



**CALIFORNIA STATE SCIENCE FAIR  
2010 PROJECT SUMMARY**

<b>Name(s)</b> <b>Ravi B. Patel</b>	<b>Project Number</b> <b>J0124</b>
<b>Project Title</b> <b>The Effect of Winglets on a Radio Controlled Plane</b>	
<b>Abstract</b> <b>Objectives/Goals</b> Since I was a young boy I have been interested in aviation. I have witnessed an increase in the use of winglets; airlines have been adding them to aircraft stating they increase stability and fuel efficiency. I wondered how winglets might affect the speed of a remote controlled aircraft under calm and turbulent conditions. Based upon my review of the literature and seeing winglets in nature such as in bald eagles, I hypothesized that winglets would help stabilize the flight of a remote controlled plane both under calm and turbulent conditions. <b>Methods/Materials</b> I purchased a battery powered Ember 2RTF remote controlled plane. This plane has wings without winglets. I cut two flat balsa wood pieces into the shape of winglets and attached the winglets to the leading edge of the wings of the remote controlled plane. I performed a series of test flights with the airplane attached to the ceiling of my house with fishing line. I tested the speed of the remote controlled plane more than 40 times. In all tests I used a fixed throttle setting, and tested the speed of the plane with and without winglets as it flew in circles under calm or turbulent conditions. Turbulent conditions were simulated using a fan blowing into the flight path of the remote controlled plane. <b>Results</b> I found that under calm conditions with or without winglets the plane flew at the same speed. Turbulence caused a significant decrease in the speed of the plane without winglets, but with the attached winglets, the plane flew the same speed whether under calm or turbulent conditions. <b>Conclusions/Discussion</b> According to my results, the addition of winglets to a remote controlled plane allows the plane to fly in a more stable manner and at a more constant speed. Some radio controlled plane designs include winglets, but they are so small they appear to be added for appearances only. I recommend that much larger winglets, such as the winglets I constructed, be tested and added to remote controlled planes to improve flight characteristics when planes are flown outdoors. This would give operators more control and perhaps avoid crashes and the loss of model airplanes.	
<b>Summary Statement</b> My project tested the effects of winglets on the speed and stability of a remote controlled plane under calm and turbulent conditions.	
<b>Help Received</b> Thanks to my father who supervised me and purchased the supplies I gathered for my experiment. Thanks to my science teacher for inspiring me and providing guidance. Thanks to my mother for encouraging me.	