1116-90-1353 **Igor Mikolic-Torreira*** (imikolic@rand.org), RAND Corporation, 1200 South Hayes Street, Arlington, VA 22202, and **Ronald H Nickel** (nickelr@cna.org) and **Jon W Tolle**. *Computing Aviation Sparing Policies: Solving a Large Nonlinear Integer Program.*

Aircraft carriers stock a large number of spare parts to support the various types of aircraft embarked on the ship. The sparing policy determines the spares that will be stocked on the ship to keep the embarked aircraft ready to fly. The objective of this work is to find a minimum-cost sparing policy that meets the readiness requirements of the embarked aircraft. This is a very large, nonlinear, integer optimization problem. The cost function is piecewise linear and convex while the constraint mapping is highly nonlinear and non-convex. The distinguishing characteristics of this problem from an optimization viewpoint are that a large number of decision variables are required to be integer and that the nonlinear constraint functions are are very difficult (and expensive) to evaluate and their derivatives are not available. We employ a pattern search method to each iteration of an interior point-type algorithm to solve the relaxed version of the problem. From the solution found by the pattern search on each interior point iteration, we begin another pattern search on the integer lattice to find a good integer solution. (Received September 18, 2015)