1023-49-1232 **Arnold Buss*** (abuss@nps.edu). *Assignment Scheduling Capability for UAVs—an Approximate Dynamic Programming Simulation Implementation to a Combinatorial Scheduling Problem.* Preliminary report.

Many military planning problems are difficult to solve using purely traditional mathematical techniques. One such problem is scheduling unmanned aerial vehicles (UAVs) in military operations subject to dynamic movement and control constraints. Because of the size of the problem (hundreds of UAVs and thousands of missions over a 15 day period), a multi-period integer program formulation proved unable to effectively represent the dynamics inherent in the problem. A dynamic programming formulation was able to more adequately address the problem features, but likewise proved to be impractical to solve to optimality. Instead, an approximate solution was obtained using the Assignment Scheduling Capability for UAVs (ASC-U) model, which incorporates concepts from both simulation and optimization. ASC-U exploits the relative strengths of both methodologies by periodically re-optimizing UAV assignments over a finite time window using a very simple optimization model. The simulation is responsible for modeling transitions according to state dynamics, including the problematic movement of entities. ASC-U thus exploits the strengths of simulation and optimization to construct good, timely solutions that neither optimization nor simulation could achieve alone. (Received September 25, 2006)