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 race 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)

16 meter lane

start

end

Front Right Wheel/fairing
• 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

Flagger/start line

End/Timer
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

- Timer
- Flagger
- Radar
- Inspector
- Radio person

Wet pavement