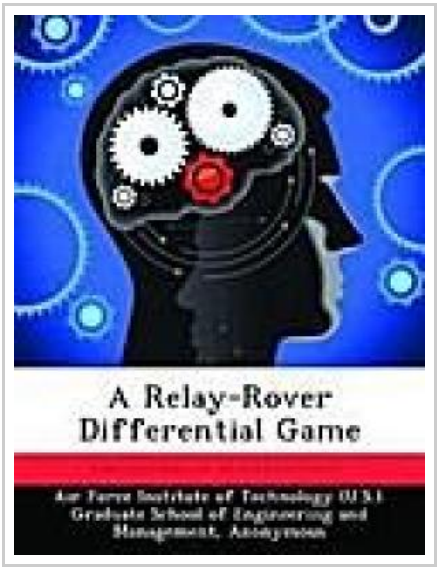

A Relay-Rover Differential Game

By Air Force Institute of Technology (U. S.). Graduate School of Engineering and Management

Bibliioscholar Sep 2012, 2012. Taschenbuch. Book Condition: Neu. 246x189x10 mm. This item is printed on demand - Print on Demand Neuware - Guidance laws are developed to optimally position a relay Micro-UAV (MAV) to provide an operator at the base with real-time Intelligence, Surveillance, and Reconnaissance (ISR) by relaying communication and video signals when the rover MAV performing the ISR mission is out of radio contact range with the base. The ISR system is comprised of two MAVs, the Relay and the Rover, and a Base. The Relay strives to minimize the radio frequency (RF) power required for maintaining communications, while the Rover performs the ISR mission, which may maximize the required RF power. The optimal control of the Relay MAV entails the solution of a differential game. Suboptimal solutions are also analyzed to gain insight into the solution of the differential game. One suboptimal approach investigated envisages the Rover to momentarily remain stationary and solves for the optimal path for the Relay to minimize the RF power requirement during the planning horizon. The one - sided optimal control problem is solved. Another suboptimal approach is based upon the geometry of the system: The midpoint between the Rover and the...

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