Optimized Crew Scheduling at Air New Zealand

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The aircrew-scheduling problem consists of two important subproblems: the tours-of-duty planning problem to generate minimum-cost tours of duty (sequences of duty periods and rest periods) to cover all scheduled flights, and the rostering problem to assign tours of duty to individual crew members. Between 1986 and 1999, Air New Zealand staff and consultants in collaboration with the University of Auckland have developed eight application-specific optimization-based computer systems to solve all aspects of the tours-of-duty planning and rostering processes for Air New Zealand’s national and international operations. These systems have saved NZ$15,655,000 per year while providing crew rosters that better respect crew members’ preferences.

Commercial airlines must solve many resource-scheduling problems to ensure that aircraft and aircrews are available for all scheduled flights. Since aircraft and aircrews are among the most expensive of airline resources, their efficient utilization is important. Because of the large savings possible from using aircrews more efficiently, many airlines have tried to develop optimization methods to solve their crew-scheduling problems. Most early optimization attempts failed because of inadequate solution methods and lack of computer power. Even now many airlines still use heuristic or manual methods to solve crew-scheduling problems. Since the