

# SAE Aero Design

## Operations Manual

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## 1) Introduction

Thank you for selecting the 2016 NAU SAE radio controlled model. The airplane is designed to compete and win in the SAE Aero competition. Built by an NAU engineering capstone class, the aircraft features a construction made out of birch wood and ABS plastic, durable aluminum wing spar structure, powerful brushless motor, and a long lasting lithium-ion battery, the 2016 NAU SAE radio controlled model promises competitive performance and a durable aircraft!

## 2) Warnings and Safety Instructions

**Warning:** Be sure to read this section for your own safety.

**Caution:** Be sure to read this section to prevent accidents and damage to your model.

**Tip:** This section will help you maximize the performance of your model.

**Note:** This section will provide more detailed explanations.

**Caution:** The 2016 NAU SAE aircraft is a radio control model plane designed for advanced pilots over the age of 18. Improper operation or user negligence can lead to serious injury and/or property damage to yourself or other persons. NAU is not responsible for any damages or injuries caused by the user's negligence or improper operation of the model. Be sure to read the instruction manual thoroughly before flying.

**Caution:** Safety is of the utmost importance when flying any model aircraft. Always fly in such a way that you do not endanger yourself or others. Bear in mind that even the best RC systems are subject to outside interference. No matter how many years of accident-free flying you have, there is always the possibility of an unforeseen problem or error that can cause an accident. Make it your job to keep your models and your radio control system in perfect operating condition at all times. Check and observe the correct charging procedure for the batteries you are using.

**Before every flight, check that the wings and the tail panels are attached and firmly seated. Also check to make sure that each control surface is operating correctly.**

***Warning/Caution/Tip:***

- You should only fly at an official model airfield.
- Check that other pilots and spectators are positioned safely before flying your model.
- Wait for other pilots to land their models if they are flying already.
- Do not fly the plane behind yourself or others.
- Do not fly under the influence of alcohol or drugs or if you are feeling ill.
- Do not fly during thunderstorms or high wind.
- Do not fly in an area where people are gathered or near tall buildings.
- Do not fly near streets or where vehicles or trains pass by.
- Do not fly near explosive materials.
- Do not fly near power lines or transmission towers.
- Be sure to do pre-flight safety checks of the model before flying.
- Always remember that the pilot is responsible for any outcome that may occur during the flight

### **3) Features and Specifications**

#### **Features**

- Durable airframe covered with light weight Mono Kote
- Powerful AXI 5325/16 Gold Line brushless motor and 75 amp Castle Creations ESC/BEC gives the 2016 NAU SAE aircraft plenty of power to carry a maximum load and perform competitively in the SAE Aero Competition
- Extra high torque Spektrum servos
- Unique payload carrying design that suspends the payload off of the wing instead of attaching to the fuselage enabling the ability to have a light weight, non structural fuselage.
- High capacity lithium-ion battery providing plenty of power for optimal performance

## Specifications

<b>Wing</b>	
Airfoil	S1223
Chord	14"
Total Length	99"
<b>Fuselage</b>	
Length	50"
Width	5"
Height	~7"
<b>Vertical Stabilizers</b>	
Chord	14"
Height	10"
<b>Horizontal Stabilizers</b>	
Chord	14"
Length	36"
<b>Propeller</b>	
Diameter	18"
Pitch	12"
<b>Electronics</b>	
Motor	AXI 5325/16 GOLD LINE
Battery	Turnigy 5000mAh 6S 22.2V 20C LiPo, 12AWG EC3
ESC/BEC	Castle Creations Phoenix Edge 75
Receiver	AR610 6-Channel DSMX Aircraft Receiver (SPMAR610)
Servos	Extra High Torque Spektrum Servo (SPMS601H)

## 4) Preparing for Flight

### Speed Control Operation

The ESC is set for optimal performance during fabrication and should not be changed. Before connecting the battery, make sure the transmitter is turned on and the throttle is in the lowest (off) position. If the throttle is not in the lowest, off position, the speed control will not initialize. If this happens, you will need to disconnect the battery and repeat the initialization sequence.

## **Flying Your Plane**

Before taking off , perform a radio range check and make sure all your control surfaces are operating in the proper direction. During test flight, take off into the wind and climb to 50 feet to begin your trim out procedures. Once trimmed out, feel free to test the performance of the plane and become familiar with the flight characteristics of the aircraft. The 2016 NAU SAE aircraft is designed to carry a payload in excess of 30 lb for the SAE competition. It is recommended that during the first trial of the competition, 10 lb of payload should be loaded to establish initial flight performance with payload. In the following trials, load the aircraft at your own risk. NAU is not responsible for any damage that might occur due to overloading of the aircraft.



# **Have Fun and Fly Safe!!**