

## **Differential Games Based Autonomous Rendez-vous for Aerial Refueling**

An integrated guidance law and auto-pilot for autonomous rendezvous towards aerial refueling using the probe-and-drogue system is presented. For the derivation the rendezvous problem is considered as a differential game in which the trailing aircraft's objective is to capture the drogue. A linear quadratic cost formulation is utilized in order to develop an optimal control expression for pursuer aircraft elevator, ailerons, and rudder control, as well as optimal evasive action. Optimal evasive action herein represents the worst-case drogue movement. Results of numerical simulations using a longitudinal lateral-directional flight dynamic model of a realistic aircraft are presented.