**WiBACK-SYSTEM**

**WiBACK SOFTWARE REL. 4**

**At a Glance**

WiBACK is designed to deliver services with a high quality of experience (QoE). It efficiently bridges the gap between the Access for end-users and provider core networks. Sophisticated algorithms dynamically orchestrate the entire backhaul network with respect to spectrum allocation, topology management and load distribution, thus minimizing the need for highly skilled personnel. Compared to traditional fixed wireless operator backhaul technologies, those key WiBACK features lead to significantly lower setup (CAPEX) and operational costs (OPEX).

Developed by Fraunhofer, WiBACK technology offers a flexible, self-managing and cost efficient solution to provide carrier-grade wireless backhauling.

**WiBACK Components**

A typical WiBACK Network consists of only two types of electronic equipment keeping the system simple. A network requires one Network Controller located at the root of the network and the outdoor WiBACK nodes which handle forwarding and provide connectivity at their location.

**Key Features**

- Plug & Play directional radio technology delivering low-cost broadband connectivity
- Self-configuration, -optimization and -healing
- Builds upon COTS hardware (BoM available)
- Supports heterogeneous technologies (e.g. IEEE802.11, micro-wave, satellite, fiber)
- Web based network visualization, monitoring and configuration
- Seamless integration into existing networks
- Small energy footprint (solar powered nodes)
- Provides carrier-grade services (e.g. QoS-enforcement, overbooking)
- Supports multi-tenancy allowing multiple operators to share the same physical network resources
- Forms redundant topologies (“rings”) to increase resilience or capacity
Utilizing WiBACK – Connect the Unconnected

Everywhere
People in low income regions are still often denied the many benefits of broadband access, creating a digital divide. Directional radio systems allow to efficiently connect rural areas, reaching the local population, institutions and businesses.

Connect
 Hospitals, schools, cellphone-towers, factories, government-buildings, sensors (security cameras, emergency sensors) and others.

By Everyone
WiBACK significantly reduces the complexity and effort required to set up and run such a network! Little skilled labor or specific technological expertise is required in the field. Therefore actors apart from the big operators are enabled to tackle this problem directly and to bring broadband Internet to where it is needed.

Connected by
Municipalities, organizations, companies, hospitals, schools, local operators, local population – allowing them to take matters into their own hands instead of being reliant on the big operators and their schedules and business cases.

WiBACK Facts
Management Capabilities
Self Management
Network is set up automatically, running within minutes after hardware is powered. No expertise required from users; auto adaption of frequencies, paths, bandwidths.

Self Healing
Fast re-routing along fallback-links and self-configuration of links.

Maintenance
Monitoring and auto-alerting, simple replacement of parts or extension of network (only plug-in of new node required).

Quality of Services
Routing, Capacity Mgmt.
Transparent ethernet bridging incl. VLAN trunking and MPLS-based traffic engineering.

Network Slicing
Multi-tenancy operation supporting different QoS-allocation models.

Monitoring
Path auto-alert, monitoring and setup page accessible via web.

Cost Efficiency / Flexibility
Hardware
Utilization of commercial off the shelf (COTS) hardware. Local assembly possible (BoM available), low energy footprint (solar-ready), only two main components (controller + WiBACK nodes).

Physical Layer
Wireless links in unlicensed (WiFi) and licensed spectrum (e.g. TVWS, public safety bands); can integrate wireline infrastructure into network.

Technical Capabilities (using IEEE 802.11ac radios)
Bandwidth
< 200/400 Mbps (40/80Mhz channel)

Latency
< 2 ms (per link)

Distances
< 20 km (per link)

Enable Crucial Services
Services
High speed connectivity, health services (e.g. general information, consultation of doctors via video conference, order/check availability of medicine), education, governmental services (ID, administration), communication (email, VoIP services), and many more at significantly lower costs than via mobile networks.

Access
Directly at a specific organization’s site, or via any access solution (cellular or commercial off the shelf access points) in a simple plug and play mode.

WiBACK Controller available as Mini-PC, virtualized entity and rack-mounted (1U).

Outdoor WiBACK node (available with 2, 3 and 4 Antennas, see data sheets).