

## NEW EVENT! Inter - Varsity Aircraft Model Competition!

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Inter - Varsity Aircraft Model Competition at Swartkops Airforce Base in Oktober 2012



### Aeronautical Society of South Africa 2012 Aerospace Challenge

#### A Low Speed Flight Competition



## Introduction

The goal of the competition is to conceptualise, design, construct and fly a radio controlled model aircraft capable of taking off in as short a distance as possible and then fly as slowly as possible over a short course while carrying a pre-specified payload.

This challenge is aimed at two different groups of participants and is therefore divided into two parts. The **Inter-University Challenge** will include the requirement to present and be judged on the academic portion of the aircraft design. The **Open Challenge** will include only the take off and flight portion of the competition and entries are accepted from any aero-modellers.

This is intended to be a fun competition with the intention of encouraging interest in both aviation and aeronautics amongst all and entry is not limited to learners and students.

## General Rules

The competition is open to any teams consisting of up to **six** competitors.

A **maximum** of **three** models is allowed per team provided that they are all significantly different in geometry.

While anybody may enter as a team member, only a **SAMAA approved pilot** may fly the aircraft at the competition. The pilot should be one of the team members; however organiser-furnished pilots will be available to fly the aircraft for any team that requires assistance, if arranged before the competition.

Building assistance from members outside of the team is permitted.

The models will be scrutineered before the event for compliance with the model rules and specifications.

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Any team whose model does not comply with the rules will be allowed a single chance to modify the model for a final attempt to pass scrutineering.

Any model that is judged to be inherently unsafe to competitors or spectators may be disqualified.

The use of propellers that are not commercially available or in a manner for which they weren't intended may result in the aircraft being disqualified on safety grounds.

Remote control of the aircraft must be provided on a **SAMAA approved frequency** and with an approved transmitter.

Transmitters transmitting on 2.4GHz are encouraged. Radio equipment required is to be sourced by the teams. Any team not entering in the spirit of the competition may, at the judges' discretion, be disqualified.

## Model Rules and Specifications:

The model is required to demonstrate a safe take off and flight with a full **355 ml cool drink can** (organiser supplied) as its payload.

The model must be designed in such a way that the cool drink can **be added immediately before flight** without major disassembly of the aircraft being needed.

The maximum allowable **empty** aircraft mass is **2.5 kg** including any weights required to achieve balance for the aircraft.

The model aircraft power source is limited to a **3 cell Lithium Polymer (LiPo) battery** of sufficient capacity for the required tasks.

The maximum total current draw from the battery is **15 Amps** to be checked by the organiser via a clamp type ammeter.

The maximum span of the model is limited to **1500 mm** measured in a straight line at right angles to the fuselage in plan view from left wing tip to right wing tip.

There is no fuselage length limitation.

Any aircraft entered in the competition must be an **original design**; no major components from existing model aircraft such as wings, fuselage or tails are permitted. Use of standard model aircraft hardware such as engine mounts, control horns, and landing gear is allowed.

Designs are limited to **fixed-winged** aircraft configurations only, no rotary wing aircraft such as helicopters or autogyros or lighter-than-air systems will be allowed. The aircraft must fly largely on the aerodynamic effects of its wing(s).

The mass of the aircraft may not be altered during the take-off or flight phases.

Aircraft geometry changes (flaps, wing sweep etc.) are allowed providing it is brought about by remote control.

The fuselage, wing and tails may be constructed of any material.

The flight batteries may be recharged between attempts (a take-off and the slow speed level flight are defined as a single attempt).

Repairs to the models are permitted at all times during the competition but the allocated

times slots within which the teams are to fly will not be extended – bring super glue!

## Inter-University Challenge Specific Scoring

The university teams must produce an A1 sized poster for judging. This poster must cover the choice of **design concept** (with some structural analysis), **performance prediction** and **stability and control predictions**. The poster will be scored out of **100 points**.

This will be made up of the following:

Design concept 30 points

Performance prediction 30 points

Stability and control predictions 30 points

Poster layout and appeal 10 points

## Flight Scoring – all teams.

All teams are to demonstrate their aircraft's ability to take off in as short a distance as possible and then (in the same flight) to demonstrate controlled flight along an out-and-back course of 100 m each as slowly as possible without substantial height gain or loss or side to side weaving.

The time spent turning will not be taken into account i.e. there will be effectively two timed flights of 100m each.

A maximum of **three attempts** at the flight score will (time allowing) be permitted.

Any object falling from the aircraft during the take-off or flight will disqualify the attempt.

For all teams the take-off performance score will be calculated as follows:

$$1/25*(50 - \text{take off distance in metres})^2$$

For all teams the low speed flight performance score will be calculated as follows:

$$1/25*(50 - \text{flying speed in metres/sec})^2$$

These two scores will be combined to form a **flight score** for each attempt.

## Overall Scores

The Inter-University Challenge winners will be the team that has the highest **combined scores** for the design presentation and flight.

The highest flight scores per team will form the final score for the Open competition.

In the event of a tie, the affected teams will have to enter a winner-takes-all fly off.

## Venue

The event is planned to take place at the Swartkops Air Force Base on the 20<sup>th</sup> October 2012.

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