

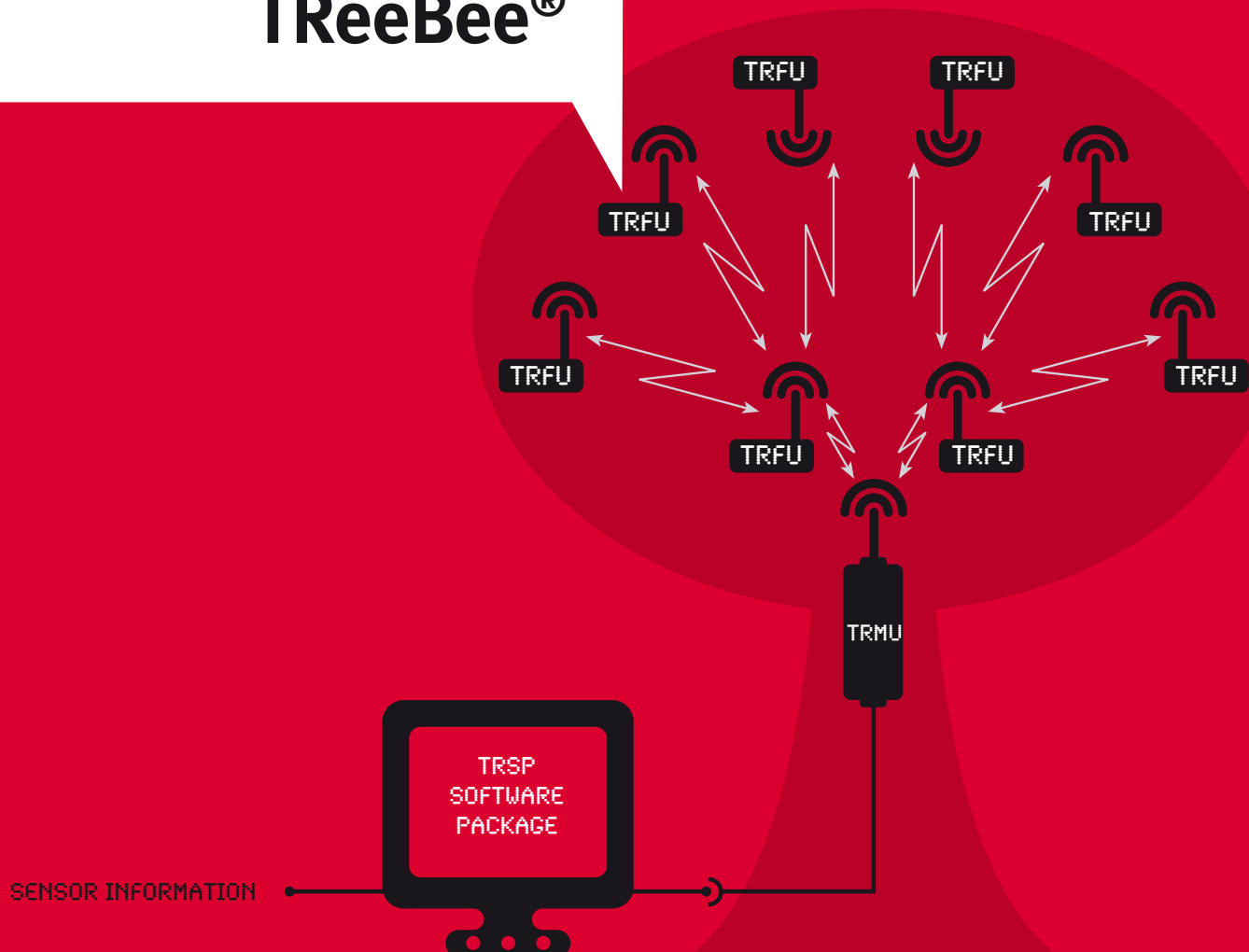


TELEFUNKEN
RACOMS

Train Communication

Meshed Sensor Communication Network

TReeBee®



WE KEEP IN TOUCH

Wireless Network Solutions for Supervision, Monitoring, Measurement and Control

SYSTEM CONCEPT

TReeBee®

TReeBee® – Wireless sensor and communication network

TReeBee® is a self organizing wireless network with ultra low power consumption for various sensor applications especially in the sectors of transportation, energy, industry and security. The network is based on the IEEE 802.15.4 and ZigBee® standard. It interconnects small TReeBee® radio units to exchange position, status, sensor and control information.

These radio devices already include typical sensors and offer various standard interfaces for additional external sensors and actuators. The TReeBee® components are geared to meet the high environmental requirements of industrial devices. By using advanced power saving mechanisms, they can be operational for years without external power supply or battery recharging. Due to its design the units are universal and flexible to be used in versatile applications, not limited to typical railway communication purposes.

TReeBee® solutions include gateway functionality for a connection to application servers and other networks. In combination with the TReeBee® Software Package (TRSP) a comprehensive system solution for various IP based network interfaces is available.

Features

- › Small size, ruggedized outdoor housing
- › Wide temperature range
- › Flexible and power efficient radio, compliant to IEEE 802.15.4
- › Self organizing wireless network capability based on ZigBee® Pro
- › License free frequency bands (780, 868, 915 MHz and 2.4 GHz)
- › Extended network topology (up to 65.000 units/net)
- › Multihop transmission capability (up to 30 hops)
- › Application specific antennas for high radio ranges (typ. indoor < 100 m, outdoor < 2 km)
- › Data encryption capability for enhanced security
- › Low power consumption (sleep mode with low duty cycle)
- › Wake up functions (based on time or events)
- › Embedded sensors (temperature and acceleration)
- › External interfaces for data exchange and external sensors/actuators
- › SW driver and configuration tools

Installation/Configuration

The configuration of relevant parameters such as network ID and network name are initially configured ex factory in an integrated EEPROM device. A manual configuration via a configuration utility at the serial interface or remotely via the air interface can be done by the user.

The TReeBee® Software Package is a software suite to be installed on any host PC/controller. After installation of the software on the host PC the TReeBee® software provides different IP based interfaces like SNMP, OPC, HTTP and UDP, where the data of the whole TReeBee® network can be accessed by user application.

Characteristics

All TReeBee® units are designed according industrial standards to withstand also in a tough outdoor environment or mobile applications. The small component housing is made of solid stainless steel rated for IP 67, with external interfaces protected against immersion of dust and water. The radio interface provides TNC-type antenna connectors for application specific use of external antennas. For all sensor and data interfaces M12 connectors are used. Multiple power supply options, either by external power sources or the usage of the embedded battery enable flexible operations. The units are also prepared for the appliance of energy harvesting methods.

Configurations/Accessories:

- › TReeBee® Software Package (TRSP) including
 - › TReeBee® Proxy
 - › TReeBee® Application Libraries
 - › TReeBee® GUI and Configuration Tool
- › Network components
 - › Master Unit (TRMU)
 - › Field Unit Type-E (TRFU-E)
 - › Field Unit Type-B (TRFU-B)
- › Mounting adapter
- › Antennas
- › Cable set (power & data)
- › Additional options:
 - › Energy harvesting solutions
 - › Integrated solution with GSM and GPS modules

TYPICAL APPLICATIONS

TReeBee®



› Transport

- › Wheel/Axles monitoring
- › Hot box/Derailment detection
- › Mileage accounting
- › Wagon/Truck identification
- › Pallet carrier tracking

› Industry

- › Wireless monitoring and control of process automation
- › Factory automation
- › Machine monitoring (Vibrations, temperature, pressure, force)

› Distribution & Warehousing

- › Cold room storage monitoring
- › Gas/Air monitoring
- › Parcel/Freight pallet tracking

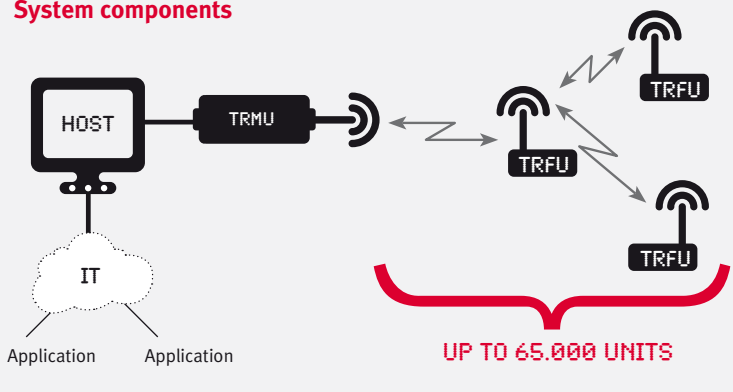
› Security

- Access control:
 - › Monitoring of make contacts
 - › Status of light barriers
- Integration of:
 - › Smoke detectors
 - › Pressure sensors

› Energy and Environment

- › Mounting at rotating or moving parts (wastewater treatment)
- › Flow rate measurement
- › Wind power stations: Replacement of slip rings, cables and connectors
- › Monitoring of solar panel fields and biogas plants
- › Floodwater monitoring

System components



System solution

The devices of a TReeBee® wireless sensor network is complemented by the TReeBee® Software Package (TRSP) that provides suitable IP network interfaces for various user applications.

Dedicated user applications as well as the sensor analysis software can take advantage in using the appropriate IP based interfaces to realize a customer specific system solution.

AGENDA:



TRMU: TReeBee Master Unit



TRFU: TReeBee Field Unit

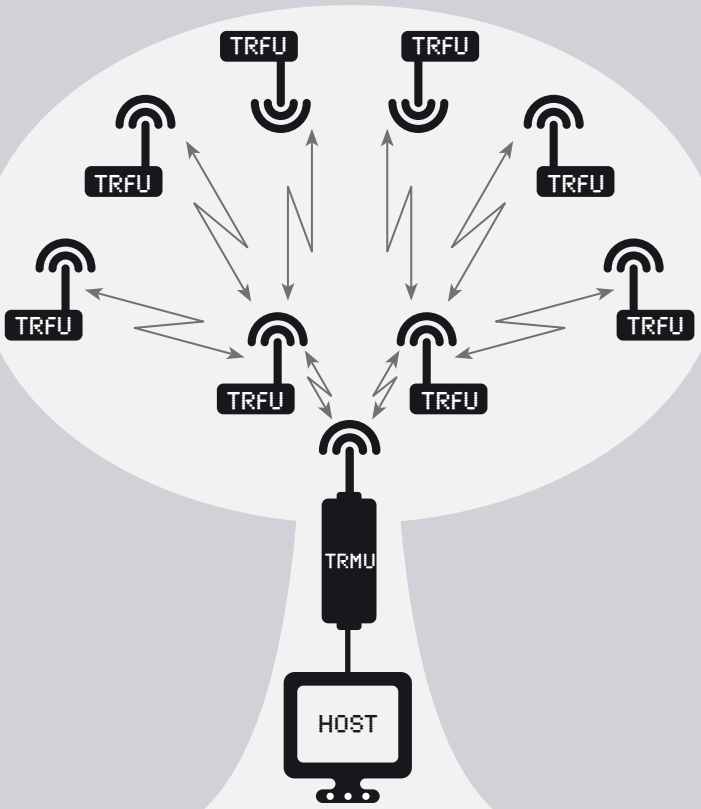


Radio Link

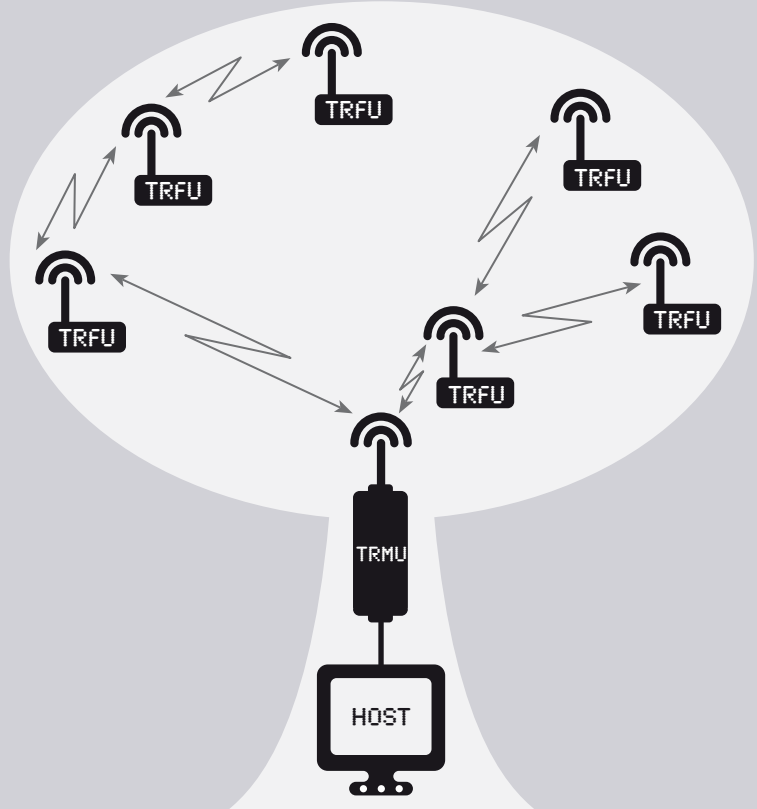


Redundant Radio Link

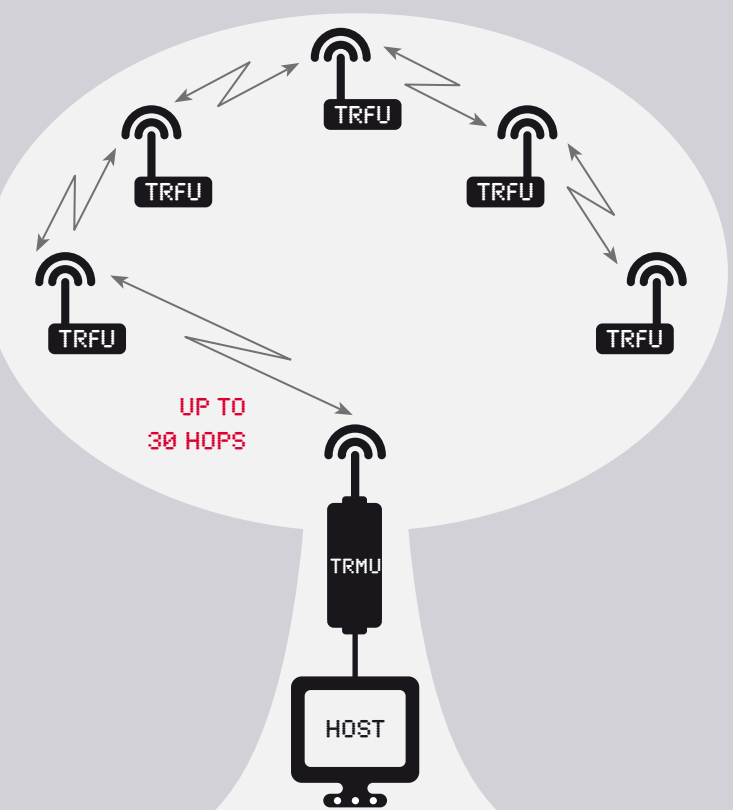
RANGE EXTENSIONS CONFIGURATION
(MAX. 65,000 UNITS)



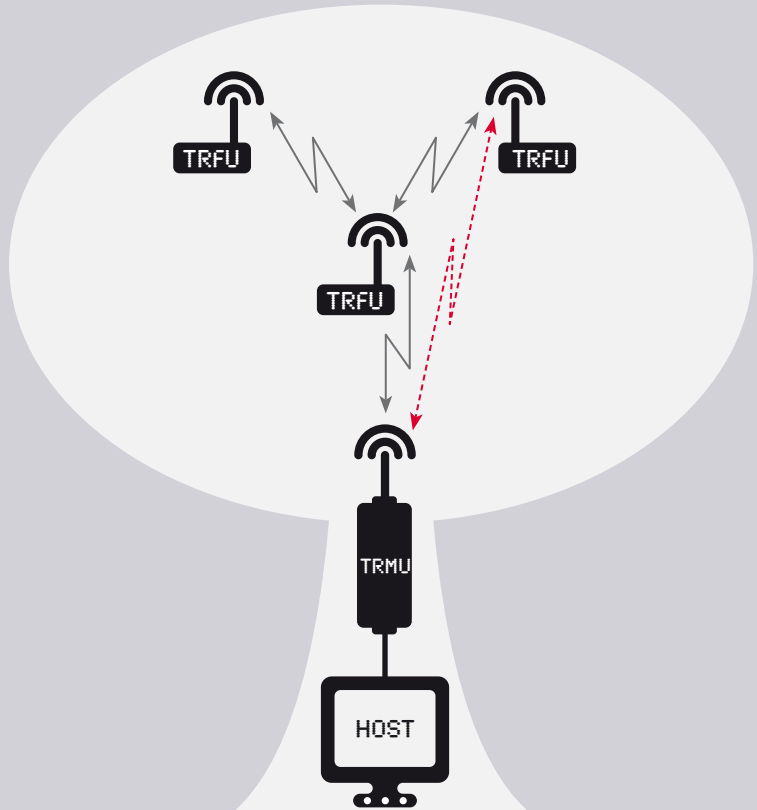
HETEROGENEOUS NETWORK CONFIGURATION



MULTIHOP LONG RANGE CONFIGURATION



SELFORGANISING NETWORK CAPABILITY





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