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SCHEDULING PERIODIC MAINTENANCE OF AIRCRAFT THROUGH SIMULATION-BASED OPTIMIZATION

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Abstract: This paper presents a simulation-based optimization model for scheduling the periodic maintenance of a fleet of aircraft. The periodic maintenance activities in the Finnish Air Force are scheduled in advance to avoid congestion in maintenance facilities and possible degradation of aircraft availability. Construction of the schedule for a fleet of aircraft is both challenging and time-consuming due to complexity of the underlying maintenance organization. We introduce a combination of a discrete-event simulation model and a search method to aid in the scheduling task. The simulation is applied in the evaluation of the efficiency of maintenance schedules while the search method creates improved schedules based on the simulation results. The performance of genetic algorithms and simulated annealing as the search method are compared. The resulting simulation-optimization model reduces significantly the effort that is required in constructing and updating the maintenance schedules. It also enhances the Air Force's capability to maintain operational preparedness.

Keywords: simulation-based optimization, maintenance scheduling, aircraft