



## **PAWR Project Office**

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mmWave networks promise high bandwidth but face significant challenges in maintaining reliable connections for users moving at high speed. Frequent handovers, complex beam alignment, and signal blockage from car bodies lead to service interruptions and degraded performance. We present Wall-Street, a vehicle-mounted smart surface that enhances mmWave connectivity for in-vehicle users. Wall-Street improves mobility management by (1) steering outdoor mmWave signals into the vehicle for shared coverage and providing a single, collective handover for all users; (2) performing neighbor-cell search without interrupting data transfer, ensuring seamless handovers; and (3) connecting users to a new cell before disconnecting from the old cell for reliable cell transitions. We implemented and integrated Wall-Street into the COSMOS testbed. We collected PHY traces with multiple base station nodes and in-vehicle user nodes with a surface-mounted vehicle, driving on a nearby road. Our trace-driven ns-3 simulation demonstrates a throughput improvement of up to 78% and a latency reduction of up to 34% over the standard Standalone handover scheme.