Dynamics Scrutineering 101

Yes, I break things for a living! Please don't be one of them!

American Solar Challenge

Brian Call, Dynamics Inspector

Checklist for Dynamics Scrutineering

- **Please have ALL Drivers ready to drive**
  (helmet, ballast, shoes, water, etc)

- **MUST have functioning communications with Driver**
  (one person with a radio & inspection sheets stands beside Inspector)

- **Solar car MUST be in rayce configuration**
  (wheel fairings in place, tire pressure you want to race with, etc)

- **If you plan to use Ecopia tires, these will be required for brake testing**

- **BE PREPARED for tire changes during brake test**

Do not block the test area.

If you need to work on the car, please move to a safe location
off the test area to allow other teams to continue testing.

General Information

- **Come as soon as you can – more time to resolve problems**
- **It will get busy – first come, first serve**
  (we might line teams up for slalom and brake test)
- **Check your tire pressure before you arrive**
  (it will be documented after your car passes the brake test and can't be increased from that level when racing)
- **Might place an wireless accelerometer in the car for the brake test**
  (this will also monitor for use of motor regen which is not allowed during the test)

Each Driver has 3 attempts at Braking test before driver swap

1st trial: pass 1 out of 3 attempts

Drivers can return to qualify, but must pass 2 out of 3 attempts to demonstrate repeatability

This will be done during lulls in dynamic testing to not hinder other teams

U-turn

- Any Driver
- Rules state 200mm high curb – if you have low and wide fairings, this is what must be inside the 16 meter lane
- Line up on the INSIDE of either marker – Inspector will help insure car is parallel in the lane before starting the turn
- Turn and HOLD at full steering lock position towards other marker
- Drive forward under car's own power – Inspector will walk beside listening and to verify turn is inside the 16 meter lane
- Turn around, setup for the other direction and repeat
- If it's wide, but close, we'll try again. If it's a huge error, back to the pits to repair.

U-turn (Left Turn Demo)

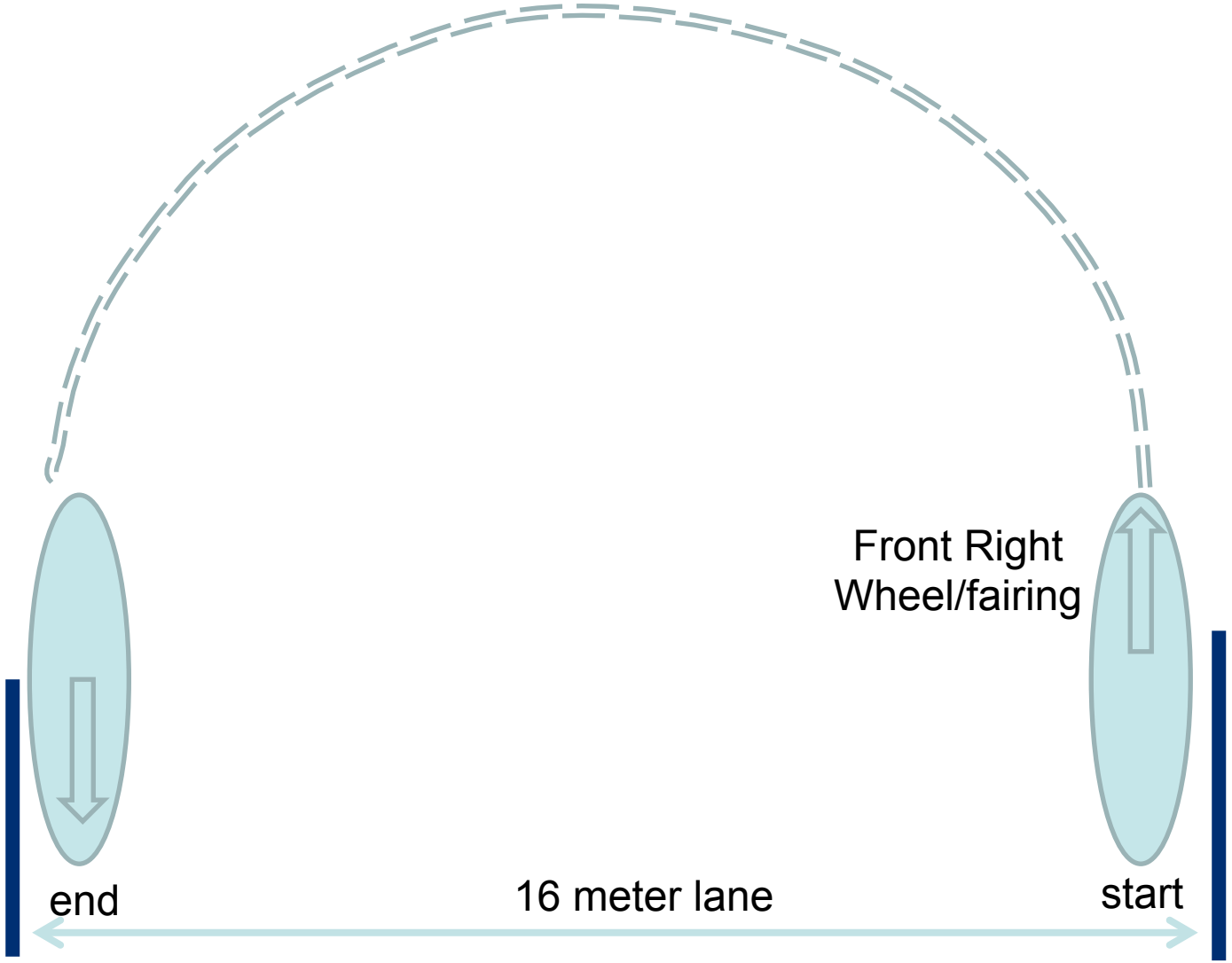
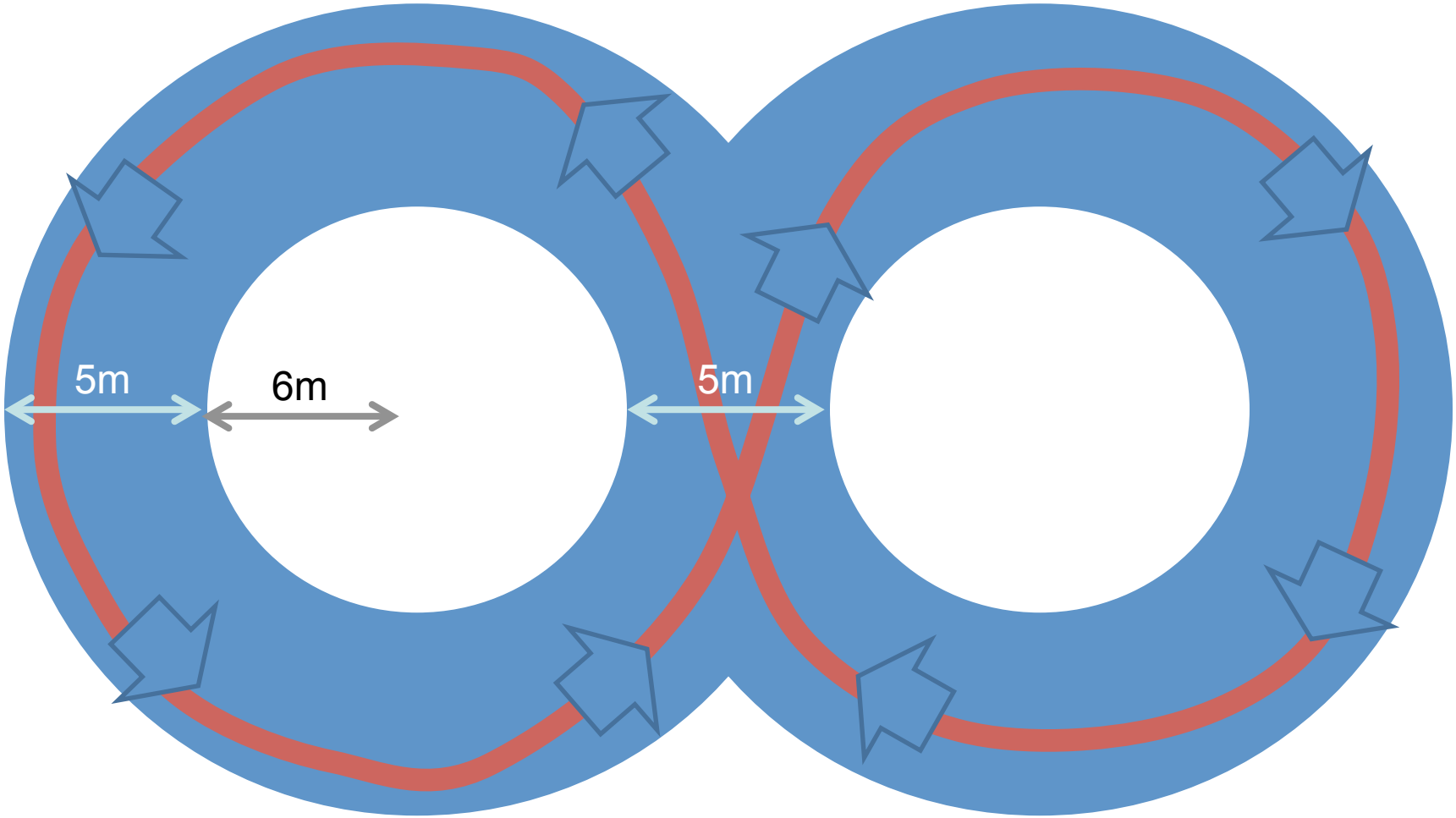


Figure 8

- Any Driver
- Enter the series of cones at any location
- Inspectors in the center of each loop along with radio person
- A team member can walk Driver through the course to get familiar
- Driver can take a few laps to get comfortable with the course
- Inspectors will keep times at various points and relay times to radio person
- Increase speed until requirement is met or Inspector says to stop
- Requirement is 18 seconds total, 9 seconds max per loop
- Fairings can touch the ground, tires cannot contact anything (no rubbing), no excessive tire lean or suspension deflection
- If cones are hit, Driver can choose to keep driving, and we'll reset the cones (note: they can cause damage to fairings and body panels!)
- If tire rubbing is noted, will use "White Out" on tire to verify no more contact

Figure 8 Layout

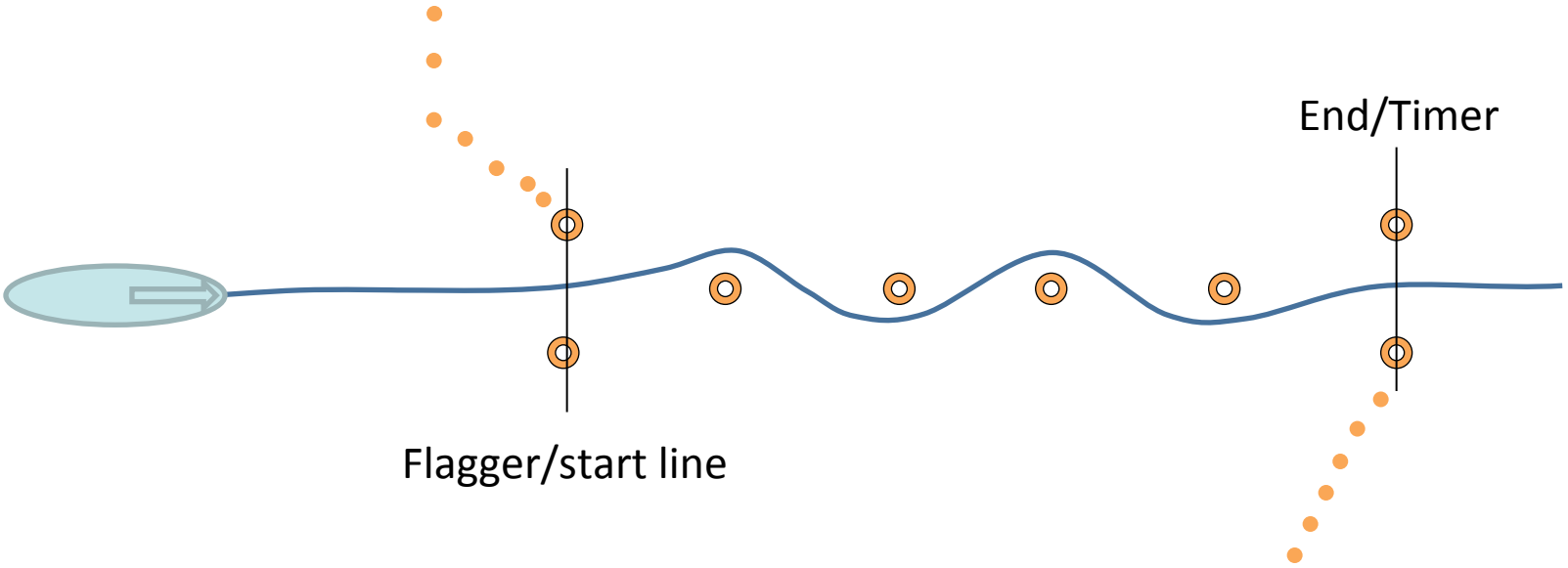


General driving path shown in **RED**

Slalom

- **Inspector's discretion for Driver – minimum of 2 will be chosen**
- **Once a Driver is chosen – they must complete the course or forfeit wristband**
- **This is to prove the Driver can control the car – NOT A RACE!**
- **Cones will depict which side to start for first cone – will not change**
- **Take a practice run to get comfortable**
- **Sequence:**
  1) Flag up – Driver picks up speed
  2) Flag drops as nose of car passes first cone – time starts
  3) Alternate thru the cones **Don't be afraid to stop and try again!**
  4) Inspector at the last cone with Timers
  5) Inspector will relay times to radio person (pass or run again)
- **Qualification times vary due to location and or # of cones due to testing space**
- **Target average speed is 25 mph**

Slalom Layout



Braking

- **Inspector's discretion for Driver – minimum of 2 will be chosen**
- **Once a Driver is chosen – they must complete the course or forfeit wristband**
- **Drive towards/thru the wet area!**
- **First run will most likely be at lower speed (~20 mph for safety/find obvious issues)**
- **Sequence:**
  1) Flag up – ready for testing, Driver picks up speed
  2) Flag horizontal – maintain speed
  3) Flag drops – hit the brakes (no regen – we can monitor this)
  4) Time starts when flag drops; time ends when car stops
  5) 1 trail/practice plus 3 attempts before Driver change
- **Target speed is between 25-35 mph**
- **Watch the flag – we might drop the flag early or late (that's the idea)**
- **Qualification based on radar speed when flag drops**
  - Speed/10 + 0.1 = Maximum time (seconds) allowed
  - 0.1s is for Timer's reaction adjustment in Driver's favor
  - Example: 31 mph would need to stop in 3.2 seconds

Braking Layout