NOTICE OF ORAL PROPOSAL DEFENCE

Geodesy and Geomatics Engineering

Doctor of Philosophy

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Tuesday, December 21, 2004
Head Hall – E-11 @ 10:00 am

Supervisor:	Dr. R. Langley
Supervisory Committee:	Dr. Peter Dare
	Dr. Don Kim
Chair:	Dr. Sue Nichols

Ultra Precise Navigation in Indoor/Outdoor Environments

ABSTRACT

Mobility has been one of the key features behind the success of wireless technology. A wide variety of additional applications are possible once this mobility is combined with location awareness. Critical for location awareness is an accurate assessment of the mobile user's position and/or attitude, and once this stage is fulfilled, it is of great significance and importance for wireless applications.

In order to obtain a precise positioning using the GPS-RTK system, one should use the observable carrier-phase, once the integer ambiguities are solved. It is well known that for kinematic positioning with small baselines (< 10 km) and with a good satellite geometry, on-the-fly algorithms (OTF) are quite efficient in solving the integer ambiguities. However, in urban canyons and/or indoor environments, this can be an impossible or impracticable task, though these are the most desirable places for GPS-RTK applications.

On the other hand, when one is looking for applications where ultra precise navigation is required in real time, nothing can guarantee that this system will be reliable knowing that the multipath is highly present, and still remains as the major contribution in the measurement error budget. This is most true for signals passing through urban canyons or signals arising from pseudolites (ground-based satellites). Actually, here the multipath error contamination is even more severe due to the fact that pseudolites are usually positioned at very low ellevation angles, and with relative short distances from the user platform. Thus, there are two main questions to be answered:

- Is it possible to accelerate the ambiguity resolution process in real time, whilst the user platform is "navigating" in indoor/outdoor environments?
- Even if the answer to the first question is positive, is it possible to remove the multipath error contaminating the precise carrier-phase measurements, involved in the ambiguity search procedure, thus allowing not only an acceleration in the ambiguity search, but also get ultra precise solutions?

Faculty Members and Graduate Students are invited to attend the 20 minute presentation