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Flow over a Modern Ram-Air Parachute Canopy[1] MOHAMMAD MOHAMMADI, HAMID JOHARI, California State University, Northridge — The flow field on the central section of a modern ram-air parachute canopy was examined numerically using a finite-volume flow solver coupled with the one equation Spalart-Allmaras turbulence model. Ram-air parachutes are used for guided air-drop applications, and the canopy resembles a wing with an open leading edge for inflation. The canopy surfaces were assumed to be impermeable and rigid. The flow field consisted of a vortex inside the leading edge opening which effectively closed off the canopy and diverted the flow around the leading edge. The flow experienced a rather bluff leading edge in contrast to the smooth leading of an airfoil, leading to a separation bubble on the lower lip of the canopy. The flow inside the canopy was stagnant beyond the halfway point. The section lift coefficient increased linearly with the angle of attack up to 8.5° and the lift curve slope was about 8% smaller than the baseline airfoil. The leading edge opening had a major effect on the drag prior to stall; the drag is at least twice the baseline airfoil drag. The minimum drag of the section occurs over the angle of attack range of $3^\circ - 7^\circ$.

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