Fourth International Workshop on Digital Signal Processing Techniques Applied to Space Communications

Organised by the European Space Agency

ESA

and

King's College London

in cooperation with

EUTELSAT

and

INMARSAT

Organizing Committee Co-Chairmen:

C. Elia & A.H. Aghvami

Technical Committee Chairman:

R.A. Harris

26–28 September 1994

King's College London, United Kingdom
Welcome and Introduction by A.H. Aghvami
(King's College London, United Kingdom)

Keynote address by R. Coirault
(ESA/ESTEC, The Netherlands)

Session 1: Synchronisation
Chairman: A.H. Aghvami (King's College London, United Kingdom)

Overview of Digital Algorithms for Carrier Frequency Synchronisation
MOENECLAEGY, M. (University of Ghent, Belgium)

The Enhanced Barycenter Algorithm: An Improvement to a Digital Algorithm for Nonlinear Estimation of PSK-Modulated Carrier Phase
MORTENSEN, I.; BOUCHERET, M.-L. (Ecole National Superieure des Telecommunications, France); FAVARO, H.; BELIS, E. (Alcatel Espace, France)

A Baseband Carrier and Clock Synchroniser for CPM
BELLINI, S. (Politecnico di Milano, Italy)

DSP Based Aided Acquisition Methods for Signal Reception in Deep Space Fully Digital Receivers

Session 2: On-Board Processing
Chairman: B. Evans (University of Surrey, United Kingdom)

Sophisticated Microsatellites for Space Exploration and Applications
SWEETING, M.N. (University of Surrey, United Kingdom)

The Use of a Digital Signal Processing Payload on the PoSAT-1 Microsatellite for Low Earth Orbit Satellite Communication Experiments
SUN, W.; SWEETING, M.N.; HODGART M.S. (University of Surrey, United Kingdom)

Data Reduction using Real-Time On-Board Satellite SAR Processing

An On-Board Baseband Switch Architecture for Flexible Data Rate INTELSAT FDMA Traffic
YEUNG, P.S. (INTELSAT, United States)

Design and Performance of Polyphase Lattice Filter Based Digital HMM Transmultiplexer Cells for Robust On-Board Processing
CORDEN, I. (ERA Technology, United Kingdom)

Design and Test of a Regenerative Satellite Transmultiplexer
HUNG, K.K.; MCLANE, P.J. (Queen's University, Canada)
Session 3: Modulation and Coding
Chairman: E. Trachtman (INMARSAT, United Kingdom)

High Speed Digital Signal Processing for Satellite Communications—Technologies for 60 Mb/s Modem and FEC LSICs
KATO, S. (NTT Wireless Laboratories, Japan)

Implementation of a Reprogrammable Reed–Solomon Decoder over GF(2^{16}) on a Digital Signal Processor with External Arithmetic Unit
PAAR, C.; HOOIJEN, O. (University of Essen, Germany)

Source Aided Channel Coding – Beyond Maximum Likelihood Performance
ONG, L.K.; KONDOZ, A.M.; EVANS, B.G. (University of Surrey, United Kingdom)

Software based Low Data Rate Satellite Modem as a PC Plug-In Card

Design of Programmable Viterbi Decoders with Linear Array and Mesh Topologies for Deep Space Applications
DANESHGARAN, F. (California State University, United States); MONDIN, M. (Politecnico di Torino, Italy)

Evaluation of the Impact of Signal Quantization on the Performance of a Digital Data Demodulator for CDMA Satellite Receivers
DE GAUDENZI, R. (ESA/ESTEC, The Netherlands); GIANNETTI, F.; LUISE, M. (University of Pisa, Italy)

Session 4: Demonstrations
Chairman: R.A. Harris (ESA/ESTEC, The Netherlands)

A DSP–Based Test Bed for Land Mobile Satellite Communications
VOGEL, H.J.; CLAYTON, H.J.; CHAMBERS, W.G.; AGHVAMI, A.H. (King's College London, United Kingdom)

Integrated Project Support Environment for DSP Software Development
PARKES, S.M.; GILLIONS, A.R. (BAe Space Systems Ltd, United Kingdom)

Digital Audio Broadcasting Live Demonstration
BBC, United Kingdom

CDMA Mobile Reconfigurable Terminal
VAN HIMBEECK, C. (SAIT Systems, Belgium)

Session 5: Broadcasting
Chairman: J.Dutronc (EUTELSAT, France)

Digital Audio Broadcasting (DAB) from Satellites
SHELSWELL, P. (BBC, United Kingdom)
Adaptive Suppression of Co-Channel Interference in Digital Multi-User Communications
SALA, J.; VAZQUEZ, G. (Polytechnic University of Catalonia, Spain); REY, M–A. (Alcatel Espacio, Spain)

The Effect of Symbol Synchronization Errors on the BER Performance of OFDM Systems
POLLET, T.; MOENECLAEY, M. (University of Ghent, Belgium)

Session 6: VLSI
Chairman: S. Kato (NTT, Japan)

VLSI for DSP in Space
HOLLREISER, M. (ESA/ESTEC, The Netherlands)

Technological Evolution of CDMA Modems for Mobile Satellite Communication
VAN HIMBEECK, C. (SAIT Systems, Belgium)

VLSIs in Consumer Electronics for Satellite Applications
GILLIES, D. (Thompson Consumer Electronics, FRANCE)

Programmable DSP Processor Systems for Space Applications
PARKES, S.M.; GILLIONS, A.R.; PRICE, S.D. (British Aerospace Space Systems Ltd., United Kingdom)

Session 7: Panel Discussion
Chairman: R. Viola (ESA/ESTEC, The Netherlands)

High-Speed Digital Signal Processing for Satellite Communications
POOR, H.V.; VERDU, S. (Princeton University, United States)

Impact of DSP on Cost-Effective Satellite Communications
- Transparent/Regenerative Re-Processing Speed
- Limits of Integration Processing
- R&D Effort
- Implementation Plans
ESA, EUTELSAT, INMARSAT, INTELSAT representatives and experts from industry, universities and research centres

POSTER SESSION

Higher Order Statistics for Blind Deconvolution in Spread Spectrum Communications over Satellite Frequency Selective Channels
MARTONE, E.M. (Alenia Spazio S.p.A., Italy)

ML–Oriented DA Symbol Synchronization for Nonselective Fading Channels using Imperfect Channel Gain Estimates
GOETHALS, K.; MOENECLAEY, M. (University of Ghent, Belgium)
The Effect of Adjacent Channel Interference in a Bulk-FFT Multicarrier Demodulator with Frequency-Domain Symbol-Timing Recovery
SHAHID, M.; BARTON, S.K.; SHEPHERD, S.J. (University of Bradford)

OQPSK Carrier Synchronisation Performance affected by Non-Ideal Interpolation in Digital Modems
BUCKET, K.; MOENECLAEP, M. (University of Ghent, Belgium)

Pilot Sequence GMSK Modulation in Satellite Mobile Channel
MOLINARI, C. (Politecnico di Milano, Italy)

A Solid State Laser Communication System for Inter-Satellite Links
SERBE, C. (Dornier GmbH, Germany)

A Hybrid CDMA Scheme and Demodulator Structure for KaBand Operation
COAKLEY, F.P. (University of Surrey, United Kingdom); YIM, W.H. (Nokia Mobile Telephones, United Kingdom)

Globalstar Satellite based Mobile Communications System
LOUIE, M. (Space System/Loral, United States); COHEN, M.; ROUFFET, D. (Alcatel, France); GILHOUSEN, S. (QUALCOMM, United States)

New FIR Fractional Delayers for Effective Signal Interpolation
CAIN, G.D.; YARDIM, A. (University of Westminster, United Kingdom); HENRY, P. (ESIEE, FRANCE)