The building penetration loss is one of the key factors in planning future satellite-to-indoor/HAP-to-indoor communication links. An extensive measurement campaign, covering a representative set of typical buildings in an urban area and aimed at building penetration loss for high elevation angles at L-, S- and C-bands, was performed in Prague in 2009. Throughout the measurement, a remote-controlled airship (http://www.airshipclub.com) was used as a pseudo-satellite carrying a transmitter which provided unmodulated continuous wave left-handed circularly polarized signals at 2.0 GHz, 3.5 GHz, 5.0 GHz, and 6.5 GHz. Based on a thorough analysis of the resulting experimental data new elevation dependent empirical models were introduced at corresponding frequencies.

Vegetation shadowing is one of the key aspects of how the local environment influences satellite mobile services in urban areas. The complete range of elevation angles typical of satellite/HAP communication links. An extensive measurement campaign, covering a representative set of typical buildings in an urban area and aimed at building penetration loss for high elevation angles at L-, S- and C-bands, was performed in Prague in 2009. Throughout the measurement, a remote-controlled airship (http://www.airshipclub.com) was used as a pseudo-satellite carrying a transmitter which provided unmodulated continuous wave left-handed circularly polarized signals at 2.0 GHz, 3.5 GHz, 5.0 GHz, and 6.5 GHz. Based on a thorough analysis of the resulting experimental data new elevation dependent empirical models were introduced at corresponding frequencies.

Satellite-to-Indoor Measurement Campaign
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SIMO/MISO Measurements for High Elevation Links
To characterize the propagation channel for high elevation links, typically satellite links, a new measurement setup at 2.0 GHz was introduced in 2011. In order to perform dual polarization measurements, the RHCP and LHCP polarized signals are transmitted at 2.00106 GHz and 2.0086 GHz by antennas placed at an automatic positioner at the bottom of the airship. This enables to instantly point the transmitting antenna towards the receiver position, resulting in propagation conditions closer to a common satellite to earth scenario and constant antenna characteristics, namely the polarization. By using a dual polarized patch antenna connected by a hybrid coupler and two power splitters to a four-channel sensitive radio receiver tuned to the two slightly shifted transmitting frequencies, SISO, SIMO, MSO and MIMO (combined MSO/SIMO) configurations with both co- and cross-polarized (LHCP/RHCP) components of the transmitted signals are received. A high sampling rate of 10 kHz allows studying fast fadings and various diversity techniques.

SIMO/MISO Measurements for Low Elevation Links
Unmanned aerial vehicles (UAVs) are deployed in many surveillance missions as they are safe and inexpensive. These aircraft need a high data rate communication link for direct evaluating or storage of data which the control link cannot guarantee. Due to the specific elevation angle this link can be classified as a "low elevation link." Similar measurement system is utilized as for the SIMOMISO high elevation scenarios, the main difference is the use linearly polarized antennas. Specific propagation channels are studied for various environments.

Measurements of Shadowing by Vegetation for Satcom & Satnav Systems
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Measurements of Horizontal Variations of Radio Refractivity
The refractive index of air is of a critical importance for all refractive effects occurring in the troposphere. Refractivity structure of lower parts of the atmosphere has been studied for decades, mostly by means of radiosounding. Vertical dependence of refractivity is relatively well understood in terms of vertical refractivity profiles including their statistics. When assessing the influence of refractivity distribution of the atmosphere on radio-wave propagation, usually a single refractivity profile is considered along the whole path of the link. Horizontal change in the refractivity profile can be important in a certain percentage of time, however. These measurements attempt to quantify the horizontal change of refractivity.

Radiowave Propagation Measurements Using Remote Control Airship
http://propagation.elmag.org