

Tuks wins AeSSA 2019 Aerospace Challenge

By John Monk

This year's Intervarsity flying competition, the AeSSA 2019 Aerospace Challenge, was again hosted by JOMAC at its relatively new model flying field on a day less windy than those of previous years but this year the competitors had to contend with temperatures in high 30s. Ten teams gathered to do battle, five from the University of the Witwatersrand (Wits) and five from the University of Pretoria (Tuks), with one team unable to make it to the competition on the day.

The rules of this year's competition were somewhat different from those of previous years. It was felt that the choice of pilot played too large a role in the team scores and also that there wasn't sufficient team involvement during the flying itself. So, the goal of this year's competition was to design a radio-controlled model aircraft to fly with the maximum number of tennis balls around a 300 m course in a five-minute period.

The challenge

A typical attempt would consist of the team members deciding how many tennis balls to load into their aircraft for each flight, based on the aircraft design, predicted performance, wind strength and direction and team tactics. At the start of the five minutes these tennis balls would be loaded into the aircraft, the model would take off and fly up and down a 150 m course and upon landing the tennis balls, would be off-loaded. The model would then be loaded again with a possibly different number of tennis balls as quickly as possible and its next flight started. This would continue until the five minutes are completed. A score for a partially completed flight was given.



The contesting teams

The results of the individual teams are as follows:

	Team name	University	Round 1 Points	Score	Round 2 Points	Score	Round 3 Points	Score	Total Score (best 2/3)	Position
1	The Whispering Wings	TUKS	8+8+8/2	20	8+8+8/2	20	8+8+8/2	20	40	1
2	Ballsy	WITS	6+8/2	10	8+10	18	12+12/2	18	36	2
3	Wing It	TUKS	5+5+5	15	5+5+5	15	-	0	30	3
4	Candy 5	WITS	6	6	6	6	6+6	12	18	5
5	We've got balls	TUKS	6	6	6+6	12	6+6+6/2	15	27	4 tie
6	The Dolphin	WITS	6	6	-	0	3	3	9	7
7	The Lightweights	TUKS	3+3/2	4.5	-	0	-	0	4.5	9
8	Something Else	WITS	2+1+3	6	2	2	-	0	8	8
9	The Right Brothers	TUKS	3+3+3	9	4	4	-	0	13	6
10	The Expendaballs	WITS	6+6+6	18	9	9	-	0	27	4 tie

The winning university is the one with the highest score from its top three teams.

TUKS	97	1st
WITS	81	2nd

The winning university for 2019 was Tuks with 97 points with Wits close behind on 81.



The winners take it all: Tuks teams with Barbara Huyssen spraying the champagne

Description of the models and how successful they were

The winning team, the *Whispering Wings* utilised a rather nifty balls-in-tube modular concept. They flew very consistently but just couldn't get through three complete flights with eight balls at a time. Their successful flight early in the competition seemed to provide the impetus that other teams needed to take more chances and load more tennis balls.



Tuks team Whispering Wings

Wits team *Ballsy* started a little conservatively but increased their payload with every flight and in a brave attempt to take the number one slot in round 3, attached 12 balls to the wing's lower surface holding mechanism and were on track to win overall. In an effort to complete a third flight in round three, the plane was landed before crossing out of the course, meaning that only half the points could be awarded. Then, with a dying battery, *Team Ballsy* was unable to take off for a final flight.



Wits team Ballsy

The Tuks team *Wing It* flew very consistently and made for a very solid third place while unlucky to crash out on the last round.

The Wits team *Expendaballs* and the Tuks team *We've got balls* tied for fourth place. The Tuks team improving with each flight starting at six balls for round 1, 12 for round 2 and then for round three with a dying battery, the Tuks managed two flights with six balls. The Tuks team earned another three points for having the plane fly into the course but completed the remaining half of the course, through one of the team members sprinting with the aircraft in hand (pointing in the direction of flight) down the course with only 30 or so seconds in hand. He reached the end of the course much to the delight of his team mates to claim half points thereby exploiting the wording of the rules - with the prior approval of the judges.

The next team was awarded fifth place after the tied fourth place teams in the interest of a good story. Wits' *Candy* series of aircraft have been regularly entered for a number of years and the aircraft has showed amazing consistency over this time with Wits placing 2nd with Candy 1, 1st with Candy 2, 3rd with Candy 3, 4th with Candy 4 and was now given a 5th place with Candy 5. Rumour has it that they will not be naming the next plane Candy 6!

The *Dolphins* had a very solid looking airframe and followed a consistent approach but paid the price for being too cautious with the number of tennis balls that could have carried. Some technical issues cost them what could have been a much higher score.

The *Lightweights* had some electric motor issues and despite having possibly the most passionate (i.e. loudest!) team member doing all he could to solve the problem, it could not be solved in time.

This year Jon Hancock and his colleagues from JOMAC arranged an amazing event with food and drinks available throughout the day, a PA system for flight announcements and a number of breaks in the competition to allow for some repairs and for demonstration flying. This included a demonstration of large-scale 3D flying and a demonstration of the latest blood delivery UAV by the South African National Blood Service.



The winning team from Tuks Whispering Wings

During the day the winds were quite variable typically blowing up, down and across the runway at times which did have some effect on the results.

Good outcomes

Overall there was a great deal more team member involvement this year than in previous years, which achieved the aim of the new rules.

Once again it seems that the Aeronautical Society of South Africa Aerospace Challenge was quite successful with a large turnout of teams and supporters and an improved team involvement due to the new rules. Thanks again to our hosts Jon Hancock of JOMAC for making this a very successful event.