Fig. 7 The on-road mode probability. The on/off-road transitions can be clearly seen around 25–30 s.

Fig. 8 The position state uncertainty (square root of trace of position covariance) for three pedestrians. The uncertainty on the roads is significantly lower. The peak for pedestrian 3 at around 28 s is due to the on-road to off-road transition, and the peak at around 34 s is due to occlusion.

5.2 Performance Evaluation with GPS ground truth

In this section a similar real data set to the one described above is used to evaluate the tracking performance for a single pedestrian by using the GPS trajectory of the pedestrian as ground truth. The MMPF pedestrian tracker with both on-road and an off-road models is compared with a standard off-road PF with no road network knowledge.