Location Awareness: Potential Benefits and Risks

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Abstract. The development of the European Satellite Navigation System, Galileo, the modernisation of GPS, and the recent advances in High Sensitivity GNSS technology have opened up new horizons, leading to new location and context based applications. Nevertheless, these satellite based technologies may not always deliver the necessary navigation and positioning information in a number of difficult environments, as well as when there is accidental or intentional interference with the satellite signals.

Underground car parks and railway tunnels are two examples of difficult environments, where the reception of satellite signals is affected. Similarly, the malicious jamming of satellite signals near landing sites at airports, or the intentional or unintentional uploading of incorrect orbit predictions will render the satellite derived navigation and positioning information unusable. The risk of such interference may be low, but difficult environments are always present in a number of safety-critical transport applications, as well as in a variety of commercial location-based-services, involving the continuous tracking of goods or individuals.

This is when there is a requirement to combine satellite derived navigation and positioning data with other positioning technologies, such as inertial navigation, cellular telephone networks, such as GSM/GPRS, and Wireless Local Area Networks (WLAN). Clearly, the specific combination of a hybrid system will depend on the required accuracy, integrity and extent of geographical coverage of the corresponding application.

The wide variety of tracking applications, involving persons, vehicles, devices or merchandise, for safety, convenience, security, marketing and other purposes, presents multiple challenges, not only with respect to technology development and service provision, but also in terms of what is legally and ethically acceptable. Many of the proposed commercial applications would create few problems regarding general public acceptance. These include the tracking of motor vehicles for congestion monitoring, taxation and insurance purposes, and the tracking of vulnerable individuals, such as the very young or individuals suffering from a debilitating infirmity such as Alzheimer.

Some of these technologies could also be exploited not only by governments for national and internal security purposes, but also by criminals. Clearly, there is a fine boundary between what is ethically acceptable and what is not. Therefore, there is a need for raising public awareness of these issues and starting a debate involving the public at large as well the relevant government, legal and political institutions.

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