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Speaker:

Dr. Joaquin Perez Soler,

Senior Research Assistant

Northumbria Communications Research Lab,
CEIS, Northumbria University,
Newcastle Upon Tyne, UK
E402, Ellison Building, City campus
joaquin.perez@northumbria.ac.uk
0191 227 3661

Authors:

Dr. Joaquin Perez Soler, Prof. Z. Ghassemlooy (CEIS) and Prof. Dave Smith (CEIS)

Title:

“Hybrid communication systems, FSO/RF and RoF: reliable and scaled communications anywhere”

Keywords:

Free Space Optical Communications, Radio-over-Fibre, Wireless Communications, Hybrid systems, Green Communications

Abstract:

Current network and telecommunication systems are required to provide higher data rates in access networks to an increasing number of users. This fact is mainly due to the increase in the Internet traffic data, which is related with the higher demand of online added-value online content, as a result of a society increasingly more interconnected. New emergent radio technologies play a key role to supply these high-demand services to customer, e.g., UWB, WIMAX and LTE-advanced. [1-3]

How to carry them to final customer? How to backup these services?

Free-space optics (FSO), Radio-over-fibre (RoF) and RF/FSO Hybrid communication systems become a solution to deploy these services on indoor/outdoor scenarios avoiding architecture problems on WAN environments, e.g., university campus, companies' parks [4]. Moreover, these systems will fit emergency scenarios, e.g. earthquakes, tsunamis, where the classical communications infrastructure cost and time replacement is very high [5]. On the other hand, the implementation of RF/FSO or RoF systems are enclosed in the new green communications issues, because they share the common goal to implement energy efficiency communications at anywhere scenario [6, 7]. Therefore, emergent radio technologies and their application on FSO and RoF systems are a challenging research issue nowadays.

(abstract = 190 words)

References:

- [1] J. Perez, M. Morant, M. Beltran, and R. Llorente, "Performance of MB-OFDM UWB and WiMAX IEEE 802.16e Converged Radio-over-Fiber in PON," *Mwp: 2009 International Topical Meeting on Microwave Photonics*, pp. 235-238, 2009.
- [2] J. Perez, M. Morant, R. Llorente, and J. Marti, "Joint Distribution of Polarization-Multiplexed UWB and WiMAX Radio in PON," *Journal of Lightwave Technology*, vol. 27, pp. 1912-1919, Jun 15 2009.
- [3] R. Llorente, T. Alves, M. Morant, M. Beltran, J. Perez, A. Cartaxo, and J. Marti, "Ultra-wideband radio signals distribution in FTTH networks," *IEEE Photonics Technology Letters*, vol. 20, pp. 945-947, May-Jun 2008.
- [4] E. Leitgeb, M. S. Awan, P. Brandl, T. Plank, C. Capsoni, R. Nebuloni, T. Javornik, G. Kandus, S. S. Muhammad, F. Ghassemlooy, M. Loschnigg, and F. Nadeem, "Current Optical Technologies for Wireless Access," *Contel 2009: Proceedings of the 10th International Conference on Telecommunications*, pp. 7-17, 2009.
- [5] S. Bloom, E. Korevaar, J. Schuster, and H. Willebrand, "Understanding the performance of free-space optics [Invited]," *J. Opt. Netw.*, vol. 2, pp. 178-200, 2003.
- [6] Z. Yi, P. Chowdhury, M. Tornatore, and B. Mukherjee, "Energy Efficiency in Telecom Optical Networks," *Communications Surveys & Tutorials, IEEE*, vol. 12, pp. 441-458.
- [7] R. S. Tucker, "Green Optical Communications---Part II: Energy Limitations in Networks," *Selected Topics in Quantum Electronics, IEEE Journal of*, vol. PP, pp. 1-14.