Investigation of Falling Parachutes

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My aim was to investigate the relationship between the square root of a parachute's mass, the inverse of the square root of its area and its design with terminal velocity in order to assess the possibility of using drones and parachutes to deliver products. By design it is meant that circular holes of different radii were cut in the canopies' centers and second canopies, "hats", were attached to the original canopies, with radii big enough to cover their respective holes and further 5 cm. Additionally, I investigated if the parachute's area and mass would change the product of air density and the numerical drag coefficient, since it may also affect the terminal velocity. The methodology was to launch groups of parachutes at height and film. Results showed that there was a linear relationship between the square root of mass, the inverse of the square root of area and the terminal velocity. Also, as the mass increased, the product of air density and the drag coefficient decreased, what may be because bigger masses have more interference in the parachute's shape and/or there is a significant decrease in the crossectional area, as the attached masses increase. Regarding the design, the "hat" increased the parachute's efficiency leading to a smaller terminal velocity for the same original canopy area. Furthermore, the "hats" of biggest radii (covering the biggest holes) were more efficient in reducing the terminal velocity than the smaller "hats". I concluded that it is possible to deliver products in this way.