Balloon Museum Pod Racing Rules

1. **Individual and Recreational Class Purpose:**
   1.1. Have fun with our fast awesome toys! The best dang race series in the world.
   1.2. Individual -- Competition against all skill levels concluding with competition against pilots of similar skill. The fun of racing while striving to push your limits, improve your speed and increase your skills. Resulting in proud representation of BMPR as we go out and race at other venues with other groups.
   1.3. Recreational -- The place to learn to fly and race, learn your quad and equipment. This is where you complete your 1st official racing lap ever. Ask questions of the more experienced pilots, check out their gear, get their advice. Learn the ropes of attending a race event (setting and changing channels, gear preparation, and how to learn courses)

2. **Standard Rules**
   2.1. Safety and Liability
      2.1.1. All pilots will have an active AMA membership at minimum 'Park Pilot' level
      2.1.2. All craft will have operational failsafe capability
         2.1.2.1. All pilots may be asked to demonstrate working failsafe capability on-demand by race control or balloon museum staff
      2.1.3. All pilots will be present for safety briefings prior to flying
         2.1.3.1. Pilots arriving after pilot briefing will require a separate briefing before flying
      2.1.4. All pilots must remain within flight area (and follow commands to return to designated safe landing zones)
         2.1.4.1. The command **"*all pilots land now*"** will be reserved as a make-safe command. Anybody present may issue this command if an unsafe condition is present requiring all pilots to land immediately
   2.2. General Rules
      2.2.1. All models must utilize a maximum of 25mW power for 5.8GHz video signals
         2.2.1.1. Default channel allocations will use Raceband channels
         2.2.1.2. Planned channel allocations will include Raceband 2/3/4 / 5/6/7/8
         2.2.1.3. R2: 5695 / R3: 5732 / R5: 5806 / R6: 5843 / R7: 5880 / R8: 5917
         2.2.1.4. EVEN Raceband Channels (2/4/6/8) will use RHCP Antennas
         2.2.1.5. ODD Raceband Channels (1/3/5/7) will use LHCP Antennas
      2.2.2. All transmitters operating in 900MHz ISM band must utilize a maximum of 100mW power
      2.2.3. All other transmitter, receiver, or transceivers must operate within ISM band compliance

2.2.4. Models with video transmitters may NOT be plugged in without approval from flight line and/or race director

2.2.4.1. This includes the pit area inside the balloon museum

2.2.4.2. Designated times for video channel changing will be provided as required throughout the race day

2.2.5. Craft may only be launched from designated flight areas

2.2.6. All pilots launched for a specific heat shall attempt to follow the course specified for that heat unless otherwise specified by race director

2.2.6.1. This is to minimize possibility of mid-air collisions due to interfering courses

3. Expectations

3.1. It is the responsibility of each individual pilot to be ready for each practice, qualifying, or race heat to maximize available flying time for all participants

3.1.1. This means craft, batteries, and ground equipment are verified to be operational and in-position within **two minutes** of call for 'pilots to the line'

3.1.2. Any pilot failing to meet readiness for a heat will be excluded unless granted an exception at the discretion of race control

3.1.3. A *one-time per-pilot* additional *two-minute* extension may be granted for technical reasons only discoverable after plugging in, provided the pilot promptly alerts race control upon discovery of a technical issue. Only one extension per pilot is allowed, and a strict four-minute limit will be applied in each instance.

3.2. The designated flight line is to have only pilots actively flying and their equipment unless otherwise expressly permitted by race director and balloon museum staff

3.2.1. During heat change-over, free flying, or practice this rule may be relaxed

3.2.2. During race heats, pilots must remove all equipment if not actively flying (excluding pre-approved exceptions from race control)

3.3. While race director and race organizing committee will make every available effort to release simulator and renderings of track design, the final track layout and sequence of 'gates' remains subject to change

3.3.1. Changes to race courses after practice day are at the discretion of the race director and organizing committee. The primary drivers for change are safety concerns, timing system performance, and minimization of mid-air collisions

4. Race Formats

4.1. Qualifying to a single "Trophy heat"

4.1.1. Individual (Racer) Class

4.1.1.1. 1st Qual Session (morning) random seeding of pilots (or order of arrival)

4.1.1.2. 2nd Qual Session (afternoon) reseeded to match similar skill pilots

4.1.1.3. Qualifying heats are 3 laps or as far as you can go within time limit Time & lap count will be recorded and used for 2nd session seeding and entry to main

4.1.1.4. Single main to be run as event conclusion (4 pilots primarily, more only if determined prior to event start)

4.1.2. Recreational Class

4.1.2.1. Random seeding of pilots (or order of arrival)

4.1.2.2. 2nd session seeding can change to match skill levels depending on amount of pilots and desire of pilots

4.2. *Qualifying to elimination bracket (draft in work)*

4.3. *Rounds scoring points to determine main (draft in work)*

4.4. *Set time - lap count (draft in work)*

4.5. *Series scoring (draft in work)*

5. Race Scoring

5.1. For qualifying, RF timing system will be implemented, with seeding according to the following rules:

5.1.1. Fixed Lap Count: Pilot order in ascending time to complete specified number of laps. Pilots completing fewer laps will be scored similarly in a recursive (n-1) number of laps fashion

5.1.2. Fixed Time Qualifying: Pilot order in descending number of laps completed in specified time cutoff, subsequently ranked by fastest completion of each number of total laps completed

5.2. For racing heats, finishing order will be used as determined by RF timing system AND available spotters

5.2.1. RF Timing will be used by default, unless erroneous function has been positively indicated by spotter or through DVR review

5.2.2. If operational for all applicable tiebreaker scenarios, ties in scoring will be broken by best recorded performance as determined by the qualifying method used in the race by RF timing

5.2.3. If timing system is inoperable at any point during head to head racing, tiebreaker determination will fall back to qualifying seeding

5.3. For instances where the outcome of the race scoring is locked for the purposes of advancement to subsequent 'main' races, those heat races will not be ran

5.3.1. In instances where a finishing order for a heat would produce a tiebreaker scenario, the tiebreaker determination prior to running that heat may be used at the discretion of the race director If status quo of tiebreaker means no additional heats are required (i.e. in a situation where a pilot trailing in points that would need to score maximum points to achieve a tie with the leading pilot(s) AND set a faster tiebreaking performance to advance, the closing heat race will not be ran in order to save time)

5.4. Scoring for multiple heat race 'mains' will consist of:

5.4.1. 4-pilot heats: 5pts for 1st place, 3pts for 2nd place, 2pts for 3rd place, and 1pt for 4th place.

5.4.2. 6-pilot heats: 10pts for 1st place, 7 pts for 2nd place, 5pts for 3rd place, 3pts for 4th place, 2pts for 6th place, and 1pt for 6th place.

5.4.3. 8-pilot heats scoring: 15-10-7-5-3-2-1-0

6. Race Rules

6.1. Heats - Practice or Qualifying

6.1.1. Race director will verify needed people in flight area, pilots, spotters, etc

6.1.2. Race director will verify good video prior to start (thumbs up)

6.1.3. All starts will be automated (computer generated, LiveTime, etc) if possible

6.1.3.1. Verbal command of 'Pilots Spool Up' or 'Pilots arm your quads' to be followed by automated start tones

6.1.4. Hole Shot Rule - All racers must make it through the 1st (or start/finish) gate or the race will be restarted. Contact before the 1st gate resulting in a crash (even if all the racers make it through) will cause a restart.

6.1.5. False Start - If a racer launches or falls off the launch pad inadvertently during the arming period and before the tone, 1 warning be issued, the race will be restarted, and on the second offense by the same pilot that pilot will have that heat disqualified. A pilot will be given 1 warning during qualifying and 1 warning during brackets. The first pilot to commit a false start will be the pilot that is given the warning/penalty.

6.1.6. All obstacles must be successfully navigated in the proper order for a lap/time to count. If an obstacle is missed, the pilot must turn around, go back and successfully navigate the obstacle.

6.1.7. The heat ends when all racers have completed the required number of laps or have crashed out or time has expired

6.1.8. At the conclusion of a heat, the results will be recorded for seeding and/or determining overall event results.

6.2. Mains

6.2.1. Rules pertaining to practice/qualifying heats for setup, starts, and navigation of laps all apply

6.2.2. Heats are concluded when the result of the heat is fixed (i.e. all but the last pilot still in the air has finished or crashed out, and finishing order can no longer change)

6.2.3. At the conclusion of the heat, results will be recorded and points (if applicable) used to determine overall event results.

7. Night racing rules addendum:
    7.1.   Required equipment:
        7.1.1.   All quads will have lighting visible from all sides when in flight
            7.1.1.1.   Recommend a minimum of five LED panels, each on different surfaces of the quad
            7.1.1.2.   Illuminated canopies require illumination on opposite surface(s)
        7.1.2.   All craft will have a chem-light attached to the quad
            7.1.2.1.   Chemlight is intended improve downed quad recovery in low light
        7.1.3.   A flashlight per pilot
            7.1.3.1.   Flashlight *must be on and visible at all times* for individual(s) on the race course after sunset
    7.2.   Track specifications:
        7.2.1.   Track will include ground level lighting that is a distinct color from gates and obstacles
        7.2.2.   Start/Finish timing gate will be visually distinct
        7.2.3.   If possible, color will be used to make identification of next gate easier
            7.2.3.1.   For example, rainbow progression across track can be used
            7.2.3.2.   Similarly, matching colors for complexes of gates can be used, or matching colors for the last gate in a cluster and first gate of the next cluster