2008 SAE Aero Design Project

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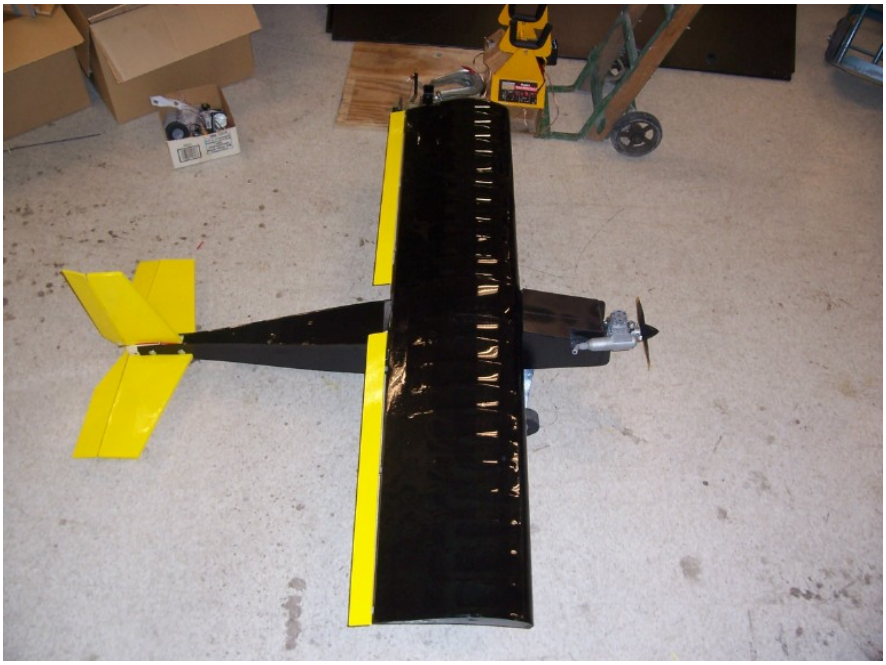
Objective:

The objective of this project was to design and build an R/C fixed wing aircraft, in accordance with SAE competition regulations, that could carry the most amount of weight in flight and be able to take-off on a grass runway. In order to achieve this, the team had to choose an airfoil with substantial lift capabilities. Once an airfoil had been chosen, the team then performed calculations to find how much weight the wing could lift and at what velocity the plane had to reach in order to fly. From there, the team designed a fuselage that was constructed of plywood which allowed the plane to be both

light in weight and durable. The size of the fuselage was determined by the required 5”x 5”x10” size of the payload bay. Calculations were done to find the proper sizing of the tail boom, the vertical and horizontal stabilizers, the rudder, elevator, and ailerons. A modified tail dragger landing gear was designed by the team in which the smaller rear wheel could be controlled in sync with the rudder for taxiing and take-off. This tail dragger design proved to be more stable and controllable when taking the plane off on a grass runway.

The team was able to make two flights with this airplane; one test flight before the spring furlough and the final flight before the final exam period. Due to hard work and determination the team was able to complete the plane before spring furlough which allowed for a test flight. The test flight proved that the plane could take-off on a grass runway while also revealing that proper balance of the plane is important. To be ready for the final flight, the team rebalanced the plane and added the payload bay for the weight. For the final flight, the team was able to utilize a professional R/C airplane pilot and was also able to take-off on a smooth dirt runway. The plane was able to take-off, fly several circles around the landing area, and land without damage. Due to the successful flight of the plane, the team was able to meet all SAE and VMI ME Dept. requirements for this project. The flight can be viewed at http://youtube.com/watch?v=GeE5dLLepRk or under VMI M.E. Senior Aero Design Project at Youtube.com.