ASC 2016 REGULATIONS

Objectives

- High level summary of ASC 2016 Regulations
- Changes from ASC 2014
- Potential amendments
- Discussion on inclusion of Cruiser class vehicles
ASC 2016 REGULATIONS

Principals for ASC 2016 Regulations

- Maintain basic car form from ASC 2014
- Updates to improve safety
- Incremental updates to improve clarity and fairness
ASC 2016 REGULATIONS CHAPTERS

Ch. 1 – Purpose/Vision  
Ch. 2 – Administration  
Ch. 3 – Entry Information  
Ch. 4 – Event Components  
Ch. 5 – Electrical  
Ch. 6 – Body  
Ch. 7 – Mechanical  
Ch. 8 – Driver Requirements  
Ch. 9 – Racing  
Ch. 10 – Penalties  
Ch. 11 – FSGP/Qualifier Operations
Vision / Purpose

- Promote, celebrate educational excellence & engineering creativity.
- Spirit of friendly competition & team work

Administration

Staff

- Inspectors
- Chief Inspector / Regulations Manager
- Observers
- Staff
- Track Stewart
- Jury

Regulations & Interpretation of Regulations

- Official/Unofficial interpretations
Entries & Registration
- Higher education teams
- Registration packages (Initial, Track, Road)
- Late penalties – *Higher this year than previous*

**Preliminary Vehicle Design Report (PVDR) – Due Sept 15, 2015**
- Initial look at vehicle design

**Vehicle Design Report (VDR) – Due Dec 15, 2015**
- Mechanical Section
- Electrical Section
- Battery Section
- Battery Protection
- Solar Cell Report
Report Grading
- Green / Yellow / Red

Team Data – Due May 1, 2016
- Team Photo (with CAR!), Data sheets
- For use in website, Event Brochures

Advisors
- Key to team success
- Teams need an advisor who is an employee

Communication – new this year
- Generic team email address which forwards to PM, Dept Managers
- Email to ASC with Generic team email and Advisor email

Insurance
- Vehicular liability and General Public Liability  (big stumbling block – don’t leave this to last minute)
ASC 2016 REGULATIONS — CH. 4 (EVENT)

Scrubineering
- Green on pre-event submissions & paid fees etc
- Inspection of cars at multiple stations across 2-3 days

Qualifier / FSGP
- Track rally and qualifier at the same time
- Does sometimes result in competing goals
- Need Green or Blue in Scrutineering to participate

The Rayce
- Road event for those who satisfy Scrutineering, Qualifying

Safety
- Paramount objective
- Talk later this evening
- Safety officer – one person, recommended multiple
Solar Array – updated for ASC 2016
- No need for approval under 22.8% (Cell type 1) = 6 m²
- Approved List – will be soon published (Cell type 2) = 6 m²
- Cell Type 3 – Silicon - not on the approved list = bounding equations
- Cell Type 4 – Ga/As = 3 m²

Energy Storage / Batteries
- Pb Acid – 125 kg / NiMH – 60 kg / LiFePo₄ – 40 kg / Li-Ion & Li-Poly – 20 kg
- Looking at Capacitors
- Supplemental Batteries – used for instrumentation, driver fans, horn, etc.

Battery Protection Circuitry (BPS)
- Pb Acid – Passive protect for OV
- NiMH – Passive protect for OT and OV
- Lithium based – Active protect for OV, OT, OC, UV
- Passive – driver monitoring and react
- Active – automatic control without human intervention (reviewing no reset-on-the-fly)
Battery Enclosures
- Contains batteries, BPS, main fuses. Max 2 boxes. Removable, non-conductive
- Ventilation requirements updated for ASC 2016

Main Fuse & Power Switch
- If Power Switch is a relay or contactor must be in Battery Enclosure (new for ASC 2016)
- Power switch used to isolate battery in the event of a BPS trip
- Also need External Power Cut Off Switch (for emergency use)

Accelerator
- Must return to zero (0) position.
- Cruise control allowed but also must shut-off (when driver intervenes, or when driver is out of the car)

Control
- Driver control only, no control/uploading to the car (new for ASC 2016)
ASC 2016 REGULATIONS — CH.6 (BODY)

Size
- No change (5 m x 1.8 m x 1.8 m).
- Ventilation requirements updated

Lighting (clarified from ASC 2014)
- Front Turn Signals, Side Marker Lights, Rear Brake Lights, Rear Turn Indicators, High-Mounted Brake Light
- Viewable from 30 m with various angles. Will be inspected from somewhere within the defined viewing angles
- Must be as bright or brighter than Reference Standard

Visibility (updated from ASC 2014)
- 8 m on ground in front, 6.4 m above @ 12.2 m ahead, 100 deg to either side

Egress
- 10 s one side, 15 s other side, unassisted, unchoked
Ballast
- No changes from ASC 2014
- Allow for common ballast
- 2 boxes (1 for individual, 1 for common)

Marking (clarified from ASC 2014)
- #’s, Institution, sponsors
- Winning Team = #1
- Retention of numbers
- Event Logo
- National Flag
Covers and Shields

- Moving parts shall be covered
- No interference - no rubbing (fairings on wheels)
- Array Attachments 2 lanyards \textit{(revised from ASC 2014)}

Tires & Wheels

- No changes from ASC 2014
- 3 or 4 wheels
- ASC 2016 Recommendation for wheel base / track width given (>1.5)
- Tires/Wheels shall be as per mfg recommendations and for intended use

Driver Cockpit

- Seating position – 27 deg – \textit{(revised templates for ASC 2016)}
- Seat Belts – heavily revised for ASC 2016 with guidelines for position
Chassis / Crush Zone / Roll Cage
- Crush zone regulations maintained from ASC 2014
- Roll cage – encompassing full head motion (clarified from ASC 2014)
- Roll cage – forward roll cage angled backwards to deflect array (change from ASC 2014)

Fasteners
- No changes from ASC 2014
- Flex-loc or other flexure style locking nuts (no nyloc, no interference style)
- Castle nuts + cotter pins (axles)
- Safety wired

Brakes
- Dual, balanced braking system. Front/rear or front/front. Left/right redundant is not acceptable (reworded for ASC 2016)
- Right foot braking
- Special requirements for cars that have Front/Rear mechanical braking (new for ASC 2016)
- Rear brake must hold 15% of the car weight (front wheels free moving / lifted)
- Proportioning valves must be lockable and away from driver
ASC 2016 REGULATIONS — CH.7 (MECH)

Parking Brake
- 10% of the car’s weight both forward and rearward
- Non-tire or non-wheel contact style
- Locking

Steering
- Added Steering backlash requirement (new for ASC 2016)

Dynamic
- Figure-8 = 12 m ID, 22 m OD, 9-sec per side
- 3.5 m lane for 250 m at speed
- Slalom 126 m lg with cones every 18 m, 11.5 sec
- Brake test 50 km/h + to 0 with deceleration > 4.72 m/s²
Drivers

- No changes from ASC 2014
- 1 driver in the car
- Team can defined 2 to 4 drivers (18 years old, licensed)
- Ballasted to 80 kg
- Helmets, shoes, water/fluids
- Driving time = 6 hrs max per day
- Communication – verbal, hands-free (applies to support vehicle drivers as well)
Road Event – Multi-stage
- Shortest Elapsed Time = Winner

Support Vehicles (requirements updated in ASC 2016)
- Lead + Chase + Trailer (mandatory)
- Scout + others (optional)

Support Vehicles (requirements updated in ASC 2016)
- Lead + Chase + Trailer

Overall Format - Unchanged from ASC 2014
- Will be looking at timing for non-stage starts (pending change)
- Trailering – can restart at Checkpoint (new in ASC 2014)

Impound
- Updated box requirements (Changed from ASC 2014)
ASC 2016 REGULATIONS — CH.10 (PENALTIES)

**Posting**
- Will be revised in future regulation releases

**Speeding**
- Will be revised in future regulation releases
- Evaluating use of GPS tracking for speed penalties

**Oversize Body and Oversize Array** *(revised from ASC 2014)*
- 15 min / day / 1000 cm$^2$ (array)
- 7 min / day / 1000 cm$^2$ (body)

**Overweight Battery Penalty** *(new for ASC 2016)*
- Defined penalty
ASC 2016 REGULATIONS – CH.11 (FSGP)

FSGP Event
- Most Laps = FSGP Winner

ASC Qualifier
- 330 km (1 day)
- 495 km (2 consecutive days)
- 85 km / driver
- Provisional Qualification (Changed from ASC 2014)
CRUISER CLASS VEHICLES

Major differences between Cruiser class vehicles and ASC 2014-2016 car form

- More batteries
- Less array
- 2-seater
- Driver / Passenger cockpit form
- Bi-lateral Egress
- Crush Zone

Inclusion for ASC 2016

- Understood that there is interest from some teams for FSGP 2015 and also ASC 2016
- How best to include..... Still working on this.
This presentation is a summary of the regulations only and is non-binding. The regulations govern!

- It is recommended that you read the regulations thoroughly.
- Have alumni or other student teams scrutinize your car before you bring it to scrutinizing.
- Finish your car and test your car before the event!