

Smart Drones

Challenge Booklet 2027

Partner:

Organised by:

Supported by:

SAFMC 2027 CAT SMART DRONES CHALLENGE BOOKLET CHANGE LOG

Version	Release Date	Description

SAFMC 2027 COMPETITION SCHEDULE

Category	Date	Remarks
PRIMARY (Presentation + Challenge)		
SECONDARY (Presentation)		
SECONDARY (Challenge)		
Awards Presentation Ceremony		

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1. INTRODUCTION

Competition schedule, General Rules and Regulations can be found in the “General Rules and Regulations” Booklet.

For Category SMART DRONES [1], teams made up of TWO (2) to FOUR (4) members are expected to work together to code their programmable drone to perform tasks under given mission scenarios.

2. CATEGORY AWARDS

Award winners will be selected based on either presentation scores, performance on the competition’s challenge day, or a combination of both.

There is no limit to the number of awards that a team can win, but there may not be a winner for every award.

All scoring decisions made by the judges are **final**. For cases that require arbitration, the Singapore Amazing Flying Machine Competition (SAFMC) organising committee will have the **final** say.

The list of awards for Smart Drone Category is listed in the subsequent sections.

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[1] Each team must include at least one Singapore Citizen to be eligible to participate

2.1. CHAMPIONSHIP AWARD

Award	Weightage
Presentation	40%
Challenge Performance	60%
Total	100%

This is the pinnacle award that any team can win. It is bestowed on the team that embodies the spirit of SAFMC. Teams are considered for the Championship Award based on their excellent overall performance during the presentation and actual challenge.

The following are the main categories for SMART DRONES 2027:

Main Categories	Sub-categories	Level
Smart Drones – Beginner	- Eagle Drone 1003 - DJI Tello Edu / Tello Talent	Primary
Smart Drones – Intermediate	- Eagle Drone 1003 - DJI Tello Edu / Tello Talent	Secondary / Integrated Programme (Year 1 to 4)

2.2. THE BEST PRESENTATION AND KNOWLEDGE AWARD

The presentation plays an integral part for teams who wish to compete for the SAFMC Championship Award. In addition, the teams will be assessed for different awards listed in Section 2.

The theme of this year's Smart Drone is **Drone: For Future Communities.** Teams should show how drones can **help create better communities for the future**. Think about how drones could solve a real-world problem or improve the way we **live, learn, work, move, connect or care for our environment.**

Your idea can be used **anywhere or in any area** — from healthcare and transport to the environment, emergency response, food, recreation and more.

The judging criteria for the presentation are as follows:

Award	Areas of consideration
Presentation *(Focus on the **theme** "Drone: For Future Communities")*	• **Innovative idea:** Show a creative way drones can solve real problems. • **Integration:** Explain how drone technology fits into daily life or community systems. • **Positive impact**: Highlight how drones improve safety, efficiency, or quality of life for people. • **Source of information** What references or research did your team use to support your solutions? • **Awareness of real-world and STEM Concepts** How does your solution reflect an understanding of real-world challenges and STEM principles?
Knowledge *(Focus on the **technical challenges** they faced during the competition and how they were addressed.)*	• **Problems / Applications identification and analysis:** What technical challenges did your team encounter during preparation, and how did you address them? • **Drone fundamental** Demonstrate your understanding of how the drone works, including its flight mechanics and onboard sensors. • **Clarity in explanation and reflection**

2.3. THE BEST PERFORMANCE AWARD

Scores shall be awarded to the team based on the sum of all points allocated to tasks completed by the flying machine during the flying mission.

There are TWO (2) attempts ONLY for the flying mission and the best score among the two attempts shall be taken as the final score. The
time taken for each attempt to complete all the tasks will be taken into consideration if there is a tie-in score. Each attempt is allocated Five (5) minutes.

Tasks and challenges for the finals will be made known on the day of the challenge itself.

Only one coding device is allowed during attempts. NO exchanging of identical smart drones and coding device is allowed during the attempt.

3. PRIZES

	Award & Rank	Medal	Trophy	Cash Prize Amount	REMARKS
Championship Award	Championship Award	✓	✓	$400	1st and 2nd Runner up will receive **only** Medals.
	1st Runner Up	✓		$200	
	2nd Runner Up	✓		$100	
Best Presentation	Best Presentation	✓	✓	$100	
	1st Runner Up	✓			
	2nd Runner Up	✓			
Best Knowledge	Best Knowledge	✓	✓	$100	
	1st Runner Up	✓			
	2nd Runner Up	✓			
Best Performance	Best Performance	✓	✓	$100	
	1st Runner Up	✓			
	2nd Runner Up	✓			

4. SAMPLE CATEGORY MISSION

4.1. Playfield

- The size of the playfield is five (5) by five (5) meters.
- Maximum flying height of the playfield is 240cm.

- Gap between grids is approximately 20cm to 30cm
- Participants are allowed to bring measuring tools

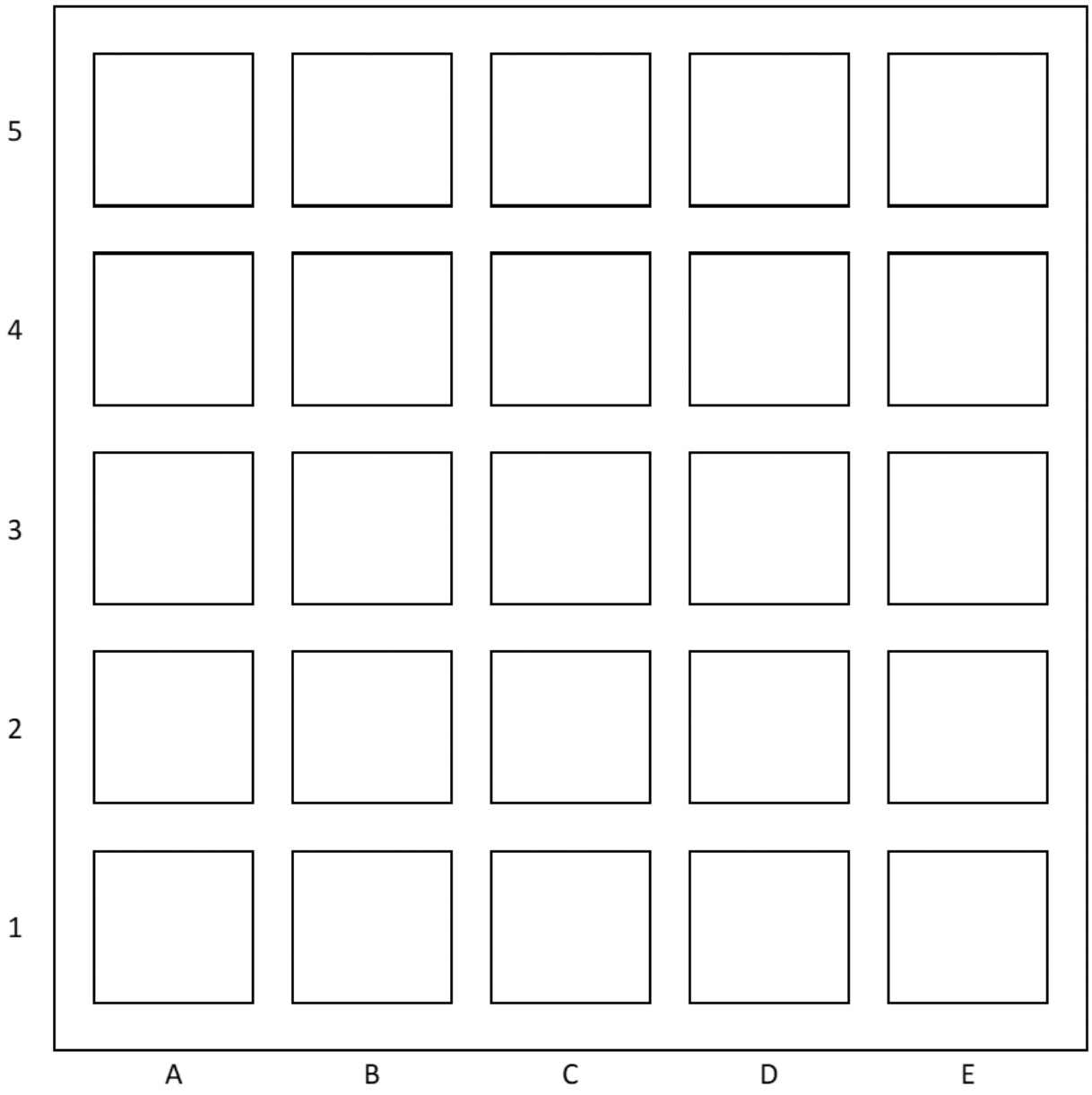


Figure 1: Playfield

4.2. Obstacle

- The size of the obstacle approximately is 60cm (B) x 60cm (L) x 80cm (H)
- Obstacles can be stacked on top of another obstacle.
- Maximum height of obstacle is 240cm.

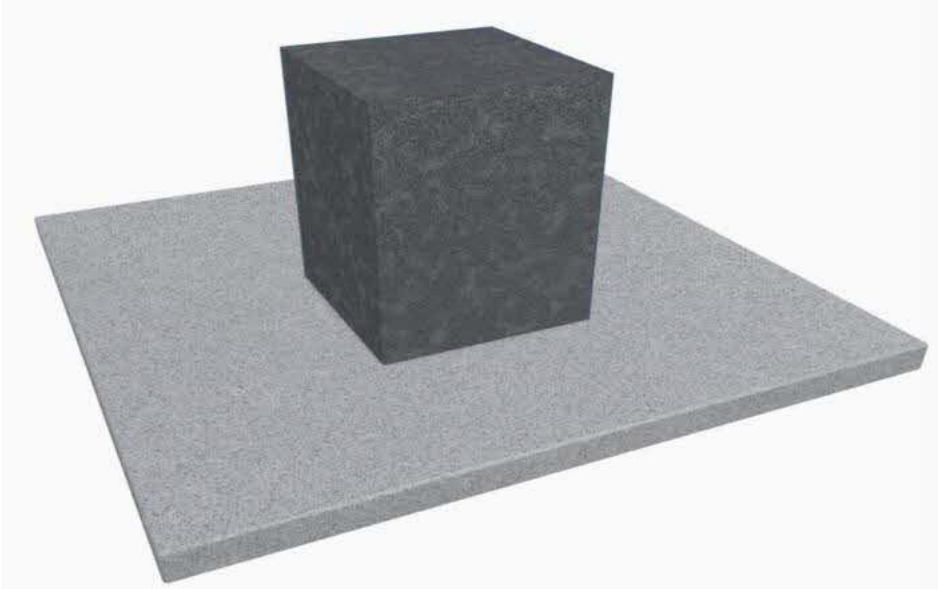
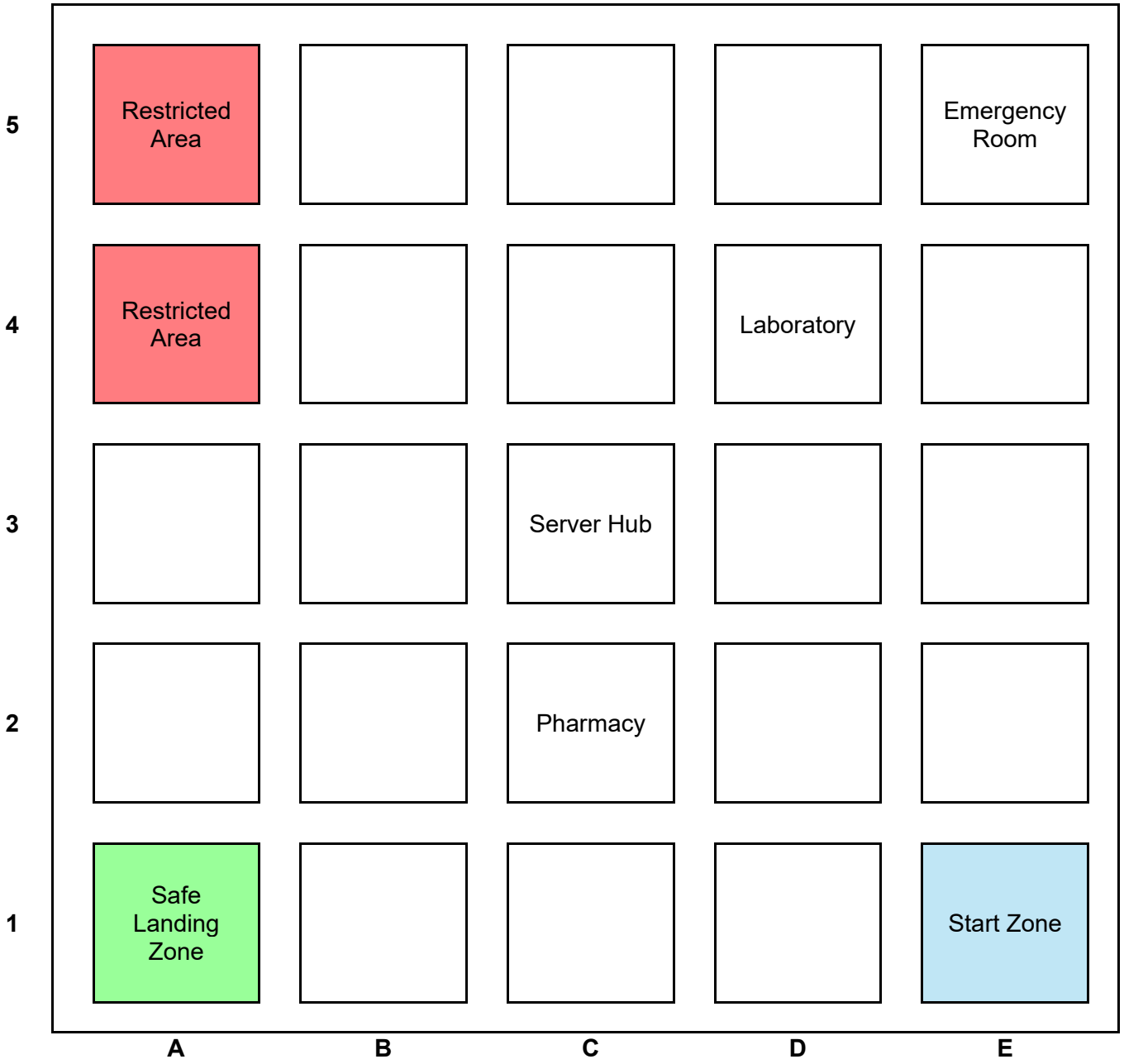


Figure 2: Obstacle

5. MISSION

5.1. Smart Drone: Eagle drone & DJI Tello Sample Playfield



Note: *This is a sample playfield. The actual location of the items will be announced on the competition day.*

Mission Reset Rule: Teams are allowed to place their drone at the Start Zone to reset their missions, or they may continue their mission from the last landing position.

Challenge	Task Description	Points
Emergency Response	Take off from Start Zone, fly to Emergency Room (E5) and hover for 5 seconds to simulate pickup	15
	Fly to Laboratory (D4) and hover for 5 seconds	15
	Land safely at the Lab to simulate delivery	20
	Maximum	**50**
Connectivity Restoration	Fly to Server Hub (C3) and record height data to simulate signal strength (if unable to record height, hover for 5 seconds — award 5 pts only)	15
	Fly to Pharmacy (C2) and record height data to simulate signal strength (if unable to record height, hover for 5 seconds — award 5 pts only)	15
	Fly to Emergency Room (E5), record height data to simulate signal strength, then return and land at the Starting Zone (if unable to record height, hover for 5 seconds — award 10 pts only)	20
	Maximum	**50 / 20**
Medical Supply Delivery	Fly to Pharmacy (C2) and record height data to simulate pickup of medical supplies (if unable to record height, hover for 5 seconds — award 5 pts only)	15
	Deliver capsule to Laboratory (D4) and record height data to simulate delivery confirmation (if unable to record height, hover for 5 seconds — award 5 pts only)	15
	Deliver capsule to Emergency Room (E5), record height data, then return and land at the Starting Zone (if unable to record height, hover for 5 seconds — award 10 pts only)	20
	Maximum	**50 / 20**
Hazard Patrol	Take off from Start Zone, fly to Restricted Area (A5), hover for 5 seconds, and perform a yaw 360° rotation to simulate perimeter scan	15
	Continue flying to Restricted Area (A4), hover for another 5 seconds, and perform a yaw 360° rotation to confirm patrol	15
	Fly to Safe Landing Zone (A1) and land safely	20
	Maximum	**50**
Restricted Zone Orbit Inspection (Secondary Schools Only)	Take off from Start Zone, fly to the perimeter of one Restricted Zone (e.g., A5 or A4), and perform a full orbit around the zone while maintaining yaw orientation so the drone's front continuously faces the zone throughout the maneuver	30
	After completing the orbit, fly to the Safe Landing Zone (A1) and land safely	20
	Maximum	**50**

5.2. Smart Drone: Scoring Rubrics

For the Smart Drones Beginner Category (Primary schools).
Teams must choose any three missions. Each mission has a maximum of 50 points. Teams are given only two attempts for the whole competition. Within each attempt, they may retry missions to improve their score, but only the best score per mission counts (no accumulation).

For the Smart Drones Intermediate Category (Secondary schools / IP Year 1–4).
Teams must complete any four missions. Each mission has a maximum of 50 points. Teams are given only two attempts for the whole competition. Within each attempt, they may retry missions to improve their score, but only the best score per mission counts (no accumulation).

5.3. Dispute Policy

To ensure fairness and consistency:

- **Final referee decisions:** All scoring, safety, and rule enforcement decisions are final and binding.
- **No appeals:** Appeals, disputes, or negotiations will not be entertained during or after the competition.
- **Uniform scoring:** Scoring will be applied uniformly across all teams according to the published rubric.
- **Accuracy & verification:** Scores will be entered into the official scoring sheet by judges and verified before being shared with teams.

By participating, teams agree to abide by these rules and accept all referee decisions as final

6. FLOW OF EVENTS

6.1. PRESENTATION

6.1.1. PRIMARY CATEGORY

On the scheduled competition day, teams shall report at the designated registration area as stated in the confirmation email, 15 minutes before their designated timeslot. Teams will be guided by the SAFMC usher to their respective areas upon reporting.

Teams will present their presentation to a panel of judges.

1. Upon registration, the team shall be ushered to the presentation holding area.
2. Every team shall be ushered to the respective room for their presentation. The team shall bring their own laptop or tablet to showcase their presentation.

3. Each team will have five (5) minutes for their presentation followed by two (2) minutes for Q&A session.
4. After the completion of the presentation, the team shall proceed to the inspection station

6.1.2. SECONDARY CATEGORY

Teams are required to deliver their presentation in-person to the assigned judges on the presentation day. Teams are expected to be present for the entire afternoon session. All teams must participate in the Presentation Segment to receive a score for the presentation component of the competition.

1. **Reporting Details:**
   Reporting timing will be provided during the QnA session at a later date.

2. **Presentation booth:**
   Each team will be allocated a booth within the hall. The exact booth dimensions and specifications will be provided during the Q&A clinic session at a later date.

3. **Presentation Booth Set-Up**
   Teams will be given one (1) hour to set up their presentation booth on the presentation day. Presentation judging will commence after the stipulated set-up time. Teams are required to complete their booth set-up before judging begins.

4. **Power Supply**
   Each booth will be provided with one (1) two-gang power socket, allowing teams to connect up to two (2) electrical devices at any one time.

   For electrical and fire safety reasons, teams are strictly prohibited from connecting additional multi-plugs, power strips, or any other forms of electrical extensions.
   Please note that failure to comply with this requirement will result in disqualification.

5. **Presentation and Judging**
   Judges will visit each team's booth individually. Each team will be allocated a maximum of ten (10) minutes per visiting judge, comprising:
   - Five (5) minutes for the team presentation; and
   - Two (2) minutes for Questions and Answers (Q&A).

Upon completion of each presentation and Q&A session, the visiting judge will award the team **ONE (1) completion stamp** to indicate that the session has been completed. The Presentation Segment will be considered complete only after the **team has collected ONE (1) completion stamp from each judge assigned to evaluate the team**.

Please note that failure to obtain all completion stamps will result in a zero score for the Presentation Segment.

Please refer to Section 2.2 for the scoring criteria for the Presentation Segment.

6. **Presentation Requirements**

During the Presentation Segment, teams are required to:

- Bring the aerial platform used during the Challenge to showcase to the judges.
- Prepare one (1) presentation in the form of up to two (2) A0 posters or up to ten (10) slides. The time limit for the presentation is five (5) minutes.
- Teams may bring their own external monitor(s) for the presentation, provided that the setup is deemed logistically feasible and does not pose any safety concerns.

6.2. CHALLENGE SEGMENT

KEY RULES TO NOTE

Rules for personnel movement and communication during the setup time and the challenge attempt are dictated in the following points:

1. Only two (2) members of the participating team are allowed to be inside the playfield at any one time.
2. NO outside communication or assistance from the audience/spectators is allowed at any point. No headphones or earpieces are allowed to be worn by the operator/pilot. Communication among teammates is allowed. Teams who flout this rule may be removed from the competition.
3. During the recovery of the smart drone, the referee may follow the assistant into the playfield to observe the safety of the assistant.
4. The other teammates are required to remain outside of the playfield and be behind the safety net when the aircraft is airborne.
5. **For safety reasons, all personnel must remain outside the playfield at all times whenever any drone propellers are spinning within the playfield. No exceptions will be made to this requirement**
6. The team are responsible for the safe flying of their flying machine(s) for the duration of the entire competition. The referees reserve the right to ground the smart drone(s) of any team at any point in the competition.
7. All repairs/ maintenance/ troubleshooting should be done in the Repair Area. The teams who flout this rule may be removed from the competition.

7. TECHNICAL RULES & REGULATIONS

1. Each team is to use the drone stated for the category.
2. Teams are allowed to use any block-based and text-based programming software.
3. The use of any external navigation station is strictly prohibited.
4. There is no limit on the number of batteries used.
5. No remote controller is allowed

8. GENERAL RULES & REGULATIONS

1. Each member can only participate in one team within their eligible category.

2. Members and immediate family members of the SAFMC organising committee are not allowed to participate in the competition.
3. The organisers reserve the right to amend the rules and regulations. In the event of any change, all teams will be informed at least TWO (2) weeks prior to the start of the competition.
4. Prizes will be awarded to the designated recipient(s), as stated in the registration form.
5. The organisers of SAFMC will not be held responsible for any damage to, or the loss of, any drone(s) and associated equipment throughout the entire competition.
6. All participants will be held responsible for the safe flying of their drone(s) throughout the entire competition. The organisers reserve the right to ground the flying machine(s) of any team.