HIS using varactor diodes are presented. The HIS obtained with this new unit cell is used in the design of a centred reflectarray antenna able to generate various types of radiation pattern beam.

2.65 A Ring-coupled Patch Antenna for Broadband Polarization Multiplex at Ka-Band

Alexander Geise (Technical University Hamburg-Harburg, Germany); Arne Jacob (Technische Universität Hamburg-Harburg, Germany)

A multilayer patch antenna with polarization multiplex is presented. The key element is a resonant feed ring which provides both circular polarizations. The arrangement features the compactness required for highly integrated antenna arrays. The design procedure is outlined. Measurements compare well with simulated S-parameters, gain, axial ratio and far-field patterns.

2.66 Dual Polarization Microstrip Patch Array Antenna for WLAN Application

Mohd Syafiuil Redzwan Mohd Shah (Universiti Teknikal Malaysia Melaka, Malaysia)

This paper present design of array antenna from type of inset-fed microstrip patch antenna oriented at 45º and -45º. The antennas are capable to generate dual linearly polarization oriented at desired location. The simulation and measurement results have been compared. The designs of array antennas yield a gain ≤ 12 dBi.

2.67 Single Frequency 2-D Leaky-Wave Beam Steering Using an Array of Surface-Wave Launchers

Symon Podlichak (Queen’s University, Canada)

A planar antenna is presented that utilizes an array of surface-waves launchers. By varying the phase difference between elements, the excited surface-waves can be controlled. With the addition of circular gratings, cylindrical leaky-waves (LWs) can be steered producing far field beam patterns that can be controlled at a single frequency.

2.68 Investigation of a Horn Antenna Fed by Several Waveguides

Haim Matzner (HIT-Holon Institute of Technology, Israel); Rami Mashiah (HIT-Holon Institute of Technology, Israel)

A horn antenna fed by four rectangular waveguides is discussed. The measured gain of the antenna is greater than the gain of a conventional horn antenna having the same volume by more than 4 dB, and low sidelobe level has been achieved. The simulation and measurement were in good agreement.

2.69 Low-Cost Wideband Antenna Arrays on Glass Substrate for ISM Band Applications

Theodore Vasiliadis (Trinity Systems, Greece); George Sergiadis (Aristotle University of Thessaloniki, Greece)

Methodology and guidelines are presented for fabricating wideband planar antenna arrays on glass substrates, for ISM band applications. Fabrication is carried-out by hand using off-the-shelf components, ensuring an extremely low-cost process and rapid prototyping. The methodology is addressed to radio amateurs wishing to deploy WLAN networks quickly and inexpensively.

2.70 Single Layer Reactively Steered Passive Array Radiator

M. G. Sorwar Hossain (Fujitsu Laboratories Ltd., Japan); Maniwa Toru (Fujitsu Laboratories LTD., Japan)
A passive array radiator has been proposed in a single layer configuration that consists of the inset fed microstrip patches and the control reactance varying RF circuit. The RF part is designed in a folded line configuration such that it does not contribute to the spurious radiation of the antenna.

2.71 A Study on Phased Array Antenna Using Bi-layered MSA
Takenori Yasuzumi (Aoyama Gakuin University, Japan); Yasuhiro Kazama (Japan Aerospace Exploration Agency, Japan)
We propose a new type microstrip antenna with bi-layered structure as a element antenna. As the measured result, scanning of the beam in the direction of hope has been achieved by adequately adjusting the phase machine.

2.72 Realization of Simple Antenna System for ETS-VIII Mobile Satellite Communications
Basari (Chiba University, Japan)
The paper presents a simple antenna system for land vehicle communication aimed at Engineering Test Satellite-VIII (ETS-VIII) applications. The developed antenna system is examined in anechoic chamber and mounted into a car for outdoor measurement using ETS-VIII. The results are presented.

2.73 Investigation on Phase Quantization Effect of Synthesized Array Factor Having a Fixed Beam and a Steered Desired Null
Mathieu Caillet (Royal Military College of Canada, Canada); Michel Clénet (DRDC Ottawa, Canada); Yahia Antar (Royal Military College of Canada, Canada)
The paper presents results on the phase quantization effect on radiation pattern characteristics of phased arrays using digital phase shifters for a scenario consisting of a desired signal and a moving interferer. The synthesized radiation pattern were investigated for various array sizes and number of phase shifter bits.

2.74 Design and Fabrication of a Waveguide Two-Dimensional Slot Array with Low Sidelobe Level of -35dB
Miao Zhang (Tokyo Institute of Technology, Japan); Jiro Hirokawa (Tokyo Institute of Technology, Japan); Makoto Ando (Tokyo Institute of Technology, Japan)
A 24-by-27 elements waveguide two-dimensional slot array with low sidelobe level of -35dB is designed by using the combination of a full-wave MoM Analysis and an equivalent circuit model. The measured total reflection is suppressed below -18dB. The sidelobe levels below -33dB for E- and H-plane are realized.

2.75 The Diverging-Focusing Properties of a Tapered Leaky Wave Antennas
Onofrio Losito (Politecnico di Bari, Italy); Vincenzo Dimiccoli (ITEL Telecomunicazioni S.r.l., Italy); Domenico Barletta (ITEL Telecomunicazioni S.r.l., Italy)
This tapered antenna lead to a quasi linear variations of the phase constant and its radiation angle. Nevertheless the variation of its cross section, allows a non-parallel emitted rays. Using a simple formula, we can be determined its beam radiation interval and its main beam radiation angle.

2.76 Optimization of large log-periodic dual-dipole antenna by using genetic algorithm on embedded element in small log-periodic array
Jian Yang (Chalmers University of Technology, Sweden); Per-Simon Kildal (Chalmers University of Technology, Sweden)
In the paper, we introduce a new method which can predict the total reflection coefficient of a large log-periodic array (with large number of elements) by calculating only several elements embedded in a small log-periodic array.

2.77 PSP Planar lens: A CORPS BFN to improve radiation features of arrays
Diego Betancourt (Public University of Navarra, Spain); Carlos Del Rio (Public University of Navarra, Spain)
In this paper a CORPS BFN defined by periodic layers of patches, slots and patches, PSP (Patch-Slot-Patch) is used to improve the radiation features of arrays, specially increasing the directivities of each one of the beams keeping the original phase centres.

2.78 Differential active antennas for the SKA project
Oscar Garcia-Perez (Universidad Carlos III de Madrid, Spain); Luis-Enrique Garcia-Muñoz (University Carlos III of Madrid, Spain); Jose Serna-Puente (Observatorio Astronomico Nacional, Spain); Vicente Gonzalez-Posadas (Universidad Politecnica de Madrid, Spain); Jose-Luis Vazquez-Roy (University Carlos III of Madrid, Spain); Daniel Segovia-Vargas (University Carlos III de Madrid, Spain)
This paper describes the design of a one square meter planar-array for the low band of the Square Kilometer Array (SKA) project (300MHz-1GHz). Electromagnetic simulation results show a correct operation for scanning angles from broadside to ±45º. Typical noise temperatures around 60K for each active antenna element have been obtained.

2.79 A 77 GHz Eight-Channel Shaped Beam Planar Reflector Antenna
Peter Feil (University of Ulm, Germany); Winfried Mayer (Endress + Hauser GmbH & Co. KG, Germany); Wolfgang Menzel (University of Ulm, Germany)
An eight-channel planar dual reflector antenna to be used in a 77GHz automotive radar sensor is presented. To meet the requirements of a combined medium and long range sensor, antenna beams are shaped by the use of dielectric radiators as feeds either only in the azimuthal or in both planes.

**2.80 Multi-Octave BAVA Radiating Elements for use in Modular Phased Array Antennas**

William Otter (Imperial College, University of London, United Kingdom); Bruno Pirolio (BAE SYSTEMS Advanced Technology Centre, United Kingdom); Robert Henderson (BAE Systems Advanced Technology Centre, United Kingdom); Rob Lewis (BAE Systems Advanced Technology Centre, UK, United Kingdom)

Simulation of BAVA antenna elements suitable for modula phased arrays.

**2.81 Fast phase-only synthesis of faceted reflectarrays**

Amedeo Capozzoli (Università di Napoli Federico II, Italy); Claudio Curcio (Università di Napoli Federico II, Italy); Giuseppe D’Elia (Università di Napoli Federico II, Italy); Angelo Liseno (Università di Napoli Federico II, Italy); Daniele Bresciani (Thales Alenia Space, France); Hervé Legay (Thales Alenia Space, France)

We illustrate a fast Phase Only Synthesis approach to the power pattern synthesis of faceted, shaped-beam reflectarrays, based on a massive use of FFTs. To allow a fast design of very large antennas, a numerical code has been developed also using a fast implementation of the FFT (FFTW).

**2.82 Millimeter-Wave Frequency Reconfigurable Slot Dipole Array with Packaged RF-MEMS Switches**

Nihan Gokalp (Middle East Technical University, Turkey); Ozlem Civi (Middle East Technical University, Turkey)

A frequency reconfigurable slot dipole array operating at millimeter-wave frequency is designed. Dual frequency operation of the array is achieved by using packaged RF-MEMS switches. Series RF-MEMS switches located on the dipole arms control the electrical length of the dipole and enable dual frequency operation.

**2.83 A dual-band low profile phased array antenna for civil aviation applications**

Andrew Thain (EADS - Innovation Works, France); Harmen Schippers (National Aerospace Laboratory NLR, The Netherlands); Adriaan Hulzinga (National Aerospace Laboratory NLR, The Netherlands); Hans Gemenier (Cyner Substrates, The Netherlands)

Dual (L & Ku) phased array antenna designs are proposed for civil aviation applications. Simulations performed with Ansoft HFSS and CST Microwave Studio are compared with prototype measurements.

**2.84 Concentric square ring elements for dual band reflectarray antenna**

Paola Pirinoli (Politecnico di Torino, Italy); Cong Pham Thanh (Politecnico di Torino, Italy); Marchco Mussetta (Politecnico di Torino, Italy); Marchio Orefice (Politecnico di Torino, Italy)

A preliminary study of a dual band reflectarray antenna is presented. The resulting antenna has properties of reduced weight and thickness, and can be easily mounted (stowed) on the roof of a vehicle and deployed when in operation.

**2.85 Beam Array Optimization For SMarcht Antenna Systems Using Stochastic Algorithms**

Konstantinos Papadopoulos (National Technical University of Athens, Greece); Chrysas Papagianni (NTUA, Greece); Christos Papas (National Technical University of Athens, Greece); Dimitra Kaklamani (National Technical University of Athens, Greece); Iakovos Venieris (National Technical University of Athens, Greece)

Adaptive array antennas are a viable solution to a number of problems in mobile communications applications. The GA and PSO algorithms are used for the beam array optimization of a linear and a planar uniform circular array and are evaluated on the basis of convergence and quality of results.

**2.86 Design and Measurement of a Wideband Aperture-Coupled and Polarization-Agile Stacked-Patch Antenna Array for Monopulse Radar Applications**

Sebastian Methfessel (University of Erlangen-Nuremberg, Germany)

A wideband circularly-polarized stacked-patch antenna array with dual polarization capability is presented. Monopulse functionality can be achieved with an external comparator network. A stacked-patch antenna element, quadrant and array is designed, simulated, fabricated and measured. Theoretical and measured results of S parameters and radiation patterns are presented and discussed.

**2.87 Low profile bidirectional antenna for Linear Wireless Sensors Networks**

Marchio Orefice (Politecnico di Torino, Italy)

This paper presents a new antenna that can be used in Linear Wireless Sensors Networks (LWSN) in the ISM frequency band (2.4-2.48 GHz) with bidirectional characteristics in order to maximize the link efficiency. The antenna consists of an array of 4 transverse waveguide slots, fed out of phase.

**2.88 Analysis of complex circular/square ring reflectarray elements**
The use of reflectarray elements consisting of several ring patches with different shapes is considered. With an appropriate design, such elements exhibit a linear phase variation in a wide range, so that they are suitable for wideband arrays. An array of 625 elements has been designed and manufactured.

2.89 Design of Tapered-Slot Antenna Arrays

Valeri Mikhnev (Institute of Applied Physics, Belarus); Pertti Vainikainen (Helsinki University of Technology (TKK), Finland); Yelena Maksimovitch (Institute of Applied Physics National Academy of Sciences Of Belarus, Belarus)

Two compact ultra-wideband antenna arrays built of tapered-slot antennas and intended for landmine surveys are described.

2.90 52/119 GHz Corrugated Horn Design for Earth Observation Applications

Jean-Pierre Adam (IEEA, France)

This paper describes the design of a dual frequency feed. The center operating frequencies are 52.5 GHz and 118.75 GHz. This feed is used to illuminate an offset reflector.

2.91 Active Phased Array Techniques for High Field MRI

Pedram Yazdanbakhsh (Duisburg-Essen University, Germany); Klaus Solbach (Universität Duisburg-Essen, Germany)

This paper describes recent developments in high field Magnetic Resonance Imaging (MRI) concerning the application of active phased array techniques where the pulse amplitudes and phases of currents in antenna (coil) arrays are adjusted in order to improve magnetic flux density homogeneity inside the inhomogeneous patient's body.

2.92 Aperiodic linear arrays for rectangular shaped beams

Giovanni Toso (Esa/Estec, The Netherlands); Piero Angeletti (European Space Agency, The Netherlands)

The aim of this paper is propose a new deterministic procedure for the design of linear aperiodic arrays generating a rectangular shaped beam.

2.93 Multi-Beam Lens-Reflector for Satellite Communications: Construction Issues and Ground Plane Effects.

John Thornton (University of York, United Kingdom); Andy White (University of York, United Kingdom); Derek Gray (National Institute of Information and Communications Technology, Japan)

A hemispherical lens with groundplane comprises the focussing aperture. Gain is 35.5 dBi at 11.5 GHz, equivalent to a 61cm dish. The finite groundplane introduces scanning loss where it truncates the aperture. This was investigated from a theory for the aperture distribution; measurements; and the commercial solver FEKO.

2.94 Array design for different SLL and null directions with an interior-point optimization method from the generalized-scattering-matrix and spherical modes

Juan Córcoles (Universidad Politécnica de Madrid, Spain); Miguel A. González (Universidad Politécnica de Madrid, Spain); Jesús Rubio (Universidad de Extremadura, Spain); Juan Zapata (Universidad Politécnica de Madrid, Spain)

This work presents an optimization procedure which yields the excitations to achieve an array pattern with the requirements of different SLL in different regions and prescribed field nulls with a maximum directive gain. All interelement coupling effects from complex radiating structures used as array elements are inherently taken into account.
The subject of the paper is the presentation of an analytical physical propagation model for the evaluation of the connectivity of multi-hop transmission in wireless mesh networks operating above 10GHz.

2.97 A Study on the Possibilities of Providing Signal Coverage for Wireless Systems from High Altitude Platforms
Petř Horák (Czech Technical University in Prague, Czech Republic); Pavel Pechac (Czech Technical University in Prague, Czech Republic)
This paper provides a study into the possibilities of signal coverage for wireless systems provided from HAPs. The theoretical maximum cell size was analyzed based on the HAP altitude and various power budget requirements given by different system scenarios.

2.98 Special Features of Kirchhoff Method Application in Microwave Radiometry of Rough Sea Surface
Mikhail Danilytchev (Institute of Radio Engineering and Electronics, Russia); Boris Kutuza (Russian Acad. of Sciences, Russia); Alexander Nikolaev (Institute of Radio Engineering and Electronics, Russia)
Several methods for calculation of microwave radiation characteristics of the “ocean-atmosphere” system using the Kirchhoff approach are considered. Joint analysis of wave recording and radiation data obtained in the experiment of bistatic sea surface sensing is considered. As a result existing methodology of theoretical calculations is validated and noticeably enhanced.

2.99 Adaptation of Terminal to Base Station Assignment to Terminal Activities and Rain Event in Broadband Fixed Wireless Access Systems
Balázs Héder (Budapest University of Technology and Economics, Hungary); János Bitó (Budapest University of Technology and Economics, Hungary)
In BFWA systems the signal to interference and noise ratio highly depends on the assignment of terminal stations (TS) to base stations (BS). Present contribution is based on applying our special diversity method which adopts genetic algorithm to dynamically optimise TS-BS assignments in BFWA service area.

2.100 Cooperative diversity performance in millimeter wave wireless mesh networks: Outage analysis
Vasileios Sakarellos (National Technical University of Athens, Greece); Dimitrios Skraparlis (National Technical University of Athens, Greece); Athanasios Panagopoulos (National Technical University of Athens, Greece); John Kanellopoulos (National Technical University of Athens, Greece)
In this paper, the outage performance analysis of a cooperative diversity system operating at frequencies above 10 GHz and suffering from rain attenuation is presented. The destination node combines the direct link signal with a signal received through a regenerative relay using Selection Combining.

2.101 The use of heterogeneous antenna arrays in experimental HF-MIMO links
Salil Gunashekar (University of Leicester, United Kingdom); Michael Warrington (University of Leicester, United Kingdom); Sana Salous (University of Durham, United Kingdom); Stuart Feeney (University of Durham, United Kingdom); Nasir Abbasi (University of Leicester, United Kingdom); Dominique Lemur (IETR, Université de Rennes 1, France); Marchtial Oger (Université de Rennes 1, France)
To date, MIMO research has focussed primarily on communications within the UHF band (and above) and has not been addressed in the lower frequency bands. This paper describes the results of experiments that have been performed to investigate the feasibility of utilising MIMO techniques within the HF radio band.

2.102 First Results from Remote Sensing of the Atmosphere using Artificial Neural Networks
Marchtin Mudroch (Czech Technical University in Prague, Czech Republic); Pavel Pechac (Czech Technical University in Prague, Czech Republic); Marchtin Grabner (Czech Metrology Institute, Czech Republic); Vaclav Kvicera (Czech Metrology Institute, Czech Republic)
The paper introduces first results from remote sensing of the atmosphere using artificial neural networks (ANNs). ANNs of various designs were applied for weather classification and refractivity height profiles estimations using our unique experimental wireless links.

2.103 Single Ridge Waveguide UWB Absorbent Harmonic Filters
Jinquan Shen (Nanjing Research Institute of Electronic Technology, P.R. China)
Some UWB harmonic absorbent filters are presented in this paper that constructed by a single ridge waveguide and single and/or double series rectangulat waveguide loads. They have lower SWR and inset loss.

2.104 Measurements and Prediction of Outage Intensity Due to Multipath in Terrestrial Line-of-Sight Links
Luiz Silva Mello (Pontifical Catholic University of Rio de Janeiro, Brazil); Marchlene Pontes (Pontifical Catholic University of Rio de Janeiro, Brazil); Erasmus Miranda (Catholic University of Petropolis, Brazil)
This paper presents results of measurements of outage intensity due to multipath fading performed in Brazil. Experimental data were collected in 30 line-of-sight links operating in the 4 and 6 GHz bands. Based on the results, an empirical expression for predicting outage intensity from link parameters is derive.

2.105 Similarities and differences of storm time occurrence of GPS phase fluctuations at northern and southern hemispheres
Ivan Ephishov (IZMIRAN, Russia); Nadezda Tepenitsyna (IZMIRAN, Russia); Luiza Koltunenko (IZMIRAN, Russia); Irk Shagimuratov (IZMIRAN, Russia)
The paper presents the analysis of storm time occurrence of GPS phase fluctuations in high latitude ionosphere for northern and southern hemispheres.

2.106 Studies on the Schumann resonance frequency variations
Jagdish Rai (Indian Institute of Technology, Roorkee, India); Ramesh Chand (Indian Institute of Technology, Roorkee, India); M Israil (Indian Institute of Technology, Roorkee, India); S Kamakshi (Indian Institute of Technology, Roorkee, India)
Schumann resonances are the resonant frequencies of electromagnetic radiations from lightning propagating in the earth - ionosphere waveguide. The recorded data of Schumann resonances at Dharali in Himalaya were used. It has been found that power spectrum shows maximum during noon time and minimum during night time.

2.107 Marchkovian Channel Modeling for Multipath Mitigation in Navigation Receivers
Bernhard Krach (German Aerospace Center (DLR), Germany); Robert Weigel (Institute for Electronics Engineering, Erlangen-Nuernberg Uni., Germany)
Latest multipath mitigation algorithms are based on the concept of sequential Bayesian estimation and improve the receiver performance by exploiting the temporal constraints of the channel dynamics, which have to be characterized by a first-order Marchkovian model for this purpose. In this paper such a channel model is introduced.

Tue-Poster: Poster Session-UWB Antennas

Room: Lobby 1 Chair: Tudor Palade (Technical University of Cluj-Napoca, Romania), Malgorzata Janson (Universität Karlsruhe (TH), Germany)

2.108 Wide-band Tulip-Loop Antenna
Muge Tanyer-Tigrek (Delft University of Technology, The Netherlands); Dani Tran (Delft University of Technology, The Netherlands); Ioan Lager (Delft University of Technology, The Netherlands); Leo Ligthart (Delft University of Technology, The Netherlands)
a small sized CPW-fed tulip-loop antenna is described. The antenna has an impedance bandwidth for VSWR ≤ 2 of 83% stretching between 6 GHz and 14.5 GHz. Radiation patterns shows stable co- and low cross polar characteristics within the specified bandwidth.

2.109 Investigation on Microstrip-fed Modified Elliptical Monopole Antenna for UWB Communications
Hocine Kimouche (EMP, Algeria); Djamel Abed (Ecole Militaire Polytechnique, Algeria); Atrouch Brahimi (EMP, Algeria)
In this paper, we present an optimized design for a novel Printed Modified Elliptical Monopole (PMEM) antenna with a notched semi-circular ground plane for UWB applications. Using a notched semi-circular ground plane, the antenna can be miniaturized and a size reduced by 32% compared to crescent antenna.

2.110 Size Reduction of a Wideband Slot Antenna
Yang Lu (University of Liverpool, United Kingdom); Yi Huang (University of Liverpool, United Kingdom); Hassan Chatta (University of Liverpool, United Kingdom)
This paper presents a small size (41mm X 18mm) broadband slot antenna which can work from about 4.5GHz to 8.5GHz with relative constant radiation pattern.

2.111 A Trapezoidal Printed Monopole Antenna with Bell-Shaped Cut for Ultra Wideband Applications with 5.0-6.0GHz Band Rejection
Osama Ahmed (Concordia University, Canada); Ahmed Abumazwed (Concordia University, Canada); Abdul R. Sebak (Concordia University, Canada)
a novel printed UWB monopole antenna consisting of a trapezoidal patch with bell-shaped cut is proposed. It exhibits good radiation patterns and gain flatness. By embedding U-shaped slot, a notch in the 5-6GHz frequency band is obtained. It is suitable for UWB applications avoiding interference with existing wireless systems.

2.112 Ultra Wideband Stacked Microstrip Patch Antenna
Ahmed Elkorany (Faculty of electronic engineering, menouf, menoufia, egypt, Egypt); Abdelmegeed Sharshar (Faculty of electronic engineering, menouf, menoufia, egypt, Egypt); Said Ehalaafawy (Faculty of electronic engineering, menouf, menoufia, Egypt)
A novel ultra wideband stacked microstrip patch antenna is proposed. The stacked patch is larger than the excited one. An impedance bandwidth of about 3:1 in the frequency range 5.6-17.2 GHz when the stacked patch center is (3,3mm) and the excited patch center is (0,0).

2.113 Stacked Patch UWB Antenna in LTCC Technology
Shenario Valavan A (Delft University of Technology, The Netherlands)
An improved stacked patch antenna design with a wide bandwidth at mm-wave frequencies, to be integrated with a RF chip is proposed. The antenna is to be manufactured in LTCC technology which simplifies integration with a RF chip.

2.114 A Novel Compact CPW-Fed Wideband Slot Antenna
Johnson William (Pondicherry Engineering College, India); Rangaswamy Nakkeeran (Pondicherry Engineering College, India)
The proposed antenna has simple structure consisting of rectangular slot, semicircular feeding structure at the anterior portion of the feed and notched ground planes. The dimension of the antenna is 19mm×20mm×1.6mm. The antenna impedance bandwidth reaches 65% over the frequency range of 5GHz to 10.3 GHz.

2.115 Performance of wavefront migration imaging in the near field of the antennas
Malgorzata Janson (Universität Karlsruhe (TH), Germany); Grzegorz Adamiuk (University of Karlsruhe, Germany); Thomas Zwict (Universität Karlsruhe (TH), Germany); Werner Wiesbeck (University of Karlsruhe (TH), Germany)
In this paper the influence of targets placed in the proximity of the antennas on the behavior of line migration imaging algorithm used for UWB imaging is presented.

2.116 Compact Printed Tapered Slot Antenna for UWB
Jorge Costa (Instituto de Telecomunicações / ISCTE, Portugal); Carla Medeiros (Instituto de Telecomunicações, Instituto Superior Técnico, Portugal); Carlos Fernandes (Instituto de Telecomunicações, Instituto Superior Tecnico, Portugal)
This paper presents a new antenna for the 3.1-10.6GHz UWB bandwidth. The radiation pattern presents smooth frequency dependence with a stable phase centre and low cross-polarization for all observation angles. Link measurements between two identical antennas have shown low pulse distortion over almost all the solid angle.

2.117 Quais-millimeter wave UWB antenna
Hisao Iwasaki (Shibaura institute of technology, Japan)
A novel quais-millimeter wave UWB antenna has been successfully developed. This antenna was consisted of the dipole antennas with deferent lengths and intersecting angle, and each were fed by an inverted L-probe. VSWR less than 1.5 was obtained from 20 GHz to 30 GHz.

2.118 UWB dipole antenna optimization with neural network tuned algorithm
Marchtin Mudroch (Czech Technical University in Prague, Czech Republic); Petr Cerny (Czech Technical University in Prague, Czech Republic); Pavel Hazdra (Czech Technical University in Prague, Czech Republic); Milos Mazanek (Czech Technical University in Prague, Czech Republic)
This paper describes improved and accelerated approach in optimization of different UWB dipole antennas. General particle swarm optimization (PSO) is tuned by artificial neural network trained by simulation results.

2.119 PCB Design of Balanced Log-Periodic Antennas
Yi-Cheng Lin (National Taiwan University, Taiwan); Tzu-Hsuan Weng (National Taiwan University, Taiwan)
A planar log-periodic antenna is fed by a planar Marchchand balun. The whole design is achievable on a PCB without any supporting device. The band ranges from 1.2GHz to 3.3GHz, with radiaion patterns at the broadside. Striplines are integrated in the antenna to suppress cross-polarization successfully.