

*RIMAC FS ALPE ADRIA 2020*



## ***EVENT HANDBOOK***

*26<sup>th</sup> – 29<sup>th</sup> of August 2020*

*Karting track St Rauš Novi Marof, Croatia*

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# Emergency Information

## MINOR INJURY

**MEDICAL CENTRE** – Please accompany the injured person to the medical centre. Emergency aid is provided there. The medical centre is occupied every day round the clock.

## SEVERE INJURY

**CALL AN AMBULANCE YOURSELF** – Call an ambulance yourself if someone is severely injured and requires urgent help. The emergency number for every landline and mobile phone is 112. (Also see information about emergency calls below.)

**DURING DYNAMICS** – When the dynamic area is open, a special rescue team is on site. To contact them, ask someone with a two-way radio (official, security).

## Emergency Numbers

### MAIN HOSPITAL

Department of Emergency Medicine

Address: Franje Galinca 4, 42000 Varaždin, Croatia

Phone: +385 42 262 280

Homepage: <http://www.zhm-vz.hr/>

### Emergency services

In case of an emergency, please call one of them, no matter what time it is.

Regular emergency number:	112	0-24h
Ambulance emergency number:	194	0-24h
Firefighters emergency number:	193	0-24h
Police emergency number:	192	0-24h

## **BEHAVIOUR IN CASE OF REGULAR FIRES**

(FUEL, OIL, PAPER, WOOD, ETC.)

- Call for help (firefighters/ambulance) by either finding an official with a radio or calling 112.
- Assist injured people to leave the area, provide first aid if you can.
- Try to extinguish the fire if this is possible without risking your own safety. If an electric consumer is on fire, first cut the power to it.
- Leave the area and instruct others to do so as well.
- Wait for the firefighters/ambulance to arrive.
- Handling of the situation by the firefighters, medical treatment provided by ambulance.

## **BEHAVIOUR IN CASE OF ACCUMULATOR FIRES**

- Immediately leave the area in a radius of 5 meters and instruct others to do so as well. Assist injured people to leave the area. An overheated accumulator is extremely dangerous, so do not put yourself in danger by trying to put it out.
- Provide first aid to the injured, if you can. See below section on what to do in case of electric shock - in any case, do NOT give the victim water or food.
- Call for help by finding an official with a radio or by calling 112 yourself. Wait for the firefighters and ambulance to arrive, who will handle the situation.
- Stay out of the way of fumes coming from the accumulator or the vehicle; mind the wind direction.

## **BEHAVIOUR IN CASE OF ELECTRIC SHOCK**

- Call for medical help by finding an official with a radio or by calling 112 yourself, preferably in parallel to the steps below.
- Push one of the emergency shutdown buttons and wait until the TSAL is switched off. Note that this can take up to 5 seconds, wait patiently.
- Try to speak with the victim and ask him/her about his/her health.
- Insulate yourself if you must move a victim away from a live contact – wear dry gloves or cover your hands with multiple layers of cloth and cover potential contact paths with the vehicle with the HV isolation blanket.
- Watch your footing to make sure that you do not slip or fall when trying to move the victim.
- Do not move the victim if there is a possibility of neck or spinal injuries, unless he/she is in immediate danger.
- Do NOT give water or food to the victim.
- Give artificial respiration if the victim is not breathing.

- Give CPR if the victim's heart has stopped (only if you are trained in CPR) or use an Automated External Defibrillator.
- Cover burns with a sterile dressing. On the surface, electrical burns may not look serious, but the burn can be severe deeper in the tissue.
- Keep the victim comfortable, warm and at rest, and monitor his/her breathing until the ambulance arrive.
- The victim might undergo ventricular fibrillation several minutes after experiencing a shock.

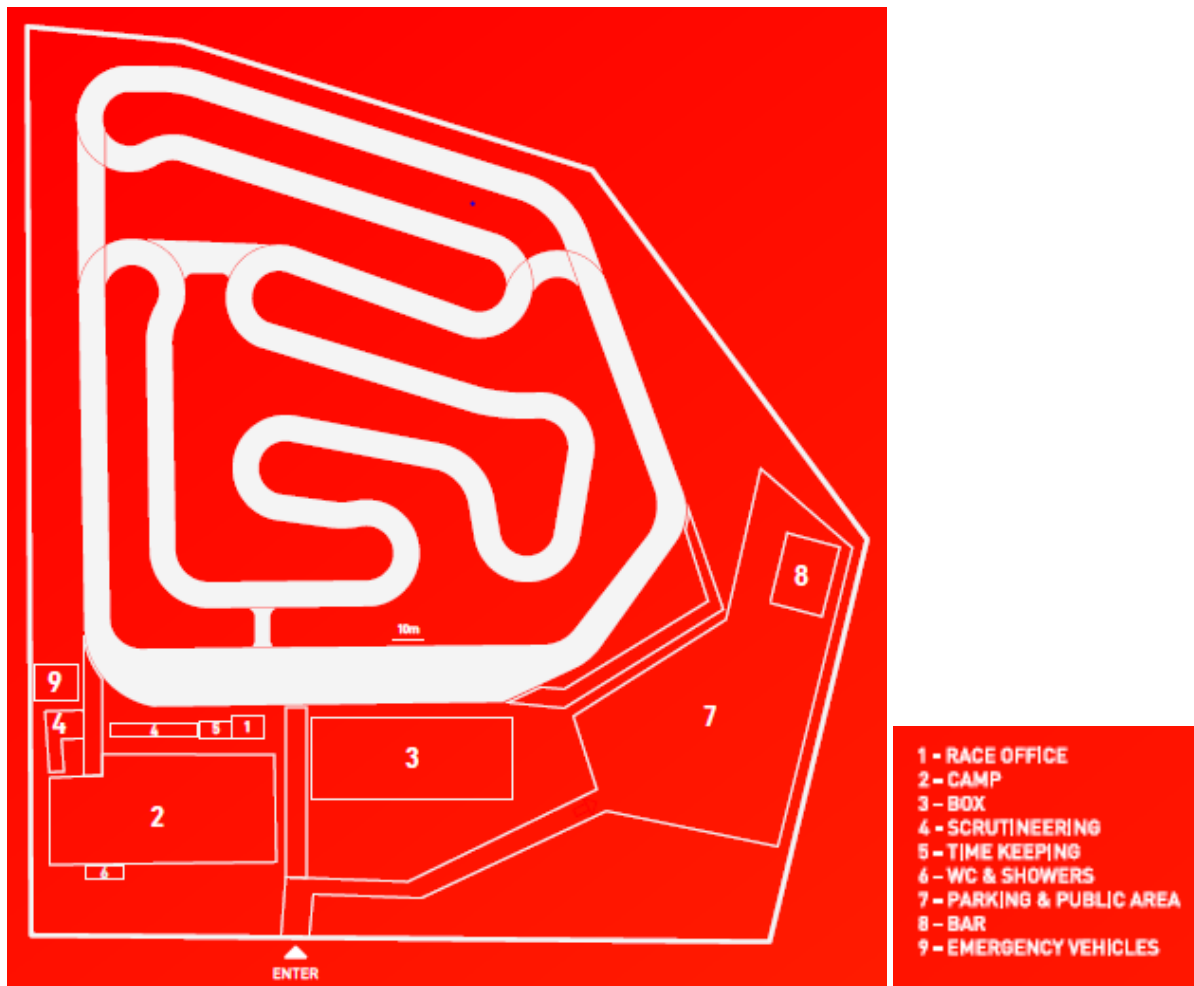
## Track and Accommodation

**Track name:** St Rauš Novi Marof

**Accommodation:** Campsite near the track

**Bathroom:** Portable toilets and portable camping showers

**Lunch possibilities:** Restaurant at track; Cooking area



**THE RACING TRACK IS DANGEROUS AND SERIOUS PLACE!!  
EVERY PARTICIPANT HAS TO BE AWARE OF THAT AND ACCEPT AND  
WORK BY PROVIDED RULES AND RECOMMENDATIONS!!**

# General Information

## ARRIVAL AND REGISTRATION FOR THE EVENT

**Date:** Wednesday, 26<sup>th</sup> August  
**Time:** 08:00 until 12:00  
**Location:** Karting track St Rauš Novi Marof; Race Office

After the teams arrive to Rimac FS Alpe Adria 2020 venue volunteers will record your arrival, and give you all needed information about the next steps - registration, parking, unpacking the trucks, etc.

ONLY the team captain can register his/her team. He/she can be accompanied by only ONE team member! During the first step of the registration procedure team captains submit a printed version of the Standard Terms document signed by all team members which we sent out to the Team Captains in advance via e-mail.

By signing the Standard Terms, the teams state that they accept the rules of the event in addition to FSG Rulebook, that only team members will work on the vehicle, also that they understand and will follow the safety guidelines of the event. After the registration, team captains will receive starter package which includes event wristbands, Event Handbook, etc.

## COVID-19 PREVENTIVE MEASURES

To prevent the possibility of spreading of the infections during Rimac FS Alpe Adria 2020 event it is necessary to ensure physical distance between participants, as well as between participants, volunteers, organizers, and other staff. The physical distance between teams must be **at least 1.5 m**. Campsite will be arranged in such a manner that the physical distance of 1.5 m is maintained between each team.

Disinfectant will always be available for periodically disinfecting of hands. Also, it is recommended to wash hands with water and soap as often as possible.

All participants should measure their body temperature, if it is reading higher than 37.2 °C, if the person feels sick or has any signs of the diseases (refers to all symptoms and signs of the disease, not just respiratory diseases), they **must notify organizers immediately** and until testing **prevent contact with other participants**.

It is mandatory to wear **face masks**. In addition to medical masks, cloth face masks that can be washed at a minimum of 60 °C and reused can also be used.

## List of Registered Teams

No.	# car number	Car class	Team name	University	Country
1.	36	C	BME Motorsport	TU Budapest	HUN
2.	E14	E	BME Formula Racing Team	TU Budapest	HUN
3.	235	C	UNI Maribor Grand Prix Engineering	University of Maribor	SVN
4.	E69	E	Superior Engineering	University of Ljubljana	SVN
5.	E169	E	Superior Engineering	University of Ljubljana	SVN
6.	33	C	CTU CarTech	University of Prague	CZE
7.	E64	E	Kaiserslautern Racing Team - KaRaT e.V	University of Kaiserslautern	DEU
8.	E7	E	FSB Racing Team	University of Zagreb	CRO
9.	10	C	AGH Racing	AGH University of Science and Technology in Cracow	POL
10.	E11	E	AGH Racing	AGH University of Science and Technology in Cracow	POL
11.	55	C	WUT Racing	Warsaw University of Technology	POL
12.	E66	E	StarkStrom Augsburg e.V	University of Applied Sciences Augsburg	DEU
13.	5	C	GreenLion Racing	University of Wuppertal	DEU
14.	3	C	PRz Racing Team	Rzeszow University of Technology	POL
15.	E23	E	PUT Motorsport	Poznan University of Technology	POL
16.	174	C	TU Brno Racing	Brno University of Technology	CZE
17.	E74	E	TU Brno Racing	Brno University of Technology	CZE
18.	51	C	Riteh Racing Team	University of Rijeka	CRO
19.	6	C	TU-Sofia Racing Team	Technical University of Sofia	BGR
20.	79	C	Arrabona Racing Team	Széchenyi István University of Győr	HUN
21.	111	C	BlueStreamline	Transilvania University of Brasov	ROU
22.	35	C	Road Arrow	University of Belgrade	SRB
23.	E42	E	TU Darmstadt Racing Team e.V.	Technische Universität Darmstadt	DEU



# Official Schedule

## Wednesday, 26<sup>th</sup> August

08:00-12:00	Arrival of all teams (setting the pits; recommended to take own tents, tables, and other equipment) @ Karting track St Rauš Novi Marof
08:00-12:00	Teams Registration and Drivers Registration @ Race Office
12:00-12:30	Opening Ceremony (team welcoming and basic information) @ Meeting Tent
12:30-13:00	Team Leaders Briefing @ Meeting Tent
13:00-14:00	Pre-scrutineering (Technical Inspection; all Classes) @ Pit Area
14:00-15:00	Lunch Break
15:00-19:00	Mechanical Scrutineering (Technical Inspection; all Classes) @ Technical Tent
15:00-19:00	Electrical Scrutineering (Technical Inspection; EV only) @ Technical Tent
19:00	Track Area closes

## Thursday, 27<sup>th</sup> August

08:00-08:30	Drivers Briefing @ Meeting Tent
08:30-14:00	Mechanical Scrutineering (Technical Inspection; all Classes) @ Technical Tent
08:30-14:00	Electrical Scrutineering (Technical Inspection; EV only) @ Technical Tent
08:30-14:00	Driver Egress (all Classes) @ Technical Tent
08:30-14:00	Tilt Test (all Classes) @ Technical Tent
08:30-14:00	Noise Test (CV only) @ Technical Tent
08:30-14:00	Rain Test (EV only) @ Technical Tent
08:30-14:00	Brake Test (all Classes) @ Track Area
08:30-14:00	Business Plan Event (all Classes) @ Meeting Tent
08:30-14:00	Design Event (all Classes) @ Pit Area
08:30-14:00	Cost and Manufacturing Event (all Classes) @ Pit Area
12:00-14:00	Acceleration (all Classes) @ Track Area
12:00-14:00	Skidpad (all Classes) @ Track Area
14:00-15:00	Lunch Break
15:00-19:00	Mechanical Scrutineering (Technical Inspection; all Classes) @ Technical Tent
15:00-19:00	Electrical Scrutineering (Technical Inspection; EV only) @ Technical Tent

15:00-19:00	Driver Egress (all Classes) @ Technical Tent
15:00-19:00	Tilt Test (all Classes) @ Technical Tent
15:00-19:00	Noise Test (CV only) @ Technical Tent
15:00-19:00	Rain Test (EV only) @ Technical Tent
15:00-19:00	Brake Test (all Classes) @ Track Area
15:00-19:00	Business Plan Event (all Classes) @ Meeting Tent
15:00-19:00	Engineering Design Event (all Classes) @ Pit Area
15:00-19:00	Cost and Manufacturing Event (all Classes) @ Pit Area
15:00-19:00	Acceleration (all Classes) @ Track Area
15:00-19:00	Skidpad (all Classes) @ Track Area
19:00	Track Area closes

### Friday, 28<sup>th</sup> August

08:00-08:30	Drivers Briefing @ Meeting Tent
09:00-14:00	Practice Area Open @ Track Area
09:00-10:30	Business Plan Event Final (all Classes) @ Meeting Tent
10:30-12:00	Engineering Design Event Final (all Classes) @ Meeting Tent
12:00-13:00	Vincenzo Bevilacqua, Senior Expert Engine Analysis, <i>Turbocharging in road and race car</i> @ Meeting Tent
14:00-15:00	Lunch Break
15:00-15:30	Course Walk @ Track Area
15:00-19:00	Autocross (all Classes) @ Track Area
19:00	Track Area closes

### Saturday, 29<sup>th</sup> August

08:00-08:30	Drivers Briefing @ Meeting Tent
08:30-09:00	Course Walk @ Track Area
09:00-14:00	Endurance Event (all Classes) @ Track Area
14:00-15:00	Lunch Break
15:00-17:00	Feedback Static Events (all Classes) @ Meeting Tent

- 15:00-19:00 Endurance Event (all Classes) @ Track Area
- 19:00-20:00 Formation Lap @ Track Area
- 20:00-21:00 Panoramic Photograph (all Teams) @ Track Area
- 21:00 Track Area closes
- 21:00-22:00 Closing Ceremony & Award Ceremony @ Meeting Tent
- 22:00 Final Party

*This programme will be changed according to the number of teams*

# Rules and Guidelines

Everyone (participants, volunteers, and spectators) at Rimac FS Alpe Adria 2020 would like to enjoy an accident-free event! These Guidelines have been established to advise teams of potential unsafe practices in the paddock and pit area.

## BEHAVIOUR

Alcohol, illegal drugs, weapons, or other illegal material are prohibited on the event site during the competition. Use of motorcycles, quads, bicycles, skateboards, rollerblades, scooters, or similar person-carrying devices in pit area are prohibited, as are self-propelled pit carts, toolboxes, tire carriers, etc.

## ALCOHOL

**PLEASE NOTE:** Alcohol on the event site is strictly forbidden! Along with the fun of this competition, we want a safe competition. There will be alcohol testing (breathalysers) during the event. 0% is the allowable alcohol content during this event for everyone. If ANY team member (driver or not), is tested with an alcohol level higher than 0%, he or she will be immediately disqualified for the rest of the event. The second person of the same team caught consuming alcohol will cause the entire team to be immediately disqualified. Motorsports are dangerous. Use common sense and let's all have a safe competition together! The prohibition ends with the beginning of the party on Saturday evening.

## TRASH

It is the team's responsibility to keep their Paddocks clean throughout the event. There are trash compactors in the paddock and near the campsite. No trash (including broken parts, old furniture, worn out tires or other materials) may be left behind at the end of the event.

## FIRES AND SMOKING

No open fires are allowed at the event site (except for the camp and unless marked otherwise). This includes BBQ grilles, oxy-acetylene torches, heaters, cigarettes, etc. Smoking is strictly prohibited in the dynamic area, in all buildings, and in the pit area. Smoking is permitted only in the dedicated area around the toilet containers.

## JACKING

When supporting your vehicle up off the ground you are required to use a safe, stable, load rated support device.

## WORKING ON THE VEHICLE

**Use of angle grinder is only allowed in the welding area.** In case of using angle grinders, wear safety glasses! During the use of all electrical machines like drills or angle driver wearing of ear protection is

recommended. When using metal cutting equipment that produces metal chips, eye protection is required for the operator as well as any team member assisting. If you are operating loud tools, hearing protection is required. **All members participating on dynamic area and working on the vehicle must wear closed shoes.**

## RUNNING ENGINES

You can run engines (IC) or put the vehicle into ready-to-drive mode (EV) ONLY in the designated engine test area, after passing scrutineering.

## WELDING

Welding is allowed with own equipment in the welding area only, using appropriate safety gear.

## FUEL AND OIL

No open fuel containers. **All fuel containers must be DOT approved.** Waste oil is to be taken to the fuel station for disposal. No refuelling in the pit and the engine test area.

## FIRE EXTINGUISHERS

Your fire extinguishers always must be immediately accessible. All team members must be familiar with their use. Each team must have at least two dry chemical/dry powder fire extinguishers with a minimum firefighting agent capacity of 0.9 kg. The following are the minimum accepted ratings: USA, Canada, and Brazil: 10BC or 1A 10BC; Europe: 34B or 5A 34B; Australia: 20BE or 1A 10BE. Extinguishers of larger capacity (higher numerical ratings) are acceptable. Aqueous Film Forming Foam (AFFF) fire extinguishers are prohibited. Halon extinguishers and systems are prohibited. All extinguishers must be equipped with a manufacturer installed pressure/charge gauge. Except for the initial inspection, one extinguisher must readily be available in the team's paddock area, and the second must accompany the vehicle wherever the vehicle is moved. Both extinguishers must be presented with the vehicle at technical inspection. Handheld fire extinguishers are not permitted to be mounted on or in the vehicle.

## VEHICLE MODIFICATIONS

If you make any major modifications to your vehicle, it must return to scrutineering for re-approval. In any case of modification, technical inspectors will be available and monitor the modifications being made.

## DRIVING PRACTICE

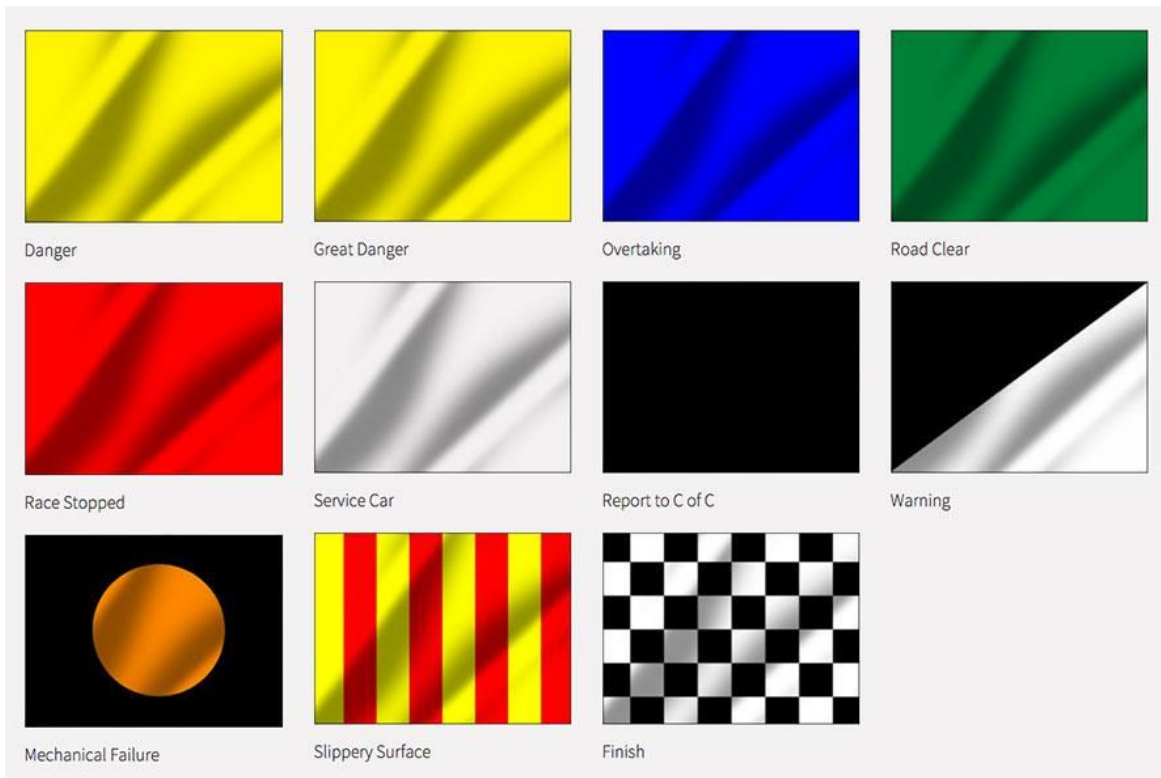
Driving practice is only allowed during designated times.

## DRIVER'S EQUIPMENT

Anytime the driver is in the cockpit with the engine running, the following approved safety equipment must be worn: helmet, suit, underwear, gloves, balaclava, and racing shoes (FSG Rulebook, Rule T13.3 "Driver's Equipment").

## FLAGGING

Flag signals are commands that must be obeyed immediately and without question. All drivers must know the competition-flagging signals.



**BLACK FLAG** – The driver must pull into the driver change area for discussion with the officials concerning an incident. A time penalty may be assessed.

**BLACK FLAG WITH ORANGE DOT** – Mechanical black flag. The driver must pull into the driver change area for a mechanical inspection of the vehicle.

**CHECKERED FLAG** – The session has been completed. The driver must exit the track at the first opportunity.

**GREEN FLAG** – The session has started. The driver may enter the track under direction of the track marshals. In case of stalling, the vehicle can be restarted, but the driver must await another green flag as the opening in traffic may have closed.

- The driver is clear to re-enter the track after using the slow lane to let a faster vehicle pass.
- The driver may pick up speed again after a yellow flag was displayed.

**RED FLAG** – The driver must come to an immediate safe and controlled stop on the track and must follow track marshals' directions.

**YELLOW FLAG** – Danger, the driver must slow down, something has happened beyond the flag station, no overtaking unless directed by the track marshals.

**RED AND YELLOW STRIPED FLAG** – The track is slippery, or something is on the racing surface. The driver must be prepared for evasive manoeuvres to avoid the situation

### **SPECIAL NOTE FOR DRIVERS**

All drivers should do a check of critical fasteners and components on their vehicles to assure complete control during the driving events. Fasteners do come loose, parts do break due to fatigue, and occasionally someone forgets to torque a nut – you will be intimately involved if this happens.

**REMEMBER: USE THE KILL SWITCH in case of an engine or brake malfunction!**

## Technical and Safety Inspection

Vehicles must pass a Technical and Safety Inspection before being allowed to practice at the test tracks or take part in the dynamic disciplines. This means a vehicle must have all the required inspection stickers, which are given at each step of scrutineering, in the following order:

CV	EV
Mechanical Scrutineering	Mechanical Scrutineering
	Electrical Scrutineering
Driver Egress	Driver Egress
Tilt Test	Tilt Test
Noise Test	Rain Test
Brake Test	Brake Test

The competition technical inspection stickers will be placed on the nose of the vehicle. Only after passing each of the relevant tests your vehicle can compete in the dynamic events and practice at the test tracks. If a vehicle is no longer in compliance with the rules, the officials will set the vehicle's technical inspection status to fail, remove the respective inspection sticker(s) from the vehicle and note the reason for revoking the technical inspection approval in the technical inspection sheet. After technical inspection, the only modifications permitted to the vehicle are listed in FSG Rulebook 2020 (Rule IN1.5.1 "Modifications and Repairs").

**VEHICLE WEIGHING PROCEDURE:** All vehicles must be weighed in ready-to-race condition. All fluids must be at their maximum fill level for weighing.

### MECHANICAL SCRUTINEERING

**Date:** Wednesday and Thursday, 26<sup>th</sup>-27<sup>th</sup> August

**Time:** 15:00 until 19:00

08:30 until 14:00; 15:00 until 19:00

**Location:** Technical Tent

Before taking part in any of the dynamic events, your vehicle must pass the Technical Inspection. The scrutineers will come to the team's pit. The teams will be judged in the registration order. If you are not ready to be scrutineered, you do not lose your slot. After your vehicle is prepared for scrutineering, please inform the scrutineers and they will come as soon as possible.

The following items must be presented at mechanical inspection:

- The vehicle in ready-to-race condition
- All the helmets you plan to use at the event



- All the drivers' suits and other safety gear
- The tallest driver of the team must be in attendance for roll bar height and egress checks.
- All the tires you plan to use at the event
- 2 fire extinguishers
- Quick jack and push bar
- SES documents and test pieces if available.

**NOTE:** Four team members (incl. the tallest registered driver) are allowed to enter technical inspection.

If you pass the Technical Inspection you should proceed to the other tests. If you have items that need to be rectified, the form will be returned to you (the team), you will not get your sticker, and you will have to present your vehicle for scrutineering again.

Scrutineering reserves the right to spot check any vehicle at any time during the event.

## ELECTICAL SCRUTINEERING

**Date:** Wednesday and Thursday, 26<sup>th</sup>-27<sup>th</sup> August

**Time:** 15:00 until 19:00  
08:30 until 14:00; 15:00 until 19:00

**Location:** Technical Tent

The following items must be presented at electrical inspection:

- One ESO
- Vehicle with mounted TS accumulator
- Quick jack and push bar
- Samples of self-designed PCBs that are part of the tractive system and are outside of the accumulator container, FSG Rulebook (Rule EV4.3.6)
- Tools needed for the BSPD check, FSG Rulebook (Rule T11.6.9)
- Data sheets for all parts used in the tractive system
- Accumulator container hand cart
- Tools needed for (dis-)assembly of accumulator container.
- Basic tools according to FSG Rulebook (Rule IN 3.2.2)
- Charger
- Printed datasheets for used wiring, insulation materials and high voltage components
- Laptop to display data of the AMS
- Spare samples of self-developed printed circuits with HV and LV
- Clear pictures of accumulator container and parts not reachable during inspection.

## DRIVER EGRESS

**Date:** Thursday, 27<sup>th</sup> August  
**Time:** 08:30 until 14:00; 15:00 until 19:00  
**Location:** Technical Tent

**PROCEDURE:** All drivers must be able to exit to the side of the vehicle in less than 5 s with the driver in the fully seated position, hands in the driving position on the connected steering wheel (in all possible steering positions) and wearing the required driver equipment. The egress time will stop when the driver has both feet on the ground.

## TILT TEST

**Date:** Thursday, 27<sup>th</sup> August  
**Time:** 08:30 until 14:00; 15:00 until 19:00  
**Location:** Technical Tent

**PROCEDURE:** The tilt test will be conducted with the tallest driver fully strapped in normal driving position. The tilt test will be conducted with all vehicle fluids at their maximum fill level. The vehicle will be placed on the table and tilted to 45° and 60°. There must be no fluid leaks and all wheels must remain in contact with the tilt table surface.

## NOISE TEST

**Date:** Thursday, 27<sup>th</sup> August  
**Time:** 08:30 until 14:00; 15:00 until 19:00  
**Location:** Technical Tent

**PROCEDURE:** The sound level will be measured during a static test. The vehicle must be compliant at all engine speeds up to the maximum test speed. Teams must bring a laptop to indicate the engine speed measured by the Electronic Control Unit (ECU). Measurements will be made with a free-field microphone placed free from obstructions at the exhaust outlet level, 0.5m from the end of the exhaust outlet, at an angle of 45° with the outlet in the horizontal plane. Where more than one exhaust outlet is present, the test will be repeated for each exhaust and the highest reading will be used. If the exhaust has any form of active tuning or throttling device or system, it must be compliant with the rules in all positions. Manually adjustable tuning devices must require tools to change them and must not be moved or modified after the noise test is passed. The position of the device must be visible to the officials and manually operable by the officials during the noise test. The test will be run with the gearbox in neutral. During this test, the vehicle must be jacked up using the quick jack. After passing the noise test the function of the master

switch, the cockpit-mounted shutdown button and the inertia switch will be tested. After passing, the air tightness of the intake system will be tested by closing off the inlet after which the engine must stall.

## RAIN TEST

**Date:** Thursday, 27<sup>th</sup> August  
**Time:** 08:30 until 14:00; 15:00 until 19:00  
**Location:** Technical Tent

**PROCEDURE:** The vehicle must be in ready-to-race condition. All components and constructions used to protect the vehicle from water during the rain test must be used during the entire competition. The tractive system must be active during the rain test. The vehicle must be jacked up using the quick jack, and all driven wheels must be removed. The vehicle must not be in ready-to-drive mode. The test will be conducted without a driver. Water will be sprayed at the vehicle from any possible direction. The water spray is like a vehicle driving in rain and not a direct high-pressure stream of water. The test is passed if the IMD is not triggered while water is sprayed at the vehicle for 120 s and 120 s after the water spray has stopped.

## BRAKE TEST

**Date:** Thursday, 27<sup>th</sup> August  
**Time:** 08:30 until 14:00; 15:00 until 19:00  
**Location:** Track Area

**CONCEPT:** Brake Test checks that the vehicle can be brought to a controlled stop. Each driver must know the proper procedure of the Brake Test.

**PROCEDURE:** With the vehicle at the start line of the station a green flag should be used to signal the start of each run. The driver must accelerate on a short straight (typically getting into 2nd gear) until reaching the braking area, which is a box defined by cones. After accelerating, the tractive system must be switched off by the driver and the driver must brake using only the mechanical brakes. It is acceptable for the TSAL to switch to green shortly after the vehicle has come to a complete stop as the reduction of the system voltage may take up to 5 s. Once inside the box, the driver must apply the brakes with enough force to demonstrate full lock-up of all four wheels at the same time. If the vehicle passes the test, the person in charge signs the approval form and provides the team with the last tech sticker. The vehicle is now free to proceed to the practice track or to the dynamic events.

**NOTE:** If the vehicle is unable to pass the brake test in two attempts, the vehicle must be repaired and then brought back for retesting. Re-certification may be required if work is performed on the vehicle's brake system or if the vehicle is involved in an incident which results in vehicle damage.

# Dynamic Events

## GENERAL INFORMATION

The dynamics at Rimac FS Alpe Adria 2020 are compliant with the FSG Rules 2020 and additional Rimac FS Alpe Adria 2020 Rules. The following pages describe the additional procedures and key aspects. Other information will be provided at the briefings on site.

## TEAM LEADERS AND DRIVERS BRIEFINGS

Team leaders briefing will be held at the Meeting Tent at 12:30 on Wednesday. Drivers briefings will be held at 08:00 on Thursday and Friday. All drivers for that day and team captains must attend. The briefing contains general event information and detailed information about the dynamic events of the day.

Each team must register at least three drivers. The drivers must be registered and to show valid driving license. Before the event teams need to send copies of driving license for all registered drivers. An individual driver may not drive in more than three dynamic events.

## ACCELERATION

**DATE:** Thursday, 27<sup>th</sup> August

**TIME:** 15:00 until 19:00

**LOCATION:** Track Area

**POINTS:** 90

**EVENT CONCEPT:** The objective of the Acceleration Event is to evaluate the vehicle's demonstrated acceleration capability by measuring the elapsed time required for the vehicle to travel 75m from a standing start. The event is designed to focus on engine performance and on the suspension's ability to maximize tire grip.

**EVENT FORMAT:** Each team has four runs, driven by two drivers with two runs each. Starting order is based upon time of arrival. Teams on their first run will receive priority. Elapsed time will be recorded for each acceleration run. Any penalties will be assessed to the acceleration run during which the penalty occurred. The fastest corrected elapsed time (including penalties) of the completed acceleration runs will be used to calculate the score for each vehicle.

**EVENT PROCEDURE:** Stage your vehicle in the appropriate staging line for either driver 1 or driver 2. Vehicles in the driver 1 staging line will be given priority. Drivers must be properly belted into the vehicle with all required safety equipment properly installed, as directed by the event workers, before the vehicle is first in line to start an acceleration run. An event worker will direct the driver to approach the start line. Vehicles will be staged approximately 0.3m (1 ft) behind the start line.

The driver is permitted to start an acceleration run only when the event worker waves the green flag. Timing will start when any part of the vehicle crosses the start line. The acceleration run is counted (one of the permitted accelerations runs) when any portion of the vehicle crosses the start line.

Timing will end when the vehicle crosses the finish line located 75m from the start line. The finish line is marked with a checkered flag.

Each driver can choose to drive one or two runs in a row. The second run may be performed immediately after the first run without stepping back to the end of the queue.

## SKIDPAD

**DATE:** Thursday, 27<sup>th</sup> August

**TIME:** 15:00 until 19:00

**LOCATION:** Track Area

**POINTS:** 90

**EVENT PROCEDURE:** Each team has four runs, driven by two drivers with two runs each. Each driver has the option to make a second run immediately after their first run. The starting order is based on the time the team arrives at the Skidpad Event. Teams on their first run will receive priority. A green flag is used to indicate that the driver may start. The vehicle will enter perpendicular to the figure and will take one full lap on the right circle to establish the turn. The next lap will be on the right circle and will be timed. Immediately following the second lap, the vehicle will enter the left circle for the third lap. The fourth lap will be on the left circle and will be timed. Immediately upon finishing the fourth lap, the vehicle will exit the track perpendicular to the figure of eight and moving in the same direction as entered.

## AUTOCROSS

**DATE:** Friday, 28<sup>th</sup> August

**TIME:** 15:00 until 19:00

**LOCATION:** Track Area

**POINTS:** 120

**EVENT PROCEDURE:** The Autocross Event is designed to test the vehicle's handling qualities without the hindrance of competing vehicles. Each team has up to four runs, driven by two drivers with two runs each. The vehicle is staged at a staging line prior to the starting line. A green flag is used to indicate that the driver may start. Timing starts only after the vehicle crosses the starting line and stops after it crosses the finish line. The starting order is based on the time the team arrives at the Autocross Event. Teams on their first run will receive priority. The fastest of the runs completed, including penalties, will be used to calculate the team score. After a driver's first run, the driver has the option of taking the second run immediately or leaving the staging area and running later in the heat. If a vehicle fails during a driver's

first run, vehicle repairs can be made to the vehicle, and the driver can return to complete the second run.

**NOTE:** Once the vehicle passes the start timing line, the run has been officially attempted and cannot be re-started. If the vehicle stalls before triggering the timing lights, it can be pushed back for a re-start. This is only allowed once. If the vehicle demonstrates difficulty in launching it will need to be pulled away and repaired.

## ENDURANCE

**DATE:** Saturday, 29<sup>th</sup> August  
**TIME:** 09:00 until 14:00; 15:00 until 19:00  
**LOCATION:** Track Area  
**POINTS:** 350

**PURPOSE:** The goals of the endurance is to test the durability of the vehicles. The dual nature of the event can lead to compromises, while the course layout and 22 km length of the event test the vehicle's durability. **Note:** No repairs or work may be performed on the vehicle during the event (except for tire changes due to weather conditions and to accommodate the second driver). There is only one run for the endurance event.

**DESCRIPTION:** This discipline represents the main challenge for all drivers. The winner of the Endurance race has the most chances to win the competition. The Event is approximately 22 km. First driver enters the track and after finishing 11 km goes out to the place predicted for drivers' exchange. The maximum time predicted for this change to happen is three minutes. After that time expires the second driver enters the track and drives 11 km before exiting. The colour of the cones is like the Autocross Event. Starting order for the Endurance Event is the reversed order from Autocross times, where best time starts last on Endurance. The starting order will be displayed at the Information Table. No refuelling is allowed during the event.

**NOTE:** According to experience of earlier years Formula Student events, it is expected to have sudden need for new teams in the waiting queue in the first section of the Endurance Event due to early DNFs. Please be prepared to attend the queue on time!

Vehicles that successfully finish Endurance and those that make it past the driver change must report to the scrutineers. They will stay there until passing the post-endurance scrutineering.

The event captains reserve the right to adjust the run order as necessary during the event to maintain safe operations and the flow of the event.

**ENDURANCE PROCEDURES:** The team must have their fully fuelled vehicle in the staging/prep area at the appointed time. Only two crewmembers, alongside first driver, are allowed in the staging area for the vehicles. When the vehicle is called to the staging line, the team must push the "race ready" vehicle with driver completely belted into the staging line. Once the vehicle is pushed to the staging line it cannot be touched by any team member except the driver in the vehicle. The only tools allowed in the possession of the team members at the staging line are those needed for driver seating adjustment during driver

change. No laptops, pressure gauges, baffles, tire wraps, etc. will be allowed at the staging line. Nothing can be brought to the starting line that is not intended to stay on the vehicle. When there is a space for the vehicle on the course and the timing/scoring system is set, the first driver will be motioned to the starting line. The person staging the vehicles is not obligated to give teams any advance notice prior to entering the track. An official will perform a safety check of the vehicle and the driver restraint system. The starter will stage the vehicle's front tires at the beginning of the entrance to the track. When there is an opening on the track, the course marshal (starter) will wave the green flag, signalling the go-ahead for the driver to start. If the vehicle stalls, the driver must wait for another green flag before being allowed on the course.

**Note:** If the vehicle cannot be restarted, the team members must move the vehicle away from the staging area. If a team running out of order has a vehicle that stalls and cannot be restarted at the entrance to the track, the vehicle will be deemed disabled and will be disqualified from the event.

On the last lap of the first driver, a checkered flag will be displayed directing the vehicle to exit to the driver change area. It is the driver's responsibility to correctly exit the track; any person directing the vehicle off the course is an additional aid only. Only three team members (including drivers) are allowed in the driver change area at once. After the vehicle arrives in the driver change area, the team has three minutes to get the second driver belted in and driving out of the driver change area. Only adjustments to fit the second driver (or weather-related tire changes) may be performed on the vehicle. No other work is allowed.

When the second driver is ready, the vehicle should be slowly driven to the starting line queue. An official will perform a safety check of the vehicle and the driver restraint system. The course marshal will stage the vehicle's front tires at the beginning of the entrance to the track. When there is an opening on the track the course marshal will wave a green flag signalling the go-ahead for the driver to start. If the vehicle stalls, the driver must wait for another green flag before being allowed on the course.

**Note:** If the vehicle cannot be restarted without external assistance, the vehicle will be deemed disabled and will be disqualified from the event.

Upon completing the last lap with the second driver, the checkered flag will be displayed and the vehicle will exit the course and will be directed to the box. After leaving the track, the vehicle must be powered down.

**PASSING:** Overtaking is only permissible in the designated passing zones and under the control of the track marshals. Passing zones have two parallel lanes, a slow lane only used by the vehicles that are being overtaken and a fast lane for the vehicles that are overtaking. Passing zones may be situated on either the left or right of the fast lane. The passing zone procedure will be as follows: a slower leading vehicle will be shown the blue flag and must drive into the slow lane and decelerate; the following faster vehicle will continue in the fast lane to pass the slow vehicle; the vehicle that has been overtaken may re-enter the track when the track marshal who is in charge of that passing zone is showing the green flag. The passing rules do not apply to vehicles that are stopped on track or vehicles that have spun out and are not moving. When passing a stationary vehicle, it is critical to slow down, drive cautiously and to follow the instructions from the track marshals.

**The Post Event Technical Inspection** must be passed to score points in the endurance event.

**NO MOTORIZED VEHICLES ARE ALLOWED ON THE COURSE EXCEPT DURING THE EVENT ITSELF.  
VIOLATORS OF THIS POLICY MAY BE DISQUALIFIED FROM THE EVENT.**

# Static Events

## ENGINEERING DESIGN EVENT (all Classes)

<b>DATE:</b>	Thursday, 27 <sup>th</sup> August Finals Friday, 28 <sup>th</sup> August
<b>TIME:</b>	08:30 until 14:00; 15:00 until 19:00 Finals 10:30 until 12:30
<b>LOCATION:</b>	Pit Area
<b>POINTS:</b>	150

**OBJECTIVE:** The concept of the Design Event is to evaluate the student's engineering process and effort that went into the design of a vehicle, meeting the intent of the competition. Proprietary components and systems that are incorporated into the vehicle design as finished items are not evaluated as a student designed unit but are only assessed on the team's selection and application of that unit.

**PROCEDURE:** At the competition, teams will present their knowledge and their vehicle to the judges, which will evaluate the teams' performance following the design objectives. Teams may bring any photographs, drawings, charts, spare parts, or other material that they believe are supportive to the design event, but the space provided for design judging may be limited.

[EV ONLY] Only sealed accumulator containers which passed the accumulator inspection may be presented or mounted in the vehicle. They must not be opened.

[EV ONLY] Only fully discharged and electrically shortened spare accumulator cells or spare stacks may be presented.

**VEHICLE CONDITION:** Vehicles must be presented for design judging in finished condition, fully assembled, complete and ready-to-race. Vehicles may be presented for design judging without having passed technical inspection. Covers and/or parts may be removed during the design judging to facilitate access and presentation of components or concepts.

**JUDGING CRITERIA:** The judges will evaluate the engineering effort based on questions and an inspection of the vehicle. The judges will inspect the vehicle to determine if the design concepts are adequate and appropriate for the application. The judges may deduct points if the team cannot adequately explain the engineering and construction of the vehicle.

**SCORING:** The overall Engineering Design Event maximum scoring is 150 points for all classes.



## COST AND MANUFACTURING EVENT (all Classes)

**DATE:** Thursday, 27<sup>th</sup> August  
**TIME:** 08:30 until 14:00; 15:00 until 19:00  
**LOCATION:** Pit Area  
**POINTS:** 100

**OBJECTIVE:** The objective is to evaluate the team's understanding of the manufacturing processes and costs associated with the construction of a prototype race car.

**PROCEDURE:** Due to the offline status of the FSG Cost Tool and to keep the cost event, a discussion with the judges will take place during the competition, next to the teams' vehicle. Since it is not possible to create the CRD, there will be no discussion about the BOM/CBOM/DBOM. Total time foreseen for the cost and manufacturing event is 20 minutes. The discussion is split into three parts:

### Part 1 "Cost Understanding":

A discussion to evaluate the general cost and manufacturing knowledge of the team.

Following topics might be judged:

- Differences between prototype and mass production
- Resource and cost planning
- Financial and production risk management
- Make or buy decisions
- Environmental influence of the vehicle production
- Effectiveness of financial planning
- Methods for software development cost calculation

The teams must present their vehicle at the designated time to the judges. Teams that miss their time slot will lose all cost points for that day. Teams can bring electronic, handwritten, or printed handouts, flip charts or like the event, but the space available may be limited. Part 1 will be a discussion of one or more subjects listed above for 8 minutes in total.

### Part 1.5 "Real Case Cost Understanding":

Over further period of 7 minutes the real case of the cost understanding will be discussed. Here a team must apply subjects listed below and prepare examples for parts of their choice from the "Suspension and Shocks" system:

- 1) Differences between prototype and mass production
- 4) Make or buy decision

## Part 2 “Real Case Scenario”

The real case scenario at RFSAA2020 will consist of presenting the Cost Judges with your understanding of manufacturing process and proposal to reduce the cost of a chosen part. The judges can choose a single or multiple part from your vehicle for you to elaborate the possibilities of reducing their manufacturing cost. 5 minutes are allocated for the discussion of Part 2.

For the Cost and Manufacturing Event no documents must be submitted prior to the competition.

**VEHICLE CONDITION:** Vehicles must be presented for judging in finished condition, fully assembled, complete, ready-to-race and with its dry tires mounted. The judges will not evaluate any vehicle in what they consider to be an unfinished state and will award zero points for the entire event. Vehicles may be presented for judging without having passed technical inspection, even if final tuning and setup is in progress. Covers and/or parts may be removed during the judging to facilitate access and presentation of components or concepts.

## BUSINESS PLAN PRESENTATION EVENT (all Classes)

**DATE:** Thursday, 27<sup>th</sup> August

Finals Friday, 28<sup>th</sup> August

**TIME:** 08:30 until 14:00; 15:00 until 19:00; Finals 09:00 until 10:30

**LOCATION:** Meeting Tent

**POINTS:** 100

**OVERVIEW:** After a year of planning, fabricating, and testing a new prototype vehicle, the team aspires to sell their vehicle design to a make-believe racing manufacturer/investor. The competitors will be judged on their ability to create and deliver a presentation that clearly explains the merits of their package.

The presentation must relate to the vehicle entered into the Rimac FS Alpe Adria 2020 Event, although the state of the prototype itself must not be considered (this means even if the vehicle is not working or finished, at this static event it does not matter).

**THE PRESENTATION:** Competing teams must keep a presentation to potential investors or partners for the presented business model. The presentation should tie together all factors that would influence the marketability and manufacturability of their design and all risks conjuring this business idea. The technical aspects of the vehicle design should be presented to reinforce or support performance claims but should be reduced to the minimum necessary for an investment decision. The competitors should show an understanding of the marketplace and the targeted customer. Furthermore, they should show how their design fits into its expected market and how it is completed to a business model. Competitors must convince the Judges that their prototype and the related concept represents a profitable enterprise for the manufacturer/investor and that is simply an attractive investment.

**PROCEDURE:** Presentations are limited to a maximum of ten minutes. The judges will stop any presentation exceeding ten minutes. The presentation will not be interrupted by questions. Immediately


following the presentation there will be a question and answer session. One or more team members may present the business plan. All team members involved in the BPP must be in the podium area and must be introduced to the judges at the beginning of the presentation. The team members who have been introduced may answer the judges' questions even if they were not actually presenting. Teams that fail to make their presentation within their assigned time will receive zero points for the BPP.

**JUDGING PROCESS:** The judging at the competition will start with an initial judging, where all teams are judged by different judging groups. The top teams are then judged by all business judges in the BPP finals.


**SCORING:** The scoring of the BPP is based on the average of the scores given by each of the judges. The scoring for the non-finalist is calculated according to FSG Rulebook (Rule S1.4 "Business Plan Presentation Scoring").

## RFSAA Officials

At the venue, we will answer your questions directly. To contact us before and after the event, please write us via

 fs.alpeadria@gmail.com

 <https://fs-alpeadria.com/>

 Formula Student Alpe Adria

 @fsalpeadria

### Organizers

BORJAN DRAGANA	+38669954807
KEZELJ TIBOR	+385993018485
MOMČILOVIĆ MATIJA	+385958067395
PRPROVIĆ MATIJA	+385912529389