

## Flight Time Allocation for a Fleet of Aircraft through Reinforcement Learning

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Fighter aircraft are typically maintained periodically on the basis of cumulated usage hours. In a fleet of aircraft, the timing of the maintenance therefore depends on the allocation of flight time. A fleet with limited maintenance resources is faced with a design problem in assigning the aircraft to flight missions so that the overall amount of maintenance needs will not exceed the maintenance capacity. We consider the assignment of aircraft to flight missions as a Markov Decision Problem over a finite time horizon. The average availability of aircraft is taken as the optimization criterion. An efficient assignment policy is solved using a Reinforcement Learning technique called Q-learning. We compare the performance of the Q-learning algorithm to a set of heuristic assignment rules using problem instances that involve varying number of aircraft and types of periodic maintenance. Moreover, we consider the possibilities of practical implementation of the produced solutions.