SAE AERO DESIGN CONTEST

The SAE Aero Design Competition (Micro Class) challenges teams to design a remote-controlled aircraft that maximizes its payload fraction (PF). The PF is defined as: \( PF = \frac{\frac{\text{Payload}}{\text{Wt.}}}{\frac{\text{Wt.}}{\text{Wt.}}} \). Furthermore, the SAE scoring formula takes into account the payload fraction as well as the empty weight of the aircraft. The scoring formula is determined by: \( \text{Score} = 13 \left( \frac{\text{PF} \times \text{Wt.}}{\text{Wt.}} \right) \).

Due to this, there is an incentive to minimize the aircraft’s empty weight. The first step towards interpreting this data was to determine how the aircraft's empty weight affected the score. In other words, was it more advantageous to increase the payload capacity or to decrease the aircraft's empty weight? A scoring chart was produced to interpret the relationships between these two parameters (scores indicated by shades of green have proven to be successful in past SAE Competitions). This analysis shows that the score will improve more by removing ½ lb of empty weight versus increasing the payload by ½ lb.

The micro class airplane, and all contents needed to fly (including transmitter, batteries, etc.) must fit within a specified carrying case measuring 18" x 13" x 5.63" on the inside. A further requirement mandates that the entire model is assembled within 3-minutes by 2-people. These requirements were met by implementing simple modular elements that were able to deconstruct to fit within the case.

Further competition requirements include a 100-ft takeoff distance and a 200-ft touchdown zone. In addition to the flight scoring, the competition including an oral presentation and a technical design report. Although the flight component was unsuccessful, above-average scoring for the presentation and technical design report allowed the team to finish 4th out of 8 entrants in the Micro Class.