

11 Topical Issues (RKH)

A single-floor shopping centre wishes to locate the mobile phones of centre users without their explicit consent and without any modification to their handsets. To do so they deploy receivers throughout the centre to capture the registration messages each handset sends to remain registered on a mobile network.

For this question you should assume these registration messages are sent regularly and contain the handset identifier as a payload.

- (a) Discuss the applicability of the following positioning techniques to this system. Your answers should describe the principles of each technique and list any requirements on the receivers for each technique deemed applicable.
- (i) Time of Flight/Arrival (ToF/ToA); [3 marks]
 - (ii) Time Difference of Arrival (TDoA); [4 marks]
 - (iii) Angle of Arrival (AoA); [3 marks]
 - (iv) Received Signal Strength (RSS). [2 marks]
- (b) Describe a modification to the registration message that could be used by the mobile network to avoid a handset being tracked around the centre. [3 marks]
- (c) Some centre users are willing to consent to the tracking. Propose a system that can augment the location system to provide more accurate and robust tracking when using handset sensors and radios that are typically found on smartphones. Discuss the strengths and weaknesses of your approach with particular reference to practical issues. [5 marks]