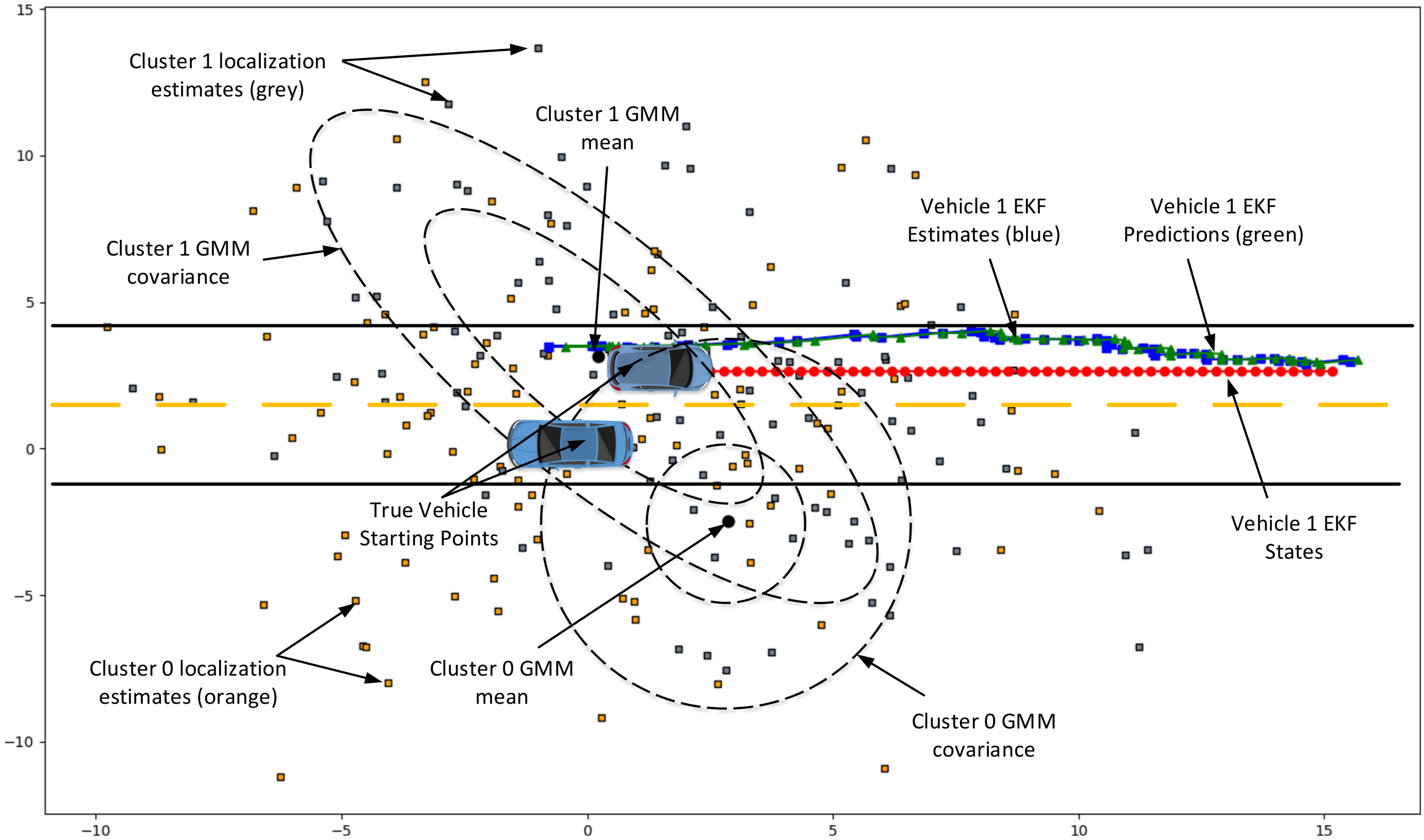
Machine Learning-Based Roadside Vehicular Traffic Localization via Opportunistic Wireless Sensing

Kyle W. McClintick, Mark Page, Thanuka Wickramarathne Alexander Wyglinski

WPI: Wireless Innovation Laboratory

{kwmcclintick,alexw}@wpi.edu, markpage@mitre.org, thanuka@uml.edu



If a set of signals of opportunity are isolated and localized using an arbitrary algorithm (RSS, TDOA, etc.), clustering algorithms can classify the increasing amount of wireless devices on vehicles and their operators to a particular vehicle. From there, lower variance Kalman Filter tracking can be performed on emitter cluster centroids.

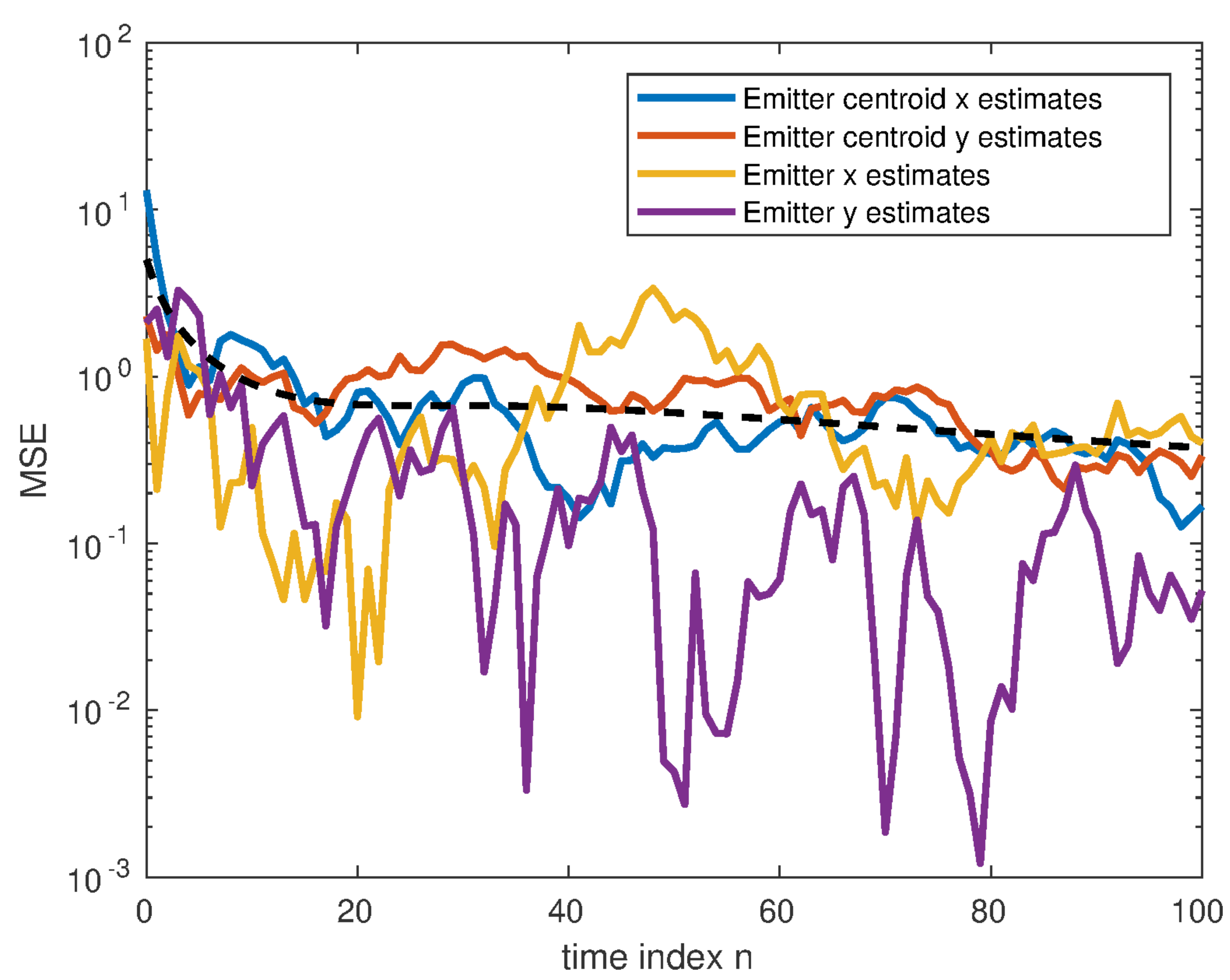


Figure 1: Kalman filter mean squared error for one emitter versus a cluster of emitters assuming 100% cluster classification accuracy. Localization observations with zero variance would follow the black dashed line.

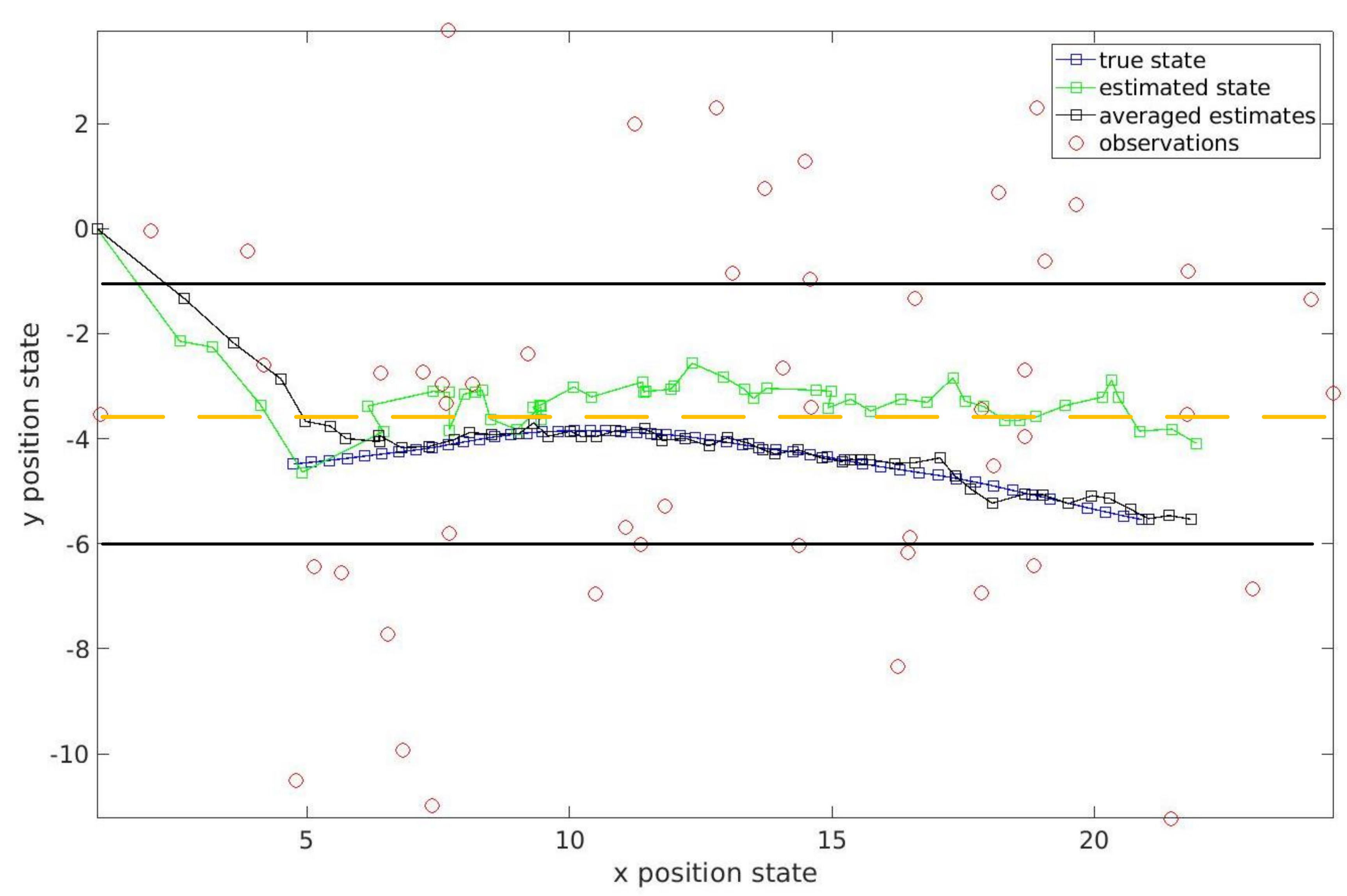


Figure 2: Tracking of a cluster of emitters versus tracking of a single on-board emitter assuming 100% cluster classification accuracy.

Wireless Innovation Laboratory

www.Wireless.WPI.edu