BONE Major Achievements

WP16 : In-Building Networks

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WP Objectives

To align the research activities on Architectures and Techniques for In-Building Optical Networks, by

- co-ordinating and integrating research efforts (exchanging researchers, joint research and lab experiments, joint publications, joint project proposals, …)
- establishing benchmark platforms for different optical in-building network technologies
- providing guidelines for roll-out and deployment of optical in-building networks and migration paths

Status at start of the BONE-project

BONE WP16 took over from e-Photon ONe+'s WP-VD-H "Home Networks and Other Short-Reach Networks", in which the first co-operations were established between the European research groups in this at that moment novel field. First mobility exchanges of researchers were done, and first joint publications produced.

Major progress during BONE-project

In BONE's WP16, an inventory among the partners resulted in a significantly extended list of research topics of common interest.

Progress in the various topics:

- In-building network architectures and techno-economics: perspectives for various home network architectures based on POF, silica MMF and SMF were outlined. Cost analyses of the capital and operational expenses were made.
- Management and control: Quality of Service management aspects of integrating wirebound and wireless services in a single fibre network were analysed.
- High capacity data transmission over wired links: standardisation was addressed for POF-based networks. Solutions for carrying both wired and wireless services were devised. High capacity transport by advanced signal modulation formats, by selective optical launching schemes and by mitigation of modal dispersion was shown. The impact of mode filtering was investigated.
- Radio over fibre: Ethernet transport over RoF links, 60GHz coverage extension, RoF for localisation and reading of RFID devices, bidirectional transport of OFDM UWB and impulse radio UWB over POF, and energy efficiency aspects of RoF were studied.
- Flexible capacity allocation: flexible routing of RoF signals by wavelength routing and by spatial liquid crystal switches was shown.
- Sensors: liquid level sensors and other fibre-based sensors were investigated.
- Wireless optical communication: ultra-high capacity free-space communication by deploying block transmission was demonstrated.

Research exchanges took place by 9 mobility actions. Joint research led to 39 joint papers.

Added value of the BONE NoE

BONE WP16 has enabled valuable cooperation between scattered research groups in Europe in the domain of in-building optical networks, which led to an increase in the exchange of scientific personnel by mobility actions, to joint publications in high-impact journals and conferences, and jointly organised workshops. The worldwide visibility of European research in in-building networks was enhanced, encompassing 'hot' areas such as high-capacity fibre-wireless networks, high-capacity (plastic) multimode fibre networks, and the convergence of wire-bound and wireless services in a single network.

The WP16 activities have created a versatile basis for strengthening the research capabilities in Europe in the area of optical in-building networks. This research is highly relevant in view of many social trends such as the

aging society, the increasing concerns about our environment, and the increasing healthcare needs. In order to meet the demands put by these trends, WP16-like research actions yielding smart and high-capacity in-building networks directly supporting the user are and remain indispensable.