

Christoph G. Günther (Ed.)

Mobile Communications

Advanced Systems and Components

1994 International Zurich Seminar
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Foreword

The topic of the thirteenth International Zurich Seminar on Digital Communications is "Mobile Communications - Advanced Services, Systems and Components". It is not the first time that the Zurich Seminar highlights the subject of wireless communications: in 1980 the Seminar's subtitle was "Digital Transmission in Wireless Systems". At that time the Seminar's president (Prof. P. Leuthold) expressed his hope "that the Seminar will bring wireless digital communications at least a small step forward". In the meantime wireless communication has in fact made much progress and the adjective "digital" is implied in this context.

Prior to the introduction of new services using digital wireless communications, many problems had to be resolved. With the new communication systems many new problems have emerged. As in all other areas of information and communication technologies the progress in mobile communication is an interplay of costs, system technologies, circuit and packaging technology, manufacturing technology, services, social acceptance etc. The response to the IZS'94 Call for Papers gave a snapshot of the attention paid to the different technical and non-technical aspects of mobile communications. It was indeed overwhelming: we have received more than 100 papers for evaluation and through a careful selection process, 48 papers have been chosen for presentation. Many excellent, but rejected papers were outside the scope of the IZS'94 session and will, hopefully, be submitted to other communication conferences.

It is remarkable to see that the system design aspects receive the most attention, followed by technological problems such as receiver design, optical transmission and general hardware implementation aspects. This profile of interests indicates that although the second generation of personal communication systems is in operation, the pioneering phase of new systems definition with integrated services persists.

We would like to express our sincerest thanks to all members of the Organizing Committee for their dedication and their outstanding organization of the conference. We certainly will remember with pleasure the many meetings of the committee, which were characterized by a humorous and friendly atmosphere combined with efficient work. Our warmest thanks go to the Technical Program Committee for their careful selection of the papers. In addition, we are very grateful to all the people whose names do not appear on the lists of the committees but who contributed to the preparation and the execution of the IZS'94.

W. Bächtold
President IZS'94

M. Dècina
Program Chairman

1994 INTERNATIONAL ZÜRICH SEMINAR ON DIGITAL COMMUNICATIONS

Mobile Communications

Advanced Systems and Components

ETH-Zürich, Switzerland, March 8-11, 1994

Organized by the IEEE Switzerland Chapter on Digital Communication Systems

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Editorial

The year 1993 has brought a wide acceptance of the Global System for Mobile Communication (GSM). The technical conception of that system has led to significant advantages over the first generation of cellular systems: improved fading resistance, increased spectral efficiency, reduced front-end complexity at the base station, effective transmission of computer data and fax, and Europe-wide interoperability, to name but a few. Similarly, on the cordless side, Digital European Cordless Telecommunications (DECT) provides low implementation complexity and uncoordinated operability, supports the use of PABX functions and includes transparent data channels.

In Europe, the second generation of wireless communication is established and a Universal Mobile Telecommunications System (UMTS/FPLMTS) is currently being conceived. The main motivation for a follow-up design is to provide a unique system with an improved spectrum efficiency to be used for all purposes: in-house and outdoors with cordless (PABX) and cellular (worldwide roaming) functionalities, which is equally suitable for voice and packet data at rates up to 2 Mbits/s with BERs of 10^{-7} . In other regions of the world, the situation is rather similar: the specification of systems which show significant improvements with respect to their predecessors is completed and follow-up systems are being considered, which are expected to include significant steps again. This summarizes the framework in which the conference takes place.

The framework mentioned leads to a natural subdivision of current research into four categories: new and improved usage of existing standards, signal processing algorithms that are simpler or closer to the optimum, further developments of existing systems and work that will ultimately lead to new system proposals. The papers presented at the seminar cover all of these categories with a slight preference for the more basic type of research. In this area, one can again notice a certain emphasis on multi-user receivers for CDMA. In general, the subject of the presentations focuses on the physical and nearby layers and covers a broad spectrum of themes, including new coding and modulation schemes for fading channels, alternative accessing schemes, new receiver algorithms for various transmission formats, performance analysis of such, control algorithms, implementation aspects and transmission at optical frequencies.

Furthermore, two panels, one on the *Convergence of Cellular and Cordless* organized by Pierre Chevillat and Larry Greenstein and one on *Mobile Satellite Communication* organized by Shuzo Kato, will contribute to clarify the possible options in the present transitory phase.

In conclusion, I would like to thank the authors for their cooperation and Annette Schicker for her excellent support during the preparation of the proceedings.

Reviewers

Serious, accurate and detailed reviews are essential for the success of any conference. It is a great pleasure to thank the reviewers listed below and the members of the program committee for their precious contribution to this important task.

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Contents

Keynote Paper

Personal Communications

<i>D.J. Goodman</i>	1
---------------------------	---

Session I: TDMA

The Evolution of GSM

<i>M. Mouly, M.-B. Pautet</i>	13
-------------------------------------	----

Integrating Data Traffic in Enhanced-TDMA Digital Cellular Systems

<i>L.F. Merakos, F. Li</i>	21
----------------------------------	----

The Geometric Dynamic Channel Allocation Strategy for High Traffic FDM/TDMA Mobile Communications Networks

<i>A. Baiocchi, F. Delli Priscoli, F. Grilli, F. Sestini</i>	33
--	----

Performance Evaluation of the DECT Radio Resource Management

<i>H. Hussmann</i>	45
--------------------------	----

Session II: CDMA

The Capacity of CDMA Cellular: Reverse Link Field Test Results

<i>R. Padovani</i>	56
--------------------------	----

Adaptive Multiuser Detector for Synchronous Code Division Multiple Access Applications

<i>Z. Siveski, Y. Bar-Ness, D.W. Chen</i>	67
---	----

Concatenated Coding Scheme for Reliable Data Transmission in CDMA Cellular Systems

<i>R.D. Cideciyan, E. Eleftheriou</i>	76
---	----

Performance of CDMA Cellular Networks with Base-Station Antenna Arrays

<i>A.F. Naguib, A. Paulraj</i>	87
--------------------------------------	----

Session III: Modulation and Coding

Joint Frequency-Phase Modulation over Rayleigh Fading Channels

<i>I. Ghareeb, A. Yongacoglu</i>	101
--	-----

Convolutional Codes and Finite Interleavers for the Block Erasure Channel

A. Lapidoth 113

Fractional-Rate Hybrid PSK-TCM Codes for the Rayleigh Fading Channel

B. Mayr, H. Weinrichter 121

Increased Capacity of DS-CDMA Mobile Systems on Frequency-Selective Slow Fading Channels

S. Cacopardi, F. Frescura, G. Reali 131

Design and Performance of an 8-Dimensional Modulation Scheme

S.L. Drakul, E. Biglieri 141

Session IV: Multi-User Receivers

Analysis of Successive Interference Cancellation in M-ary Orthogonal DS-CDMA System with Single Path Rayleigh Fading

P.R. Patel, J.M. Holtzman 150

Simulation Results for a CDMA Interference Cancellation Technique in a Rayleigh Fading Channel

L. Levi, F. Muratore, G. Romano 162

Matched Median Detectors for Synchronous Direct-Sequence Multiple-Access Communications

R. Wichman, J. Lilleberg, Y. Neuvo 172

Cellular Spectrum Efficiency of a Joint Detection C/TDMA Mobile Radio System

J. Blanz, A. Klein, M. Naßhan, A. Steil 184

Session V: Equalization and Decoding

Multiple-Symbol Differential Detection Scheme for Differential Amplitude Modulation

T. Suzuki, T. Mizuno 196

Phase-Correcting Filter for Sub-optimal Equalizers

A. Wautier, J.-C. Dany, C. Mouro 208

Performance of Adaptive Equalization in Typical Indoor Environments Including Non-Linear Power Amplifiers

A. Valdovinos, F.J. Casadevall 219

New Error Probability Upper Bound on Maximum Likelihood Sequence Estimation for Intersymbol Interference Channels <i>H. Nogami, G.L. Stüber</i>	230
---	-----

Session VI: Receivers for DSSS and DS-CDMA Signals

Bit Error Probability of a Rapidly-Adapting Rake Receiver as a Function of Dwell Time <i>P. Schramm</i>	242
Near-Far Resistant Propagation Delay Estimators for Asyn- chronous Direct-Sequence Code Division Multiple Access Systems <i>E.G. Ström, S. Parkvall, B.E. Ottersten</i>	251

Session VII: Optical Transmission

Dynamic Cell Planning for Wireless Infrared In-House Data Transmission <i>F.R. Gfeller, P. Bernasconi, W. Hirt, C. Elissi, B. Weiss</i>	261
Frequency Response Measurements of the Wireless Indoor Channel at Infrared Optics <i>H. Hashemi, G. Yun, M. Kavehrad, F. Behbahani, P. Galko</i>	273
Propagation Losses and Impulse Response of the Indoor Optical Channel: A Simulation Package <i>C.R.A.T. Lomba, R.T. Valadas, A.M. de Oliveira Duarte</i>	285
A 50 Mbit/s Optical Wireless LAN Link Using Novel Optical and Electronic Enabling Technologies <i>M.J. McCullagh, D.R. Wisely, P.L. Eardley, P.P. Smyth</i>	298

Session VIII: Modulation and Amplifier Linearity

Performance Comparison of GMSK and $\pi/4$ -DQPSK Modulations in a Mobile Radio Environment <i>D. Sorbara, M. Visintin</i>	310
The Effect of Modulation on the Power Rating of Multi-Channel Linear Amplifiers <i>D.W. Bennett, P.B. Kenington, R.J. Wilkinson</i>	322

Session IX: Evaluation of Error Rates

Simulation of GSM Data Channels in a Safety Critical Railway Environment <i>G. Blanke</i>	334
---	-----

A Model for BER Evaluation of Indoor Frequency Selective
Channels Using Multipath Measurement Results at 2.4, 4.75
and 11.5 GHz

G.J.M. Janssen, P.A. Stigter, R. Prasad 344

Measuring Bit Errors, Clock Errors and Their Burst
Characteristics in Mobile Communication Systems

R. Kattenbach, H. Früchting 356

Session X: Power Control

Performance of Dynamic Feedback Power Control in a TDMA
Radio System

S. Ariyavisitakul 365

Performance of Cellular Radio Systems with Power Control in
Varying Shadow Fading Environments

R. Saunders, L. Lopes 376

Power Control on the Forward Link in Cellular CDMA

M. Zorzi, L.B. Milstein 391

Session XI: Next Generation and Future Systems

Performance Analysis of a CDMA-Based Satellite-Mobile Audio
Broadcasting System

R. De Gaudenzi, F. Giannetti 400

Radio Protocol Architecture of the CODIT UMTS System

*E. Berruto, T. Brännlund, J. Gustafsson, D. Maiwald, W. Schott,
P. Whitworth* 417

RACE-II Advanced TDMA Mobile Access Project - An Approach
for UMTS

D. Cygan, F. David, H.J. Eul, J. Hofmann, N. Metzner, W. Mohr 428

Multitone Spread Spectrum Communication Systems in a Multi-
path Rician Fading Channel

L. Vandendorpe 440

Session XII: Random Access

Slotted ALOHA with Capture in a Mobile Radio Environment

M. Zorzi, R.R. Rao 452

Improved Performance of Mobile Data Networks Using Stack Algorithms and Receiver Capture <i>N.D. Vvedenskaya, J.C. Arnbak, B.S. Tsybakov</i>	464
Contention Resolution Multiple Access Techniques for Handling Speech and Data Traffic on Wireless Networks <i>F. Babich</i>	476
Certain Generalizations on the Slotted Collision Channel Without Feedback <i>T. Ketseoglou</i>	488
Session XIII: Implementation Aspects	
Monolithic Integration of a Spread-Spectrum Transmitter and Receiver Front End for Wireless LAN Applications <i>W. Baumberger, H. Kaufmann</i>	501
A Bit-Serial CMOS Digital IF-Filter for Mobile Radio Using an On-Chip Clock <i>P. Nilsson, M. Torkelson, K. Palmkvist, M. Vesterbacka, L. Wanhammar</i>	510
A 65-MHz Digital Chip-Matched-Filter for DS-Spread Spectrum Applications <i>S.D. Lingwood</i>	522
Area-Efficient Viterbi Decoders for Complex Rate-k/n Convolutional and Trellis Codes <i>H.-D. Lin</i>	529
Session XIV: Handover	
Soft Handoff Extends CDMA Cell Coverage and Increases Reverse Link Capacity <i>A.J. Viterbi, A.M. Viterbi, K.S. Gilhousen, E. Zehavi</i>	541
An Architecture and Methodology for Mobile-Executed Cell Hand-off in Wireless ATM Networks <i>A.S. Acampora, M. Naghshineh</i>	552
Author Index	563