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Adaptive Linear Holding Using Reinforcement Learning to Reduce Terminal Manoeuvring Area Delays and Holdings 1901
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Scripting Engine Design Approach for Avionics Systems 1911
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Agent-Based Modeling for Strategic Flight Delay Prediction in Multi-Layered Airport Network 1921
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Preparing for Potential Closure of European Airspaces Due to Re-Entering Space Objects 1950
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Are Vision-Language Foundation Models Able to Fly? 1957
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Overarching Properties-Based Arguments for the Safety Assurance of an Ai-Assisted Runway Alignment System 1964
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Achieving Completeness in Multicore Interference Channel Identification 1974
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Optimizing Data Coupling and Control Coupling in Multi-Core Avionic Software: A Case Study with Xilinx Ultrascale+ Processors 1984
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Development of a Low Cost AI-Capable Drone for Obstacle Avoidance: A Tutorial 1992
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