

Advanced Statistical Signal Processing for Next Generation Trajectory Prediction

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Abstract— Trajectory Prediction (TP) is fundamental in Air Traffic Management (ATM). This research focuses on TP for the execution phase of the flight. In contrast to exploit black-box machine learning-based solutions, we tackle TP as an estimation problem, resorting to mathematical tools arising from statistical signal processing. Our first goal is to find an optimal and robust 4D (3D space plus time) TP solution, and the real-time estimation of the aircraft's active guidance mode, observing flight data collected from Automatic Dependent Surveillance-Broadcast (ADS-B), and transponder selective mode (Mode S) transmissions. Notice that this work is at a very early stage and only preliminary results are available.