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Report on the dissemination activities for the first half of the project

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CO	Confidential, only for members of the consortium (including the Commission Services)	

Executive Summary

This ALPHA Deliverable (D0.4) presents the dissemination activities performed by the ALPHA consortium during the first half of the project. These activities follow the dissemination plan reported in D0.1 [1]. The dissemination activities have been carried out via publications at renowned scientific journals and at major public events where the achievements of the ALPHA project have been presented via invited talks, regular contributions and at the exhibition.

The main conferences for the dissemination activities in the first half of the project in Europe included ECOC 2008, Networks & Optical Communications Conference (NOC 2008 and 2009 editions), ICTON 2009, ICT Mobile Summit 2009 and the Networked and Electronic Media summit (NEM 2008). In North America, the ALPHA project was represented at OFC 2009, in Asia and Pacific at the Opto-Electronics and Communications Conference (OECC-08), Asian-Pacific Optical Communications Conference (APOC-08) and Asian Pacific Microwave Photonics (APMP-09). Internal dissemination has also been accomplished by means of in-house seminars.

Publications in major journals on optical communications such as the Optics Express, the IEEE Journal of Lightwave Technologies and the IEEE Photonics Technology Letters have constituted an important part of the dissemination activities. Totally, 96 separate dissemination contributions (publications, presentations and posters/exhibition events) have been produced by the ALPHA project in the first half of the project. Among the most important ones, the ALPHA-supported ECOC 2008 workshop “Everything converged: today, tomorrow and after tomorrow”, invited presentations at OFC 2008/2009 “Perspectives of Radio over Fiber Technologies” and “Access and in-building activities - in Sweden and in the rest of the world”, as well as the reporting of a real-time optical OFDM 3Gb/s transmission over 500 metres of a multimode fibre can be mentioned.

This Deliverable lists all the publications submitted and accepted for publication during the first half of the project, subsequently this list will be updated in D0.5 “Final report on the dissemination activities of the project”. The publications are grouped in the document using the following subject groups: project overview and latest results, access networks, in-building/home networks and transmission/PHY techniques. The invited papers list is accompanied by a description of the event where the talk took place as well as by a description of the paper itself. Extracts from the press articles about the project and statistics on the ALPHA publications complete the dissemination report.

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1 Introduction

1.1 Purpose and Scope

This document presents the dissemination activities executed in the framework of the ALPHA consortium for the first half (January 1, 2008 – June 30, 2009).

1.2 Reference Material

1.2.1 Reference Documents

[1]	ALPHA Deliverable D0.1: Plan for dissemination and other horizontal activities for first half of the project
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1.2.2 Acronyms and Abbreviations

APMP	Asia Pacific Microwave Photonics
APOC	Asia-Pacific Optical Conference
BBWFE	Broadband World Forum Europe
ECOC	European Conference on Optical Communications
EL	Electronics Letters
FP6 or FP7	Framework Programme 6 or 7
ICT	Information and Communication Technologies
ICTON	International Conference on Transparent Optical Networks
IPHOBAC	Integrated Photonic mm-Wave Functions For Broadband Connectivity (EU FP6 Integrating Project)
JLT	Journal of Lightwave Technology
JQE	Journal of Quantum Electronics
MWP	IEEE Topical Meeting on Microwave Photonics
NEM	Networked and Electronic Media
NOC	Networks & Optical Communications Conference
OECC/ACOFT	Opto-Electronics and Communications Conference (OECC) and the Australian Conference on Optical Fibre Technology (ACOFT)
OFC	Optical Fiber Communication conference
PTL	Photonics Technology letters
SIOE	Semiconductor and Integrated Optoelectronic
WOC	Wireless and Optical communications

1.3 Document History

Version	Date	Authors	Comment
01	2009-08-26	G. Puerto	First draft with contributions from partners
02	2009-09-01	G. Puerto	Statistics and summarise of contributions
03	2009-09-02	G. Puerto	Executive summary and cross-references
04	2009-09-07	G. Puerto, Mikhail Popov	First proof-reading
05-06	September 17-October 2, 2009	G. Puerto, M. Popov	Last updates and proof-reading

2 Publications after activity areas

The publications below have been organised after the project overview & latest results papers and the following activity areas: access networks, in-building networks, and transmission/PHY.

2.1 Project overview and latest results

This section presents the publications representing the project overview. The description of the project and latest results has been presented in European conferences and internal seminars towards the scientific and industrial community in the field of access and in-building networks.

2.1.1 Conferences, workshops and seminars

M. Popov, "ICT ALPHA – Architectures for fLexible Photonic Home and Access networks: project overview and latest results", Seminar "Broadband technology for access and home networks", Acreo, Stockholm, April 8, 2008 (presentation).

M. Popov and C. P. Larsen, "ICT ALPHA – Architectures for fLexible Photonic Home and Access networks: project overview and latest results. Acreo seminar on plastic optical fibre, Acreo, Stockholm, May 2008 (presentation).

M. Popov, E. Ortego, "ICT ALPHA – Architectures for fLexible Photonic Home and Access networks: project overview and latest results", ICT Mobile Summit 2008, Stockholm, June 10-12, 2008 (poster).

M. Popov, "ICT ALPHA – Architectures for fLexible Photonic Home and Access networks", a part of "Gb/s to the end-user: a dream or future reality?" session, Broadband World Forum Europe (BBWFE 2008), Brussels, September 29- October 2, 2008 (presentation).

E. Ortego, H. Wessing, G. Treffner and M. Popov "ICT ALPHA – Architectures for fLexible Photonic Home and Access networks: project overview and latest results", Networked and Electronic Media summit (NEM 2008), Saint-Malo, France, October 13-15, 2008 (poster).

P. Faccin, "The ALPHA Project: an overview of the Andrew's Activities, Goals and Expectations", Internal Workshop on the ALPHA Project, Andrew Wireless Systems GmbH, November 4, 2008, Buchdorf, Germany.

2.2 Access networks

The ALPHA project has generated a series of publications on the next-generation access networks. The publications cover topics, in particular, studies of broadband optical access network evolution with high speed interfaces for fixed and mobile services. The impact of network access evolution on network architecture and transmission equipment localization on the metropolitan network has also been addressed. Some technical challenges are discussed, e.g. concerning the optical extended budget, as well as the necessity of offering connectivity to customers at 1 Gbit/s due to the access bit rate evolution.

The techno-economic studies of FTTH deployments have also been covered, while focusing on the most important expenses to get a balanced view on the total cost, the description of methods and potential risks give a high level view of the expenses at each one of the deployment steps.

Implementation results of a multi-layer network with IP/MPLS, Ethernet, and OTN type data plane support with a single GMPLS control plane performed in the Acreo testbed have been presented.

2.2.1 Journals

P. Chanclou, Z. Belfqih, B. Charbonnier, T. Duong, F. Frank, N. Genay, M. Huchard, P. Guignard, L. Guillo, B. Landousies, A. Pizzinat, H. Ramanitra, F. saliou, S. Durel, P. Urvoas, M. Ouzzif, J. Le Masson "Access network evolution: optical fibre to the subscribers and impact on the metropolitan and home networks", *Comptes Rendus de la Physique, Académie des Sciences – Paris*, ed. Elsevier, vol. 9, N. 9-10, pp. 935-946, 2008.

2.2.2 Conferences

D. Chiaroni, « Perspectives d'évolution de la technologie FTTH, et impact sur les couches périphériques : le Projet Européen ALPHA et le Projet ECOFRAME », FTTH seminar, Telecom ParisTech, 2nd December 2008.

K. Casier, S. Verbrugge, R. Meersman, D. Colle, M. Pickavet, P. Demeester, "A clear and balanced view on FTTH deployment costs", *Proc. of FITCE 2008, 47th Federation of Telecommunications Engineers of the European Community Congress*, pp. 31-36, London, UK, 21-24 Sep. 2008.

E. J. Ortego. "Next generation access networks" published in *Telecom I+D*, Oct 2008 Bilbao, Spain. ISBN 978-84-9860-135-0.

Pontus Sköldström, Anders Gavler, Claus Popp Larsen, Annikki Welin, Andras Kern, "The Acreo GMPLS Testbed – Current Functionality and a Path Towards a Multi-Flavoured Ethernet Hierarchy", *ICT Mobile Summit 2009, Santander, Spain*, June 2009.

2.3 In-building networks

The area of in-building networks has also been represented by conference contributions covering in particular the areas of fibre Distributed Antenna System applications in MIMO systems, new architectures for home networks where two main approaches have been presented: home networks based on CWDM and broadcast and select technologies and home networks featuring all-optical routing capabilities. New concepts and guidelines for building future-proof home networks have also been covered.

2.3.1 Conferences

L. Tarlazzi, "F-DAS Applications to MIMO Systems", *Internal Workshop on the ALPHA Project*, Andrew Wireless Systems GmbH, November 4, 2008, Buchdorf, Germany.

H. Ramanitra, P. Guignard, A. Pizzinat, B. Charbonnier, L. Guillo, "Scalable Optical Multi-service Home Network", *OFC-NFOEC 2008*, paper JThA90, San Diego, 2008.

H.-D. Jung, N. Calabretta, E. Tangdionga, H.J.S. Dorren, and A.M.J. Koonen: "All-optical Routing Architecture of Radio Signals using Label Processing Technique for In-building Optical Networks", *ECOC 21-25 Sep. 2008*, Brussels, Belgium, paper Tu.4.F.2.

H. Yang, H.-D. Jung, Y. Zheng, B. Huiszoon, J. H. C. van Zantvoort, E. Tangdionga and A.M.J. Koonen: "OFDM Radio-over-Fibre Systems Employing Routing in Multi-Mode Fibre In-building Networks", *ECOC 21-25 Sep. 2008*, Brussels, Belgium, paper Tu.4.F.6

J. Faller, "Tutorial - Home Wiring" next generation home networks", *POF 2008*, Santa Clara USA, August 26-28, 2008.

J. Faller, "Optical Multimedia Home Networking", *ETSI AT2 - Meeting*; Sophia Antipolis, November 5, 2008.

J. Faller: "The IP-TV Ready Home - New Concept for the optical Home Network"; BFE – Oldenburg, November 26-27, 2008

H.D. Jung, C. Okonkwo, E. Tangdionga, T. Koonen " Optical Routing of Millimeter-Wave Signals with a New Optical Frequency Multiplication Scheme," European Workshop on Photonic Solutions for Wireless, Access and In-house Networks (IPHOBAC), Duisburg, Germany, May 18-20, 2009

Claus Popp Larsen and Christer Lindqvist, "Guidelines to building future-proof home networks", ICT Mobile Summit 2009, Santander, Spain, June 2009

2.4 Transmission technologies/PHY

The transmission/PHY area has been widely covered both in journals and at conferences. The major topics included various OFDM and DMT transmission techniques (including a demonstration of a real-time 3 Gb/s modem prototype) for all types of fibres and theoretical models to evaluate the capacity of MMF link. The other publications cover the radio over fibre techniques including converged transport of the baseband and RoF signals over SMF, MMF and POF, photonic filter designs for microwave applications, UWB transmission over fibre, UWB pulse generation and architecture designs employing cost-effective components, such as broadband optical sources and commercially available distributed feedback and vertical cavity surface emitting lasers.

2.4.1 Journals

Gasulla and J. Capmany, "Modal noise impact in Radio over Fiber multimode fiber links", Optics Express, vol. 16, pp. 121-126, (2008).

Gasulla and J. Capmany, "1 Tb/s-km Multimode fiber link combining WDM transmission and low-linewidth lasers", Optics Express, vol.16, pp. 8033-8038, (2008).

J. Mora, L.R. Chen, and J. Capmany, "Single-Bandpass Microwave Photonic Filter With Tuning and Reconfiguration Capabilities," J. Lightwave Technol. 26, 2663-2670 (2008).

J. Capmany, D. Pastor, B. Ortega, J. Mora, L. Pierno, M. Varasi, "Theoretical Model and Experimental Verification of 2×1 Mach-Zehnder EOM With Dispersive Optical Fiber Link Propagation", IEEE Journal of Quantum Electronics, vol. 44, pp. 165-174 (2008).

J.L. Wei, X.Q. Jin and J. M. Tang, "The influence of directly modulated DFB lasers on the transmission performance of carrier suppressed single sideband optical OFDM signals over IMDD SMF systems," IEEE J. Lightwave Technol., Vol.27, No.13, pp. 2412-2419, 2008.

X. Zheng, J.L. Wei and J.M. Tang, "Transmission performance of adaptively modulated optical OFDM modems using subcarrier modulation over SMF IMDD links for access and metropolitan area networks," Opt. Express., Vol.16, No.25, pp.20427-20440, Nov. 2008.

X. Zheng, J.M. Tang and P.S. Spencer, "Transmission performance of adaptively modulated optical OFDM modems using subcarrier modulation over worst-case multimode fibre links," IEEE Communications Letters, Vol. 12, No.10, pp.788-790, Oct. 2008.

E. Giacomidis, J. L. Wei, X. Q. Jin and J.M. Tang, "Improved transmission performance of adaptively modulated optical OFDM signals over directly modulated DFB laser-based IMDD links using adaptive cyclic prefix," Opt. Express., Vol.16, No.13, pp. 9480-9494, June 2008.

Mario Bolea, Jose Mora, Beatriz Ortega, and Jose Capmany, "Optical UWB pulse generator using an N tap microwave photonic filter and phase inversion adaptable to different pulse modulation formats," *Opt. Express* 17, 5023-5032 (2009)

Fulvio Grassi, José Mora, Beatriz Ortega, and José Capmany, "Subcarrier multiplexing tolerant dispersion transmission system employing optical broadband sources," *Opt. Express* 17, 4740-4751 (2009)

Davide Visani, Giovanni Tartarini, Luigi Tarlazzi, Pier Faccin, "Transmission of UMTS and WIMAX Signals over Cost-Effective Radio over Fiber Systems" Submitted to *IEEE Microwave and Wireless Components Letters*.

H. Yang, S.C.J. Lee, E. Tangdionga, C. Okonkwo, H.P.A. van den Boom, F. Breyer, S. Randel and A.M.J. Koonen, "50 Gb/s Transmission over 100 m Graded-Index Plastic Optical Fiber based on Rate-Adaptive Discrete Multitone Modulation", submitted to *Journal of Lightwave Technologies*, special issue Jan, 2010.

R.P. Giddings, X.Q. Jin, H.H. Kee, X.L. Yang and J.M. Tang, "Real-time implementation of optical OFDM transmitters and receivers for practical end-to-end optical transmission systems," *Electron. Lett.*, Vol.45, No.15, pp.800-802, July 2009.

J.L. Wei, X. L. Yang, R.P. Giddings and J.M. Tang, "Colourless adaptively modulated optical OFDM transmitters using SOAs as intensity modulators," *Optics Express*, Vol.17, No.11, pp.9012- 9027, May 2009.

J. L. Wei, A. Hamié, R. P. Giddings and J. M. Tang, "Semiconductor Optical Amplifier-Enabled Intensity Modulation of Adaptively Modulated Optical OFDM Signals in SMF-based IMDD Systems," *IEEE J. Lightwave Technol.*, Vol.27, No.16, pp.3679-3689, August 2009.

J.L. Wei, X.Q. Jin and J. M. Tang, "The influence of directly modulated DFB lasers on the transmission performance of carrier suppressed single sideband optical OFDM signals over IMDD SMF systems," *IEEE J. Lightwave Technol.*, Vol.27, No.13, pp.2412-2419, July 2009.

X.Q. Jin and J.M. Tang, "Effectiveness of the use of 3-dB bandwidths of multimode fibres for estimating the transmission performance of adaptively modulated optical OFDM signals over IMDD links," *IEEE J. Lightwave Technol.*, Vol.27, 2009 (accepted for publication)

X.Q. Jin, R.P. Giddings and J.M. Tang, "Real-time transmission of 3Gb/s 16-QAM encoded optical OFDM signals over 75km SMFs with negative power penalties," *Optics Express*, Vol.17, 2009 (accepted for publication).

R.P. Giddings, X.Q. Jin, and J.M. Tang, "Experimental demonstration of real-time 3Gb/s optical OFDM transceivers," *Optics Express*, June 2009 (submitted).

Duong, T.-N.; Genay, N.; Ouzzif, M.; Le Masson, J.; Charbonnier, B.; Chanclou, P.; Simon, J.C., "Adaptive Loading Algorithm Implemented in AMOOFDM for NG-PON System Integrating Cost-Effective and Low-Bandwidth Optical Devices," *Photonics Technology Letters*, IEEE Volume 21, Issue 12, June15, 2009 Page(s):790 - 792

A. Caballero, J. B. Jensen, X. Yu and I. T. Monroy, "5 GHz 200 Mbit/s radio over polymer fibre link with envelope detection at 650 nm wavelength" *Electronics Letters*, vol. 44, no. 25, pp. 1479-1480, December 2008

Xianbin Yu, Timothy Braidwood Gibbon, and Idelfonso Tafur Monroy, "Bidirectional Radio-Over-Fiber System With Phase-Modulation Downlink and RF Oscillator-Free Uplink Using a Reflective SOA," *Photonics Technology Letters* Vol. 20, No. 24, December 15, 2008

J. B. Jensen, R. Rodes, A. Caballero, X. Yu, T. B. Gibbon and I. T. Monroy, "4 Gbps Impulse Radio (IR) Ultra-Wideband (UWB) Transmission over 100 Meters Multi Mode Fiber with 4 Meters Wireless Transmission," Accepted for publication in *Optics Express*, 2009

K. Prince, J. B. Jensen, A. Caballero, X. Yu, T. B. Gibbon, D. Zibar, N. Guerro, A. V. Osadchiy and I. T. Monroy, "Converged Wireline and Wireless Access Over a 78-km Deployed Fiber Long-Reach WDM PON," Accepted for publication in *IEEE Photonics Technology Letters*, 2009

2.4.2 Conferences

T. N. Duong, N. Genay, P. Chanclou, B. Charbonnier, A. Pizzinat, "Adaptively modulated optical OFDM: a low-cost solution for high bit rate passive optical network", 13th European Conference on Networks and Optical Communications NOC2008, pp. 108-112, Krems

T. N. Duong, N. Genay, P. Chanclou, B. Charbonnier, A. Pizzinat, R. Brenot, "Experimental demonstration of 10 Gbit/s upstream transmission by remote modulation of 1 GHz RSOA using Adaptively Modulated Optical OFDM for WDM-PON single-fibre architecture", Post-deadline paper, ECOC 2008, Bruxelles, 2008.

T.N. Duong, N. Genay, P. Chanclou, B. Charbonnier, "10Gbit/s transmission over 2.5GHz bandwidth by direct modulation of commercial VCSEL and multi-mode FP lasers using Adaptively Modulated Optical OFDM modulation for Passive Optical Network", ECOC 2008, paper We.1.F.4, Vol. 3, pp. 69-70, Bruxelles, 2008.

H. Yang, J. Zeng, Y. Zheng, H.-D. Jung, B. Huiszoon, J.H.C. van Zantvoort, E. Tangdiongga and A.M.J. Koonen: "Evaluation of Effects of MZM Nonlinearity on QAM and OFDM Signals in RoF Transmitter", IEEE Topical Meeting on Microwave Photonics (MWP) 30 Sep - 3 Oct. 2008, Gold Coast, Australia, paper Thu3-4.

M. Sagues, J. Mora, S. Sales, A. Loayssa, and J. Capmany, "Optical Modulation Formats by Combination of Two Time-Delayed Orthogonally Polarized Double Sideband Modulated Signals," in Asia Optical Fiber Communication and Optoelectronic Exposition and Conference, OSA Technical Digest (CD) (Optical Society of America, 2008), paper FD3.

I. Gasulla and J. Capmany, "Principal Mode Coefficients for Multimode Fibers", presented in 34rd European Conference and Exhibition on Optical Communication (ECOC), (Brussels, Belgium, 2008), paper P1.16.

I. Gasulla and J. Capmany, "1 Tb/s-km WDM Transmission over Multimode Fibre Link", presented in 34rd European Conference and Exhibition on Optical Communication (ECOC), (Brussels, Belgium, 2008), paper Tu3E5.

I. Gasulla and J. Capmany, "Simultaneous baseband and radio over fiber signal transmission over a 5 km MMF link", in proceedings of 2008 International Topical Meeting on Microwave Photonics (IEEE-MWP), (Goald Coast, Australia, 2008), pp. 209-212.

R. Sambaraju, J. Morá, B. Ortega, and J. L. Corral, "Transmission of Optically Generated 1.25 Gb/s QAM Wireless Signals in a Dynamically Reconfigurable Optical WDM Network," in Optical Fiber Communication Conference, OSA Technical Digest (CD) (Optical Society of America, 2009), paper OTuJ7.

X.Q. Jin and J.M. Tang, "A Simple and Accurate Approach for Estimating the Transmission Performance of Adaptively Modulated Optical OFDM Signals over IMDD MMF Links" OFC/NFOEC, San Diego, CA, USA, paper JWA94, March 22-26, 2009.

X.Q. Jin and J.M. Tang, "Statistical Investigations of the Effectiveness of Using 3-dB Bandwidths of Multimode Fibres to Quantify the Transmission Performance of AMOOFDM Signals," 2009 International Conference on Communications and Mobile Computing (CMC2009), January 6-8, 2009. Kunming, Yunnan, China.

X. Zheng and J.M.Tang, "Subcarrier Modulation Enabled Improvement in the Transmission Performance of Adaptively Modulated Optical OFDM Signals over Multimode Fibre Links," The International Conference on Telecommunication Technology, 10-12 Nov., 2008, Hangzhou, China .

E. Giacomidis, J.M. Tang and K.A. Shore, "Improved Transmission Performance of Adaptively Modulated Optical OFDM Signals over MMFs Using Adaptive Cyclic Prefix", Opto-Electronics and Communications Conference (OECC) and Australian Conference on Optical Fibre Technology (ACOFT) OECC/ACOFT 2008, Monday 7 – Thursday 10 July 2008, Convention & Exhibition Centre, Sydney, Australia .

X.Q.JIN, J.M.Tang, K.Qiu and P.S.Spencer, "30 Gb/s over 300m Transmission of Adaptively Modulated Optical OFDM Signals in 99.5% of Installed MMF Links," OFC/NFOEC, San Diego, CA, USA, paper OMu6, February 24-28, 2008.

X Q Jin and J M Tang, " Is the 3-dB Fibre Bandwidth Definition Applicable for Adaptively Modulated Optical OFDM Signals Transmitting over MMF Links," 22nd Conference on Semiconductor and Integrated Optoelectronics (SIOE'08), Cardiff, 31 March -2 April 2008.

J L Wei and J M Tang, "Improved Dispersion Tolerance of Coherent Optical OFDM Signals by Adaptive Modulation," 22nd Conference on Semiconductor and Integrated Optoelectronics (SIOE'08), Cardiff, 31 March -2 April 2008.

M A Jarajreh and J M Tang, "Improved Transmission Performance of Coherent Optical OFDM Signals by Increasing the Number of Sub-Carriers," 22nd Conference on Semiconductor and Integrated Optoelectronics (SIOE'08), Cardiff, 31 March -2 April 2008.

E Giacomidis and JM Tang, "Influence of Adaptive Cyclic Prefix On the Transmission Performance of Adaptively Modulated Optical OFDM Signals over Directly Modulated Laser- Based IMDD Links," 22nd Conference on Semiconductor and Integrated Optoelectronics (SIOE'08), Cardiff, 31 March -2 April 2008.

R P Giddings, X Q Jin and J M Tang, "Demonstration of a Non-Real-time System for Transmitting >10Gb/s Adaptively Modulated Optical OFDM Signals" 22nd Conference on Semiconductor and Integrated Optoelectronics (SIOE'08), Cardiff, 31 March -2 April 2008.

X Zheng and J M Tang, Adaptively Modulated Optical OFDM Modems Using Sub-carrier Modulation for Multi-mode Fibre-Based Transmission Links, 22nd Conference on Semiconductor and Integrated Optoelectronics (SIOE'08), Cardiff, 31 March -2 April 2008.

J. Faller, "POF The innovative home network alternative", Seminar at Acreo, Sweden, May 23, 2008.

J. Faller, "Status und Erfahrungen mit POF für optische Heimnetzwerke", ITG Meeting/NOC, June 30, 2008.

A. Tymecki, "1 mm POF home cabling - connection influence on network transmission parameters"

during IEC SC86B "Fibre optic" standardisation committee, Working Group 6 "Standards and Specifications for Fibre Optic Interconnecting Devices and Related Components" meeting at Kyoto, Japan. The meeting of IEC SC86B WG6 took place 28-30 October 2008.

Gaudino R., V. Arlunno, A. Carena. "Performance analysis of OFDM modulation formats for multimode direct detection optical links", ICT-Mobile Summit 2009, 10 - 12 June 2009, Santander, Spain.

F. Grassi, J. Mora, B. Ortega, J. Capmany, "20 GHz Radio over Fiber signal transport using optical broadband sources over multimode and singlemode fibers" 14th European Conference on Networks and Optical Communications (NOC) 10-12 June, Valladolid, Spain.

Fulvio Grassi, José Mora, Beatriz Ortega, José Capmany, "Experimental evaluation of the transmission in a low cost SCM/WDM radio over fiber system employing optical broadband sources and interferometric structures" 11th International Conference on Transparent Optical Networks, June 28 - July 2, 2009 - Island of São Miguel, Azores, Portugal

H. Yang, S.C.J. Lee, E. Tangdiongga, F. Breyer, S. Randel and A.M.J. Koonen, "40-Gb/s Transmission over 100m Graded-Index Plastic Optical Fiber based on Discrete Multitone Modulation", OFC 2009, San Diego, USA, March 21-25, 2009, PDPD8

X.Q. Jin and J.M. Tang, "A Simple and Accurate Approach for Estimating the Transmission Performance of Adaptively Modulated Optical OFDM Signals over IMDD MMF Links" OFC/NFOEC, San Diego, CA, USA, paper JWA94, March 22-26, 2009.

Duong, T.N.; Genay, N.; Chanclou, P.; Charbonnier, B.; Le Masson, J.; Ouzzif, M. "Maximizing the transmission performance of DMT signal for next generation PON system by direct modulation of cost-effective and low bandwidth lasers," Optical Fiber Communication - includes post deadline papers, 2009. OFC 2009. Conference on 22-26 March 2009 Page(s):1 - 3.

Xianbin Yu, Timothy Braidwood Gibbon, Darko Zibar and Idelfonso Tafur Monroy, "UWB-over-Multimode-Fiber Technology for Short-Range Communication Networks," 13th Annual Symposium of the IEEE/LEOS, pages: 79-82, 2008.

Antonio Caballero, Jesper Bevensen Jensen, Xianbin Yu and Idelfonso Tafur Monroy, "5 GHz 200 Mbit/s Radio Over Polymer Fiber Link with Envelope Detection at 650 nm Wavelength," Optical Fiber Communications Conference OFC/NFOEC 2008, San Diego USA, 2008

3 Events

3.1 Description of the events: invited papers

During the first half of the project the ALPHA partners have been invited to major conferences and events in Europe, North America and Asia. This section describes the events and presents an overview of the invited talks following the classification on project overview, access, in-building and transmission/PHY areas.

3.1.1 NOC 2008/2009

This conference aims to bring together ideas which can help to solve key technical and economical issues in optical networking. The Networks & Optical Communications Conference (NOC) is an European conference that combines fibre optics systems, networks and technology within a single event, providing a forum for the promotion of new opportunities from industry, institutes of technology and academia. NOC 2009 at Valladolid (Spain) was the 14th edition of the conference, following the previous event in Krems (Austria) in 2008.

Project overview and latest results

- M. Popov, "On Beyond HDTV, ICT ALPHA and Convergence", Networking and Optical Communication conference (NOC 2008), Krems, Austria, July 1-4, 2008 (invited).

Description: On Beyond HDTV as a driving force for NG access and in-building networks, a general overview of the ALPHA project (scope, budget, participants) and fixed-wireless convergence in access/in-building.

Access

- P. Chanclou, B. Charbonnier, F. Saliou, S. Durel, Z. Belfqih, N. Genay, B. Landousies, P. Guignard, H. Ramanitra, L. Guillo, A. Pizzinat, M. Ouzzif, J. Le Masson, P. Urvoas, "G-PON and home networks advances, increased eligibility, and easy operation of broadband access", invited paper, 13th European Conference on Networks and Optical communications, NOC2008, pp. 121-128, Krems (Austria), 2008.

Description: Recent developments in PON technologies and standard (G.984.6) offer a solution to operators to increase the splitting ratio or the optical budget dedicated to the reach. These facts authorize in the future an access network evolution with an optimum number of central offices. Also, if 100 Mbits/ or 1 Gbit/s interfaces are now feasible for FTTH users, the bottleneck could be the high speed connectivity in home network.

In-building

- P. Guignard, A. Pizzinat, B. Charbonnier, P. Chanclou, S. Meyer, L. Guillo, H. Ramanitra, "A view on future architectures for optical home networking", invited paper, 13th European Conference on Networks and Optical Communications NOC2008, pp. 203-209, Krems (Austria), 2008.

Description: The rapid multiplication of connected devices and applications and the development of new services such as 3D television and network hosted applications and storage, will bring to the need of data rates exceeding 1 Gbit/s inside the home at the horizon 2012. The question is thus how to assure such a bit rate in any place inside the home, keeping into account also for the strong preference that users have developed for wireless connectivity. Only a fibre based home network could be able to offer architecture flexibility, multi format transmission and protocols, long term evolution of requirements. After reviewing the three fibre types that are candidates for entering the segment of home networks, we propose 4 different architectures for the optical home networking: point to point or active star architecture, point to multipoint (PON like), multipoint to multipoint or LAN like, and finally multiservice broadcast and select

coarse wavelength division multiplexing (CWDM) architecture. For each of them we show how it could be deployed, the constraints in terms of the optical system, the fibre that could be used and the transparency to services. We also show the possible migration between these architectures, thanks to an efficient structured cabling.

- A.M.J. Koonen, A. Pizzinat, E. Tangdionga, P. Guignard, H.D. Jung, and H.P.A. van den Boom, "In-building optical network architectures for converged services delivery", NOC/OC&I 10-12 June 2009, Valladolid, Spain, Invited paper Th1.3, page 123-130.

Description: Broadband in-building networks which are capable of delivering both wired and wireless services can be advantageously realised by using optical fibre. Depending on the application environment, such as residential buildings or large (semi-)public ones, and on the various fibre types available, the pros and cons of a number of architectural solutions including their techno-economic aspects have been investigated.

3.1.2 ECOC 2008

ECOC is the largest conference on optical communication in Europe, and one of the most respected and long-standing events of its kind in the world. ECOC 2008 is the 34th edition, representing the stability and attractiveness of this event as one of the world's major events in the field, providing a forum for new results & developments in optical communication and networks.

Project overview and latest results

- M. Popov and C. P. Larsen "Everything converged: today, tomorrow and after tomorrow", Workshop on Convergence, European Conference on Optical Communications (ECOC 2008), Brussels, September 21-25, 2008 (invited).

Description: Workshop with a number of invited speakers (from ALPHA -Acreo, Andrew Wireless, Telefonica I+D) to understand what different people mean by the word "convergence. Various technologic solutions and also market trends were explored. The conclusion is that for tech convergence, the "convergence of the people" is necessary in the first place.

Access

- Pizzinat, P. Chanclou, B. Charbonnier, F. Frank, P. Niger, P. Herbelin, B. Landousies, J-P. Charles "Advantages of integrating fixed and wireless services over a common infrastructure", invited paper, symposium on Fiber Radio Convergence, ECOC 2008, Bruxelles, 2008.

Description: Presentation of the evolution of fixed access networks and the evolution of mobile networks covering from GSM to UMTS to HSPA towards SAE/LTE and taking into account the consequences of the bit rate increasing. Also the possibility to use FTTx infrastructure for mobile Networks is presented.

- P. Chanclou, Z. Belfqih, B. Charbonnier, T. Duong, F. Frank, N. Genay, M. Huchard, P. Guignard, L. Guillo, B. Landousies, A. Pizzinat, H. Ramanitra, F. Saliou, S. Durel, A. Othmani, P. Urvoas, M. Ouzzif, J. Le Masson, "Optical Access Evolutions and their impact on the Metropolitan and Home Networks", invited paper, ECOC 2008, paper We.3.F.1, vol. 3 pp. 211-214, Bruxelles 2008.

Description: This paper describes broadband optical access networks including high speed home interfaces for fixed and mobile services. Access technical challenges are also discussed, namely concerning extended budget, 10 Gbit/s as well as the impact of the metropolitan network.

- A.M.J. Koonen: "Trends in optical access and in-building networks", ECOC 21-25 Sep. 2008, Brussels, Belgium, Tutorial We.2.A.1.

Description: As users require ever more speed, variety and personalization in ICT services, the capacity and versatility of access networks needs to be expanded. The first generation of point-to-point and of point-to-multipoint time multiplexed passive optical networks (PON) is being installed. More powerful wavelength-multiplexed and flexible hybrid wavelength-time multiplexed solutions are coming up. Radio-over-fibre techniques create pico-cells for high-bandwidth wireless services. Next to bringing the bandwidth luxury to the doorstep, it must be distributed inside the user's home. By advanced signal processing techniques, high-capacity wired and wireless services are jointly distributed in a low-cost converged in-building network using multimode (plastic) optical fibre.

In-building

- L. Cucala, P. Faccin, "Mobile communications transport over optical and access networks: today and tomorrow", Workshop on "Everything converged: today, tomorrow and after tomorrow", 32nd European Conference and Exhibition on Optical Communication – ECOC 2008, September 21, 2008 – Brussels, Belgium (invited).

Description: The talk described two complementary approaches for indoor wireless coverage supported by fibre access networks; a F-DAS architecture supporting RoF signals, and a femtonode architecture where the fibre supports the connection of the femtocells with the mobile network. The talk analyzed the most suitable deployment scenarios, technology status and future trends, taking into account the new emerging wireless standards".

- J. Le Masson, A. Pizzinat, P. Guignard, B. Charbonnier, P. Chanclou, S. Meyer, L. Guillo, H. Ramanitra, M. Ouzzif, "Towards Optical Home Networks", invited presentation, workshop on Short Range Optical Networks, ECOC 2008, Bruxelles, 2008.

Description: short reach optical links, i.e. optical transmission systems that cover distances from few meters up to some 100 meters, are gaining increased attention mainly due to the evolution of the required bit-rates up to levels that make the traditional "electrical" solutions critical.

3.1.3 OFC 2008/2009

OFC/NFOEC is the world's leading global conference for optical communications and networking professionals. OFC/NFOEC brings together the people, products, and information that drive optical communications and networking.

Access

- A.M.J. Koonen, M. García Larrodé, A. Ng'oma, K. Wang, H. Yang, Y. Zheng, E. Tangdiongga: "Perspectives of Radio over Fiber Technologies", OFC/NFOEC 24-28 Feb. 2008, San Diego, US, Invited paper OThP3.

Description: Radio-over-fiber technologies enable efficient provisioning of broadband wireless services both in access and in in-building networks, in particular when combined with flexible optical routing and dispersion-robust RoF transport techniques, such as optical frequency multiplying.

In-building

- Claus Popp Larsen and Gunnar Jacobsen, "Access and in-building activities - in Sweden ... and in the rest of the world", OFC/NFOEC Workshop on Access Networks, San Diego, Ca, USA, March 2009 (invited).

Description: future services and home network requirements are presented along with a description of current home networks infrastructures

3.1.4 APOC 2008

The 8th SPIE Asia-Pacific Optical Communications (APOC), one of the world's major conferences in the field of optical communications, it was held 26-30 October 2008 in Hangzhou, China. The conference is organized by the Chinese Optical Society, SPIE and the Joint Research Centre of Photonics of the Royal Institute of Technology (Sweden) and Zhejiang University.

Project overview and latest results

- M. Popov, "European FP7 ALPHA project: perspectives in home and access networking", Asian-Pacific Optical Communication conference (APOC 2008), Hangzhou, China, October 26-30, 2008 (invited)

Description: Overview of the ALPHA project - scope, key numbers, partners and people.

- M. Popov, A. Houghton, D. Kennedy, P. Vetter, and J.-P. Javaudin, "Gb/s to the end-user: why, how, and when?", Asian-Pacific Optical Communication conference (APOC 2008), Hangzhou, China, 2008 (invited).

Description: A summary of one more talk made together with the EC, MUSE, Omega, Eurescom (see below). Requirements for future networks, technologies available for FTTx including those enabling 1 Gb/s to the end-user, and a time-frame forecast for it.

3.1.5 ICTON 2009

The 11th International Conference on Transparent Optical Networks (ICTON 2009) was held in Island of São Miguel, Azores, Portugal from 28 June 2009 to 2 July, 2009. The scope of the Conference is concentrated on the applications of transparent and all-optical technologies in broadband telecommunication networks, systems, and components.

Access

- M. Forzati and C. Popp Larsen, On the symmetry requirements for tomorrow's fibre access networks (invited), proceeding of International Conference on Transparent Optical Networks (ICTON) 2009, Island of São Miguel, Portugal, paper Tu.B5.3.

Description: In this paper we review current and emerging bandwidth-intensive services, and we argue for the fact that future services will lead to strong symmetry requirements on optical fibre access networks. The argumentations are supported by traffic measurements as well as behavioural and market trends.

3.1.6 OECC 2008

The 13th OptoElectronics and Communications Conference (OECC 2008) was held in Sydney, Australia on 7-10 July 2008. The Conference covered all major areas in optoelectronics and optical communications along with tutorial sessions, invited sessions, and workshops in areas of current interest.

In-building

- A.M.J. Koonen, H. Yang, H.-D. Jung, Y. Zheng, J. Yang, H.P.A. van den Boom, E. Tangdiongga: "Recent Research Progress in Hybrid Fibre-Optic In-building Networks", Opto-Electronics and Communication Conference (OECC) 7-10 July 2008, Sydney, Australia, Invited paper WeL-1.

Description: Advanced optically-emulated x-QAM techniques and the modal dispersion-robust radio over-fiber OFM technique enable the delivery of high-capacity data via a single multimode (silica or polymer) optical fiber in-building network to wired as well as wireless terminals.

3.1.7 ICAIT 2008

The International Conference on Advanced Infocomm Technology was held from July 28 to 31, 2008 in Shenzhen, China. The scope of the conference covered recent research results in the areas of optical devices, components, communications, transmission, network architectures, protocols, design, management and operation. The main goal of the conference was to bring together academics, scientists, professionals, engineers and industrialists who work in the field of optical communications and networks and to foster the exchange of information, ideas and experiences in the field of Optical Communications at large.

Transmission/PHY

- J.M.Tang, "Optical OFDM for high-speed networks", International Conference on International Conference on Advanced Infocomm Technology (ICAIT 2008), 28-31 July 2008, Shenzhen, China (Invited)

Description: The Bangor Research Group has been involved in proposing, for the first time, the signal modulation concept of Optical Orthogonal Frequency Division Multiplexing (OOFDM) in 2005. In the same year, significant advances in the proposed OOFDM technique have also been made by the Bangor research group due to the introduction of a novel signal modulation technique known as Adaptively Modulated OOFDM (AMOOOFDM). Over the past two years, the techniques have been received overwhelming scientific and industrial interest, and different variants of the techniques have been extensively investigated for various optical application scenarios including long-haul networks, Metropolitan Area Networks (MANs) and Local Area Networks (LANs).

3.1.8 European Workshop on photonic solutions for wireless, access, and in-house networks

This workshop was held at inHaus Innovation Centre in Duisburg (Germany) in May 18-20, 2009. The aim of this workshop is to provide an overview on actual research activities in Europe in the area of photonic components and technologies for communications (wireline and wireless for access and in-house), to foster European cooperation in these areas and to provide a forum for discussing about future activities at a European level. Technical demonstrations will be organised during the workshop as well as laboratory visits. The workshop is co-organised by 10 European projects (ALPHA, BONE, euroFOS, FUTON, GIBON, HECTO, IPHOBAC, ISIS, OMEGA, and UROOF) and it is supported by the Optech- Net e.V., the Fraunhofer Gesellschaft and the European Commission.

Project overview and latest results

- M. Popov et al, "Project overview and recent project results", European Workshop ON Photonics Solutions, Duisburg, May 18-20, 2009.

Transmission/PHY

- R.P. Giddings, X.Q. Jin, H. Kee, X.Y. Yang and J.M. Tang, "Real-time Optical OFDM Signal Transmissions over MMF Links" European Workshop on Photonic Solutions for Wireless, Access, and In-house Networks, May 18-20, Duisburg, Germany.

Description: Real-time optical OFDM transmitters and receivers are, for the first time, successfully demonstrated for 1.5Gb/s and 3Gb/s transmission over 500m 62.5/125µm multimode fibres and 75km MetroCor SMFs in an intensity-modulation and direct-detection system involving a directly modulated DFB laser. A BER of less than 1.0×10^{-9} was observed in the corresponding optical back-to-back system. The implemented modems only use standard, commercially available components including FPGAs and DACs/ADCs.

3.1.9 APMP 2009

The Asia-Pacific Microwave Photonics Conference (APMP 2009) took place in Beijing, China, from April 22-24, 2009. With the fast expansion and development of microwave photonics, APMP has

become an important international forum in Asia-Pacific region for scientists and engineers to exchange new ideas, report advances in the field of microwave photonics.

Transmission/PHY

- J.L. Wei, A. Hamie and J.M. Tang, "Semiconductor Optical Amplifier-Enabled Intensity Modulation of Adaptively Modulated Optical OFDM signals for Passive Optical Networks," 2009 Asia-Pacific Microwave Photonics Conference, April 22-24, 2009 The Beijing International Conventional Center (BICC), Beijing, China.

Description: The feasibility of using Semiconductor Optical Amplifiers (SOAs) to achieve intensity modulation of adaptively modulated optical orthogonal frequency division multiplexed (AMOOFDM) signals will be presented for practical applications in WDM PONs. It will be shown that the optimized SOA-based intensity modulators can offer colourless operation and support a 30 Gb/s AMOOFDM signal transmission over a 80km SMF, which doubles the transmission performance offered by directly modulated DFB lasers. The aforementioned performance enhancement is mainly due to a considerable reduction in the frequency chirp effect, resulting from the strong SOA gain saturation-induced bandwidth broadening. Relatively low extinction ratio and clipping of the SOA modulated signals are identified to be the key factors limiting the maximum achievable AMOOFDM transmission performance.

- X. Yu, T. B. Bibbon, I. T. Monroy, "High-speed ultra-wideband wireless signals over fiber systems: photonic generation and DSP," Asia-Pacific Microwave Photonics Conference, APMP'09, Beijing, China, April 2009. Paper J01 (invited paper), April 22-24, 2009

Description: We firstly review the efforts in the literature on UWB-over-fiber systems. Secondly, we present experimental results on photonic generation of high-speed UWB signals by both direct modulation and external optical injecting an uncooled semiconductor laser. Furthermore, we introduce the use of digital signal processing (DSP) technology to receive the generated UWB signal at 781.25 Mbit/s. Error-free transmission is achieved.

3.1.10 BROADNETS 2008

BROADNETS 2008 was an international conference focusing on broadband communications, networks, and systems and covers the entire gamut of next generation networks, communications systems, applications and services. The conference covered the three main technical topics: wireless, optical and internet.

In-building

- Larsen, C.P., "Broadband and home networks in Sweden -commercial deployments and research status," 5th International Conference on Broadband Communications, Networks and Systems. BROADNETS 2008, pp.227-231, Sept. 2008.

Description: This paper describes the Swedish broadband market and compares it to other countries. Sweden has a high ICT maturity and ambitious goals, but there are still groups that are not reached. Broadband should be regarded as a utility in line with water, heating and electricity, and to achieve this, a high quality home network is important. Recommendations on how to build a low-cost, future-proof home network are reported. This is all related to Acreo's broadband and testbed activities including the recently initiated EU-project ALPHA which are described.

3.2 Exhibitions

3.2.1 ICT Mobile Summit 2009

The ICT Mobile Summit 2009 (18th edition) was held in Santander (Spain) on June 10-12, 2009. This event was supported by the European Commission under the ICT Theme of Framework Programme 7 (FP7). The ICT Mobile and Wireless Communications Summit addressed all the challenges of building the future Internet, which will be based on mobile, wireless and fixed broadband communications infrastructures. ICT-Mobile Summit 2009 brought together experts from industry and research which enabled underlying activities like sharing experiences and research results, identify future trends, discuss business opportunities and identify opportunities for international research collaboration under the ICT Theme of Framework Programme 7 (FP7). The Scientific Programme incorporated all the key constituents of future communication networks including the topics such as Radio Access and Spectrum, Converged and Optical Networks, and Future Internet Technologies. Thus, the event contributed to showcasing European research in the field, and positions it within the multiplicity of related initiatives supported in other regions of the world.

The ALPHA project presented three papers during the conference sessions, the ALPHA project coordinator was the chair of Session 3d, and during the whole duration of the meeting there was an exhibition stand to show the main achievements of the project.

The ALPHA stand in the ICT Summit 2009 was 6 meters long (see Fig. 3-1) where four different ALPHA related posters were shown:

- ALPHA poster. General description of the project and main achievements
- TID poster. Description of the testbed and main services
- Homefibre poster. Home network POF based
- FT poster. Broadcast & Select solution

The booth stand had an example of a real POF network deployment using ALPHA partners Homefibre media converters and Telsey's gateway. The demonstration exhibited a POF network deployment and operation.

The ALPHA objectives and achievements have been displayed at a 50" screen as a Power Point presentation. This screen was also used to show in real time the Telefónica testbed, using in particular a small robot moving around in the testbed (another robot was located in the stand).

During the three days of the exhibition, the stand had many visitors who were very interested in the availability of the solutions proposed, some technical details, the bandwidth and the prices (mainly). Some of these visitors were¹:

- Mayor of Santander
- Teaching staff of University of Cantabria
- Director of Technology and Services Development, Telefónica
- Research staff, University of Athens
- Access Research Leader, BT Group
- Teaching staff, University of Kent
- Technical Manager, PDM
- Director Wireless Research, IMEC
- Representative of Larkhill Consultancy Limited

¹ Due to the public nature of this document, the names of the people who attended the booth are omitted.

Architectures for flexible Photonic Home and Access Networks

- Research staff of ARM
- Teaching staff of Brunel University, London
- Representative of Vindeira
- Strategic Alliances Manager, Corrigent systems
- Representatives of Telecom Italia
- R&D Project manager, CRAT.

Also, other people from the University of Cantabria, from the European Commission, and other EU projects have visited the ALPHA booth. It is planned to have a continuation exhibition in the following Future Internet and Mobile Summit which will be held in Florence in June 2010.



Fig. 3-1: ALPHA booth at the ICT Mobile Summit 2009, Santander, Spain, June 2009.

4 Media coverage

During this first half of the project, the ALPHA project has been covered in European newspapers, magazines and television. In the following sections, the known media coverage of the ALPHA project is presented.

4.1 “Optical fibre to dominate the houses...”

The ICT Mobile Summit in Santander, Spain had broad media coverage of the event. The ALPHA project was reported via Telefónica I+D in the newspaper “El diario montañés” (Fig. 4-1), in local television “Radio Televisión Española de Cantabria” during the news (Fig. 4-2) and in “Telemadrid” (local television of Madrid).



Fig. 4-1: Newspaper article in “El diario Montañés”



Fig. 4-2: TV capture from RTVE Cantabria

4.2 “Project solves broadband problems...”

The Swedish newspaper “Hudiksvalls Tidning” highlights the importance of ALPHA project via Acreeo’s work (Fig. 4-3).



Installatörerna Christer Jonsson och Andreas Nordström tror att arbetet med de nya bredbandsuttagen kan göras på en dag.

FOTO: STEFAN WESTERLUND



– Genom den här tekniken kan man få en jämn ström på 100 megabit per sekund överallt i lägenheten, säger Claus Popp Larsen, projektledare på Acreeo.

Med en kombinerad uttagsdosa för el och bredband ska monteringen gå smidigt.



Hudikprojekt löser bredbandsproblem

HUDIKSVALL
I två äldre Hudiksvalls-lägenheter ska ny bredbandsteknik testas. Tanken är att bredbandsuttagen ska bli lika många som eluttagen.

Imånga nya lägenheter som byggs i Sverige finns bredvid eluttagen också nätverksuttag för bredband. Nätverksuttagen gör det möjligt att koppla in modem för exempelvis internetbaserad telefoni- och tv, så kallad IP-telefoni eller IP-tv, i alla rum, utan att behöva gå via ett trådlöst nätverk eller dra kablar från ett

rum till ett annat. Men att dra in bredbandsuttag vid eluttagen i äldre lägenheter kan både vara kostsamt och komplicerat.

Nu startar delvis Hudiksvallsbaserade forskningsinstitutet Acreeo tillsammans med Fiber Optic Valley, Hudiksvalls bostäder och Ericsson ett projekt där man testar en ny teknik som ska förenkla installationen av bredbandsuttag i äldre lägenheter.

Genom att använda plastfiberkabel istället för glasfiberkabel, samt en kombinerad uttagsdosa för el och

bredband ska monteringen gå smidigt.

– De nya tjänster som utvecklas kräver bredband som är stabilt och har högre hastighet än många trådlösa nätverk. Genom den här tekniken kan man få en jämn ström på 100 megabit per sekund överallt i lägenheten, säger Claus Popp Larsen, projektledare på Acreeo.

Den kombinerade uttagsdosen är konstruerad av ett österrikiskt företag som samarbetar med Acreeo inom det EU-stödda Alpha-projektet.

Till att börjades ska tekniken installeras och testas i två lägenheter i Hudiksvall och i dag började man arbeta i en bostad på Vallvågen.

Nils-Erik Blomdahl, vd för Hudiksvalls Bostäder ser plastfiberprojektet som ett försök kopplat till det stora Gunillaprojekt (samarbete som förutom Hudiksvalls Bostäder innefattar företagen Ericsson, Zitius och Fiberstaden) som syftar till att bygga ut Hudiksvalls stadsnät parallellt med satsningar på forskning och utbildning.

– Det kommer att vara en

ganska lång process innan det blir fråga om massinstallationer av den här tekniken, men vi tror definitivt att det kan finnas stora fördelar med plastfiberkabler istället för glasfiberkabler inne i själva lägenheten, säger Nils-Erik Blomdahl.

Glasfiberkabel används ofta i bredbandsammanhang och har kapacitet att transportera stora informationsmängder i tunna kablar. Ett problem är dock att de kräver dyr installationsutrustning och är väldigt känsliga för damm och smuts.

FAKTA

- Plastfiberprojektet i Hudiksvall är det första i Sverige och ett av de första i världen i sitt steg.
- Det finns i dag ingen gemensam eller officiell definition på vilka krav som en teknik ska uppfylla för att få kallas bredband.
- Kännetecknet för bredband är att du ständigt kan vara uppkopplad, att du oftast betalar en fast avgift oavsett hur ofta du är uppkopplad och att stora mängder information kan överföras på kort tid.

– I en glasfiberkabel förs informationen genom trådar som är tio mikrometer tjocka och ett litet dammkorn kan stoppa hela överföringsförmågan. En plastfiberkabel är i alla fall någon millimeter tjock och är inte alls lika smutskänslig, säger Claus Popp Larsen.

LOVE SVENSSON
0650-355 41
love.svensson@ht.se

Fig. 4-3: Article from “Hudiksvalls Tidning”, July 2009, Sweden

4.3 “To download a movie within the blink of an eye...”

Spanish newspaper “El Pais” mentioned the ALPHA project via the work made by UPVLC in the field of MMF transmission. (Fig. 4-4).

El Pais



José Capmany e Ivana Gasulla en su centro de trabajo de la Politécnica de Valencia. / SANTIAGO CARREGUI

Para bajarse una película en un parpadeo

Investigadores de Valencia baten un récord de transmisión de datos que abre nuevas aplicaciones comerciales

IGNACIO ZAFRA
Valencia

La industria cinematográfica tiene buenas razones para temblar: si el descubrimiento de un grupo de investigadores valencianos llega a comercializarse, descargar una película por Internet costará poco más que parpadear. El grupo de comunicaciones ópticas y cuánticas del Instituto ITeam, en la Universidad Politécnica de Valencia, ha batido el récord mundial de velocidad de transmisión de datos por fibra óptica multimodo. La nueva cota casi multiplica por cinco la anterior (en manos de la Universidad de Stanford) y alcanza la muy impresionante altura de un terabit por segundo por kilómetro.

En otras palabras, explica José Capmany, responsable de la investigación, en un gran edificio de 100 pisos, ese terabit “per-

mitiría darles a cada uno 10 gigabits por segundo”. O, lo que es lo mismo, 500 veces los “20 megas” que ofrece actualmente Internet por ADSL.

La investigación, publicada por Capmany y su compañera Ivana Gasulla en la revista esta-

El avance puede solucionar el cuello de botella de los accesos caseros

dounidense *Optics Express*, forma parte del proyecto europeo Alpha, en el que participan otras universidades del continente, compañías de la talla de Telefónica, Alcatel-Lucent y France Telecom, y empresas dedicadas a proporcionar redes de acceso.

Las patrocinadoras tienen derecho a explotar comercialmente los resultados de las investigaciones. Eso significa que, en caso de interesarles, en cinco años la nueva versión de Internet ultrarrápida estaría disponible para los hogares, calcula Capmany.

La fibra óptica multimodo ha sido tradicionalmente portadora de poca capacidad. Y las redes de transportes (las *autopistas* tendidas en largas distancias) suelen ser de fibra monomodo, capaces de transmitir centenares de terabits por segundo. “Pero eso ha generado un cuello de botella en el usuario final”, indica Capmany. La fibra monomodo es carísima cuando se trata de escalas tan pequeñas. Lo que ha provocado que en las redes de acceso (las *caseras*) reine la fibra multimodo, que puede aprovecharse del nuevo avance tecnológico.

Fig. 4-4: Article from “El Pais”, Spain

4.4 “We’ll make internet broadband 100 times faster, say British scientists...”

Specialized Internet websites also have mentioned the ALPHA project, here is a description of Bangor’s planned contribution to the ALPHA project is presented. (Fig. 4-5).

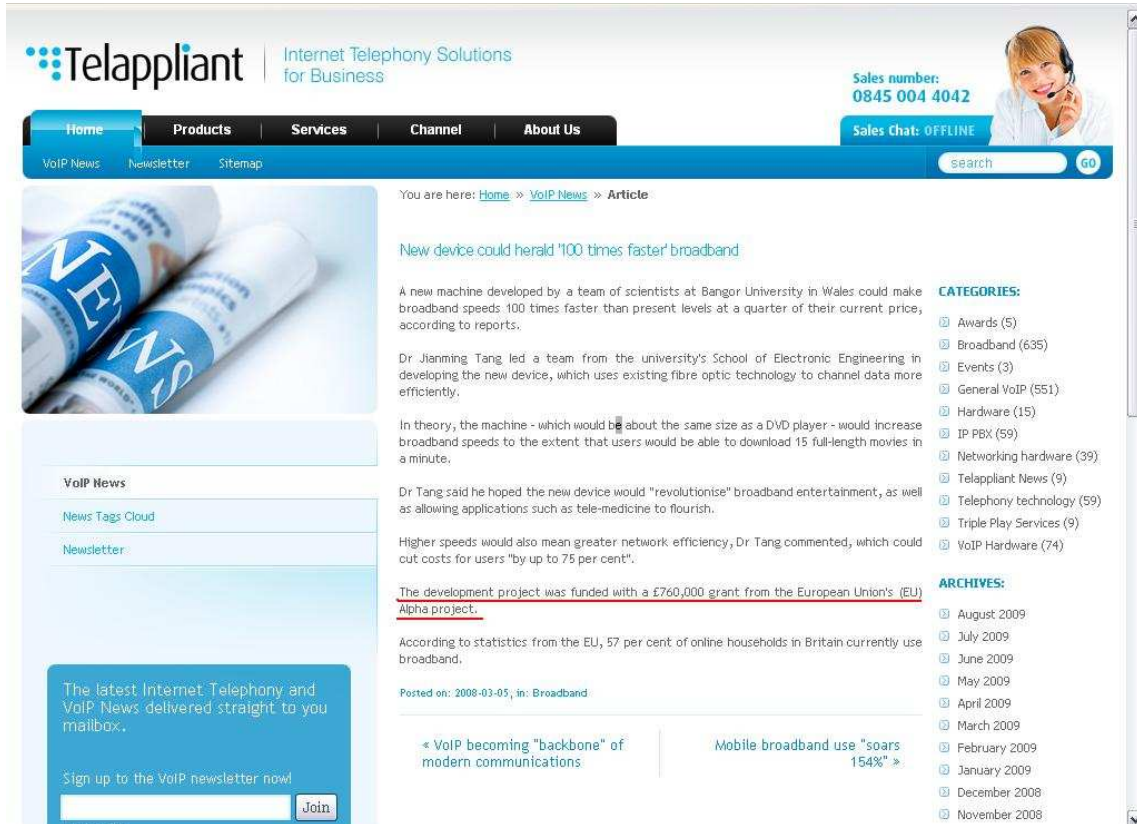


Fig. 4-5: Web clipping of telappliant.com

4.5 Others

ALPHA project has also been mentioned in specialized magazines, one of them is the Optoelectronic Engineering which is a local magazine in China published by NTP International Publishing Co.,Ltd.. It focuses on newly optoelectronic market trend and advanced technologies, especially on the optical components and equipment applied in telecommunications, CATV, data communications, IT industry and so on. In February, 2008, this magazine issued an article entitled “POF shows promise for Home Networking” which presents the work made by Lucoat.

Homefibre has participated in CENELEC meeting following smart house standardisation.

5 Statistics

This section presents a set of statistics for dissemination based on publications in journals and conferences. Invited talks also take part of the defined metric which follows the classification in accordance with four main areas: Project overview, access, in-building and transmission/PHY. Fig. 5-1 shows the number of papers per area, invited papers are included in each defined area as well. The total number of papers during the first half of the project is 96.

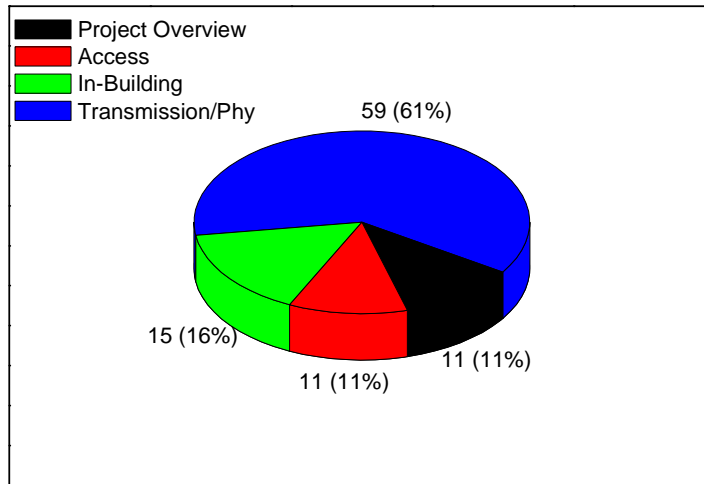


Fig. 5-1: Distribution of publications: total number of papers.

Fig. 5-2 shows the distribution of papers following the classification based on invited and regular submission category for the four defined thematic areas. Fig. 5-3 shows the distribution of regular papers for journal and conference category. The total number of invited papers is 21 and the number of regular papers is 75 which are distributed in 25 regular papers in journals and 50 papers in conferences.

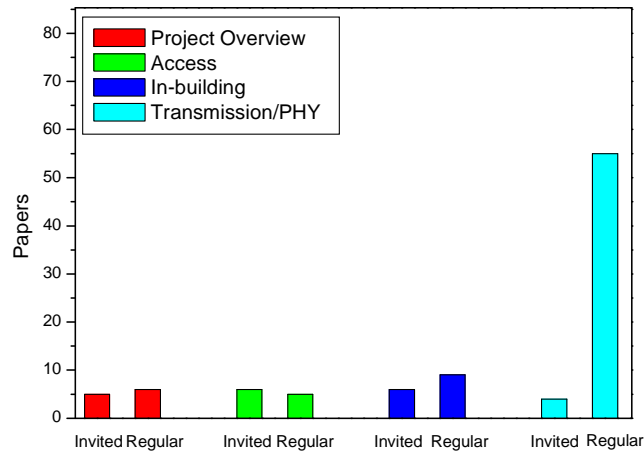


Fig. 5-2: Number of invited/regular paper following classification.

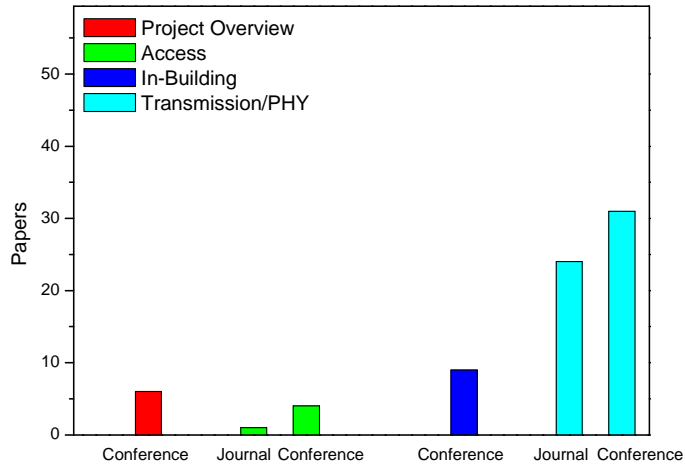


Fig. 5-3: Distribution of regular papers.

Fig. 5-4 depicts the classification in a publication per event basis distinguishing between the invited Fig. 5-4(left) and regular submission Fig. 5-4(right) for project overview category.

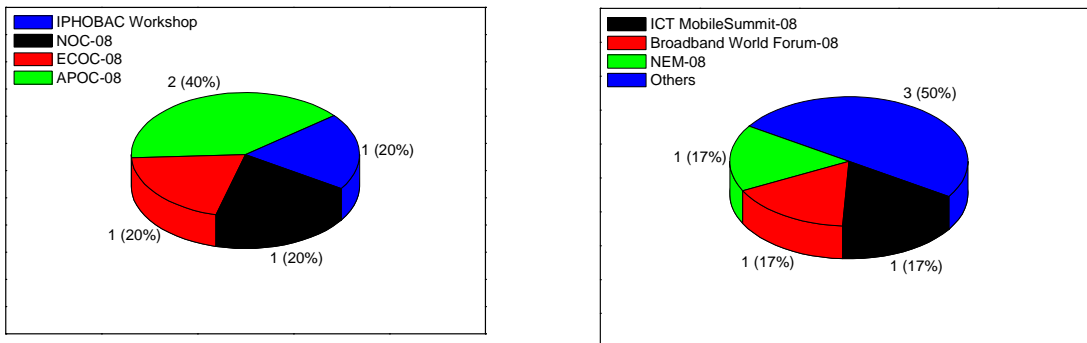


Fig. 5-4: Publications per event for project overview related papers. (left) Invited. (right) Regular.

Fig. 5-5 shows a similar classification as the previous one for the invited Fig. 5-5(a) and regular submission Fig. 5-5(b) in the access category.

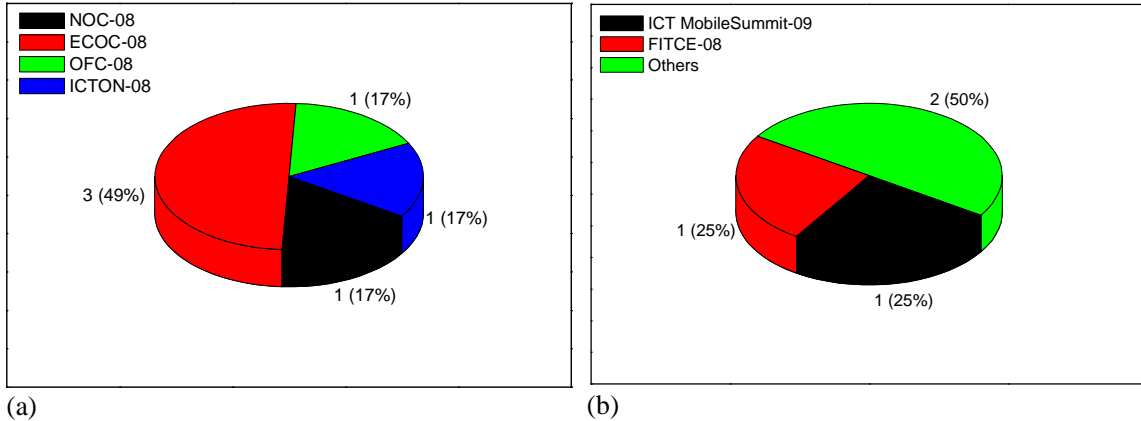


Fig. 5-5: Publications per event for access related papers. (a) Invited. (b) Regular

Fig. 5-6 shows the same classification for the in-building category. Fig. 5-6(a) shows the invited submissions and Fig. 5-6(b) shows the events where regular submission took place.

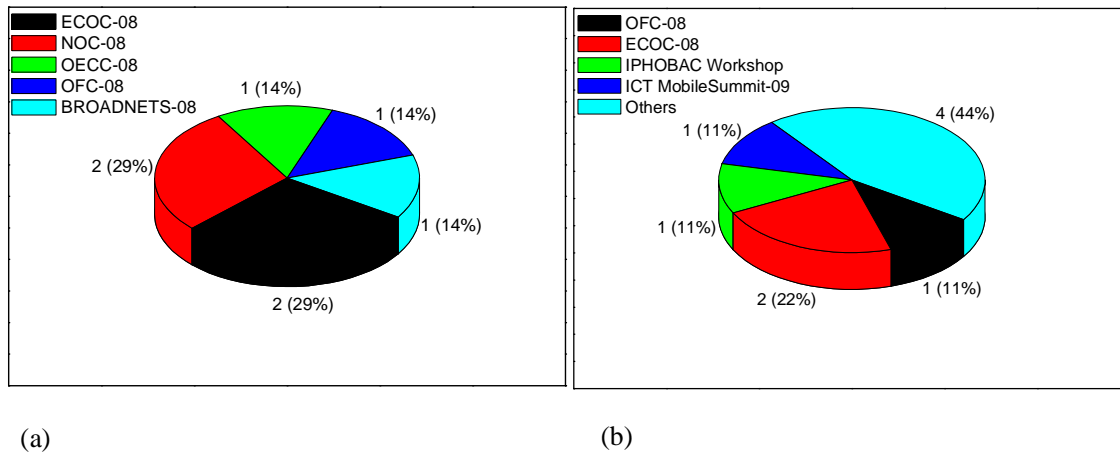


Fig. 5-6: Publications per event for in-building related papers. (a) Invited. (b) Regular.

Finally, the same classification has been done for the transmission/PHY area, see Fig. 5-7.

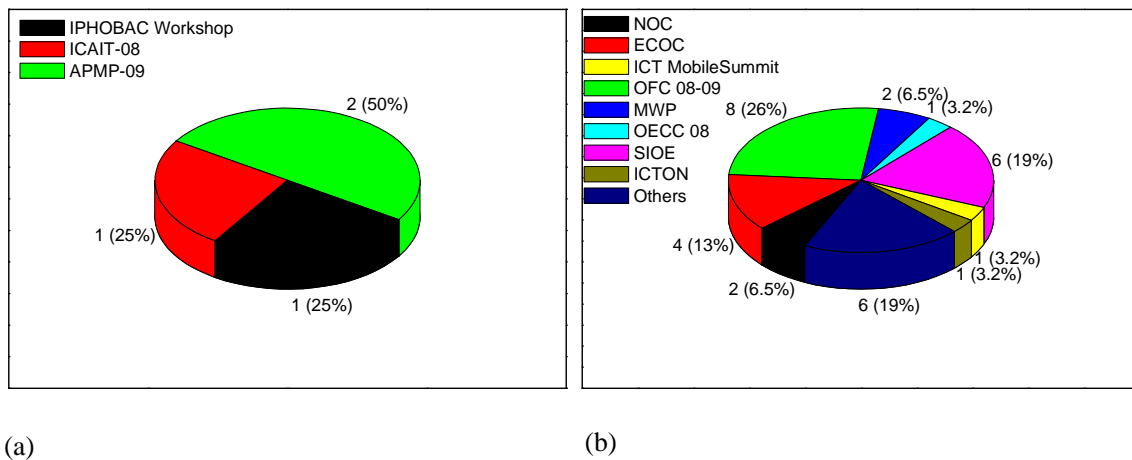


Fig. 5-7: Publications per event for transmission/PHY related papers. (a) Invited. (b) Regular

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A journal-based classification has also been taken into account; Fig. 5-8 represents the publications per journal. The graph corresponds to the transmission/PHY category.

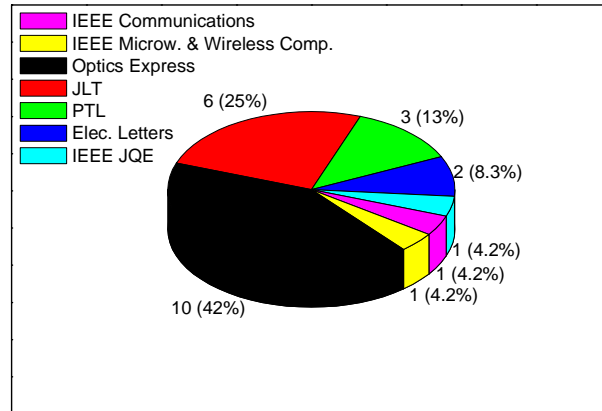


Fig. 5-8: Publications per journal for transmission/PHY related papers.