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(54) **ATTACK DETECTION AND COUNTERMEASURES FOR AUTONOMOUS NAVIGATION**

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(57) **ABSTRACT**

Autonomous navigation cyber-attack detection and/or avoidance techniques include visual and inertial odometry (VIO) algorithms to provide a root-of-trust during navigation, VIO algorithms that cross-validate navigation parameters using IMU and visual data, and hardware-dependent attack survival mechanisms that support autonomous systems during an attack.

