Increasing Wing Lift for Safer Landing

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The landing is the most difficult and important stage of the flight. It requires a suitable length of the runway and pilot's skill. The main idea of our project is to decrease the landing speed and thus to decrease the risks when landing. The lifting force of the wings exceeding the weight of the aircraft is necessary to ensure the flight. In case of the classic wing, the lift is a quadratic function of the airspeed, i.e. the plane will crash if the speed is lower than minimum. We studied factors influencing the lift, then designed, created and tested a model enabling to increase the lift during the flight thus decreasing the minimum airspeed. The lift increase was reached by embedding a rotating cylinder in the wing. We tested different models with cylinders of various size, position and rotating frequency, and found their optimum combination. As a result, we managed to increase the lifting force of the wing by 50 percent and thus to decrease the landing speed by 20 percent and shorten the landing run by one-fifth. The designed model can be used for unmanned aerial vehicles and aircrafts in areas with limited landing conditions, for example in mountainous terrain. In future, we believe such a model will allow creating a new type of aircrafts with speed characteristics of planes and landing advantages of helicopters.

Awards Won:
Fourth Award of $500
Arconic Foundation: Fourth Award of $1,000