A REVIEW ON RECENT AVAILABLE POSITIONING TECHNOLOGIES AND ITS ADVANCEMENT

Chai Nee Ping¹*, Wan Azlan Wan Zainal Abidin¹, Wan Hashim Wan Ibrahim², Kismet Anak Hong Ping¹

¹Department of Electronic Engineering, Faculty of Engineering, Universiti Malaysia Sarawak (UNIMAS), Kota Samarahan, Sarawak, Malaysia.
²Department of Civil Engineering, Faculty of Engineering, Universiti Malaysia Sarawak (UNIMAS), Kota Samarahan, Sarawak, Malaysia.
*Corresponding author: chaineeping@gmail.com

ABSTRACT This paper reviews and compares the available positioning technology for location based application such as the Intelligent Transport System (ITS) and personal vehicle positioning. With the rapid growing trend of worldwide vehicle ownership, issues such as traffic congestion, environmental pollution, energy consumption and road accident cases are increasing. Intelligent Transportation System (ITS) which depends on location and positioning has been identified as one of the advocated key to resolve the issues. Global Positioning System (GPS) is one of the most promising ubiquitous positioning technologies accepted worldwide for ITS application. It is discerned that GPS alone in ITS application is not adequate since GPS faced Non-Line-of-Sight (NLOS) and multipath effect. New technology integrated is needed to overcome the drawback of the current system for continuous positioning; particularly important for ITS application to be fully functional. This is the significant motivation for tremendous research works had been carried out to improve the performance of positioning. In this paper, advantages and disadvantages of the recent available positioning technologies being used in the implementation of ITS such as satellite-based positioning, network-based positioning and location integration of several positioning technologies is found to be able to improve accuracy, reliability, availability and applicability of the ITS.

INTRODUCTION

Increase in the use of private vehicles is a common phenomenon in developed and developing countries. The number of vehicles in the world is increasing from year to year [1]. The increase of average annual percentage of registration from 1960 to 2010 is only 2.3% [2], the guesstimate number of vehicle is around 12 million. The increase of number of vehicle around the world triggers concern and interest in road safety, ease of mobility and environment impacts. The direct impact can be seen through the increase of road accidents with high fatality rate. The alongside effect of road accidents generally associated with health service burden and claims as well as expenditure on repairing services on the crash damages and initiate liability to the national economy [3].

On the other hands, the increasing number of vehicles with lack of infrastructure development causes traffic congestion [4] and brings great challenges to transportation mobility and sustainability, causing a waste of time and fuel [5]. The increasing of fuel