

# Seeking Indoor Continuity for GNSS Positioning Solution



Researchers at Telecom SudParis, France, which is part of the Institut Mines-Telecom, a world-leading education and research institution in the fields of information and communication technology, are working on a solution to provide indoor continuity for GNSS positioning. The idea is to deploy a minimal transmission infrastructure in order to allow a standard receiver to measure pseudo-ranges and carrier phases, thus leading to a accurate indoor positioning. The infrastructure consists of several antennas fed through optical fibres with a GNSS-like signal.

In order to achieve positions accurate to a few decimetres, the locations of the various indoor antennas had to be accurately known. This was achieved with the Spectra Precision FOCUS 8 total station in a local reference frame. In addition, in order to

calculate the indoor positioning in WGS84 format and to achieve full compatibility with current outdoor GPS, a Spectra Precision ProMark 800 GNSS receiver was used to link the local reference frame and the GPS. The accuracies of the FOCUS 8 and the ProMark 800 and their ease of use were invaluable to the team, said Nel Samama, lead researcher and Professor at the Institut Mines-Telecom.

The International Conference on Indoor Positioning and Indoor Navigation (IPIN) 2012 and 2013 published the first results of the research, and the latest results will soon be published in a paper, *Repealite Based Indoor Positioning System Performance*. The papers propose a new approach to indoor positioning: the repealite system. It aims at providing continuity of the positioning service through the use of GNSS-like signals, thus leading to a single technological means: a GNSS receiver, for both outdoors and indoors. A few error sources have been dealt with in order to reach sub-metre accuracy indoors, among which one has to cite multipath and near-far effects. The paper describes a way to reach indoor sub-metre accuracy and the practical current implementation of the system.

## About Telecom SudParis

Telecom SudParis is a leading graduate school of engineering and part of Institut Mines-Telecom, the reference Institute for Information and Communication Technology in France. Telecom SudParis focuses primarily on Information and Communication Technology and provides a generalist and rigorous scientific training to prospective engineers and future managers. With the presence of a management school on the same campus, Telecom SudParis is a pioneer among *Grandes Ecoles* in combining scientific and management education in France.