Moto Engineering ITALY race for passion

Competition Regulation

10th-11th October 2021

MES
Motorsport Engineering Society

SUMMARY

1. STATIC EVENT

The static event, named “Tech Talk”, should describe the evolution of the project for each Team along the Competition development. The participant Teams must show to the Jury and to the Organization the complete process of the prototype design and development, and a theoretical project of a racing Team creation.

1.A Procedure

According to the event schedule, each Team will have 15-20 minutes to expose their project in front of a jury composed by members of the sponsor Companies. The full list of the Companies will be shared on the event website prior the event day.

The presentation will happen in a dedicated room where digital support (i.e. television or projector) can be used by the Teams via HDMI connection. Audio playback is allowed. Team’s prototype must be exposed in front of the Jury during the presentation.

There is no limit in the number of Team members that will perform during the tech talk, proven that each member has a role during the presentation. Additional audience is allowed, but non-performing members will stay behind judges table.

Analog support (e.g. posters, physical components, etc.) are allowed.

1.B Contents

The Tech Talk suggested topics are the following:

1. Project Duration and Team Organization Chart
2. Powertrain Description
    a) Battery Pack Design and Simulation
    b) Motor Control Design and Simulation
    c) Powertrain Integration and Control Strategy
    d) Powertrain Safety
    e) Energy Management Strategy
    f) Prototyping and Validation Testing
3. Vehicle Description
    a) Chassis Design and Simulation
    b) Drivetrain Design and Simulation
    c) Brake and Suspension System
    d) Aerodynamics
    e) Prototyping and Validation Testing
4. Full Prototype Testing Plan

It is not mandatory to discuss about all these topics during the oral exposition: each Team is free to select the topics where they claim the major technological innovations or where they think to be more advanced than their competitors.

In addition to the Tech Talk, a full written document called “Tech Details” that includes all the elements listed in previous list must be prepared: this document will be provided to the jury members and it will be considered to create the final ranking.

1.C Static Event Score

Each Team will be evaluated considering both the “Tech Talk” performance and the “Tech Details” contents. Each topic will gain a score according to the following table:

TOPIC	SCORE
1. Project Duration and Team Organization Chart	5
2. Powertrain Description	
a) Battery Pack Design and Simulation	35
b) Motor Control Design and Simulation	30
c) Powertrain Integration and Control Strategy	40
d) Powertrain Safety	30
e) Energy Management Strategy	30
f) Prototyping and Validation Testing	50
3. Vehicle Description	
a) Chassis Design and Simulation	35
b) Drivetrain Design and Simulation	30
c) Brake and Suspension System	30
d) Aerodynamics	40
e) Prototyping and Validation Testing	50
4. Full Prototype Testing Plan	70
5. TECH TALK	125
TOTAL	**600**

2. DYNAMIC EVENTS

2.A Objectives

The dynamic events consist of a series of tests aimed at assessing the dynamic behaviour and the performance of the manufactured prototype on track. The dynamic tests on the track will be carried out by the rider presented by the Team.

The Dynamic Tests list is the following:

1. Brake Performance
2. Handling Test
3. Best Acceleration
4. Full Track Parade

The dimensions, speed, schedules, and measurement indicated in this article may vary and change in the Final Event, if the Organization so had to determine it for any reason. Each of these events will be described in the following articles, and the score will be added to the score achieved with the static event in order to form the overall ranking.

The Dynamic Tests will take place on the straight in front of the pit lane.

2.B Requirements

The Team and the Prototypes must be compliant with the Registration Terms and Conditions available on the Official Event Website dedicated page: motoeng.co.uk/event-details. These requirements will be verified upon Team's arrival at the Autodromo Internazionale.

2.C Weather Conditions

Every Team should bring any equipment needed to perform on track with wet conditions. In case of intense rain or other prohibitive weather condition (e.g. fog, snow, ice, etc.), the Race Direction can deny the access to the track. Dynamic Events postponement can be also considered, to allow as far as possible the participation of all the Teams to the track tests.

2.D Access to the track

Prototypes must access to the track through the exits enabled by the Organization for each test.

2.E Behaviour on track

In the event of an accident or breakdown, the rider must immediately take his prototype off-track, in a place where it does not represent any danger to the normal development of the Competition and always out of the path of the rest of the riders.

On the track, it is forbidden for anyone to approach a prototype stopped at the circuit, except for the rider himself, the Race Director, his deputies, the marshals or Technical Staff.

The Race Director may stop a prototype whose rider had committed an infraction. A black flag with the bike number will indicate to the rider that he/she must stop. If the rider does not stop after two laps, the Race Director will communicate the Team Leader to order his/her prototype to stop immediately. The reasons for this decision will be communicated to the Team Leader.

The Race Director or any marshal post (only at the request of the Race Director) may indicate a rider to leave the track if the prototype has mechanical problems that could put him/herself or others in danger. A black flag with an orange circle and the bike number would be shown to a rider in all marshal posts to stop immediately, without completing the lap.

2.F Access to the pit lane

During the development of the competition, only people with the proper accreditation may be in the Pit Lane. The Organization will be able to evict from these zones all those persons whose stay is not duly justified.

2.G Technical rules

In case of oil or any other liquid spillage from a prototype in the Pit Lane soil (work zone), it will not be allowed to start up that prototype before the affected area and prototype are completely cleaned.

If a rider going out from his/her Box has a problem in the prototype before the exit of the Pit Lane, can return to the Box with the engine/motor off through the work zone and accompanied by a Pit Lane marshal.

During pit stops only registered Team members can manipulate the prototype. Failure to comply with this rule may result in the exclusion of the Team.

During pit stops a maximum of 3 people (rider excluded) may manipulate the prototype. Any contact with the prototype will be considered as manipulation (even if the rider stays

on it, although he/she does not intervene).

If the work is done inside the Box, the number of registered Team members working on the prototype is not limited. During the race sessions, introducing the prototype inside the Box will mean the exclusion of the Team from that session.

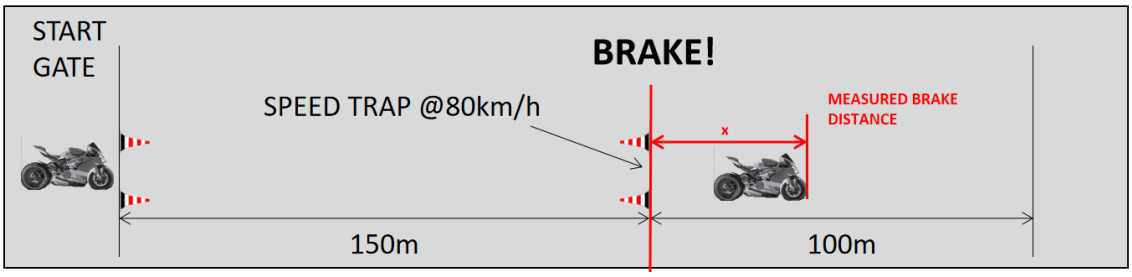
Oil or other liquids exchange and cleaning must be done over a recipient and inside the Box. After this operation the Team must ensure that the area remains perfectly clean.

2.H Brake Performance

This test is aimed to evaluate the distance needed to bring the prototype to a complete stop from a minimum speed of 80 km/h. This is the first Dynamic Test.

The area dedicated to this test will be composed by a start gate, an acceleration area, a braking area, and an exit gate. The speed of the prototype will be recorded just before the entrance of the braking area

The following picture shows a graphic representation of the area:



If the speed at the speed trap is lower than 80 km/h, 3 meters will be added to the measured braking distance for every 1km/h below the threshold.

2.I Brake Performance Score

The maximum score during the brake performance is 100 points. The first classified will gain the maximum score, while the other Teams will receive points according to the following formula:

$$S = 100 - 99 * \frac{D_B - D}{D_B - Dw}$$

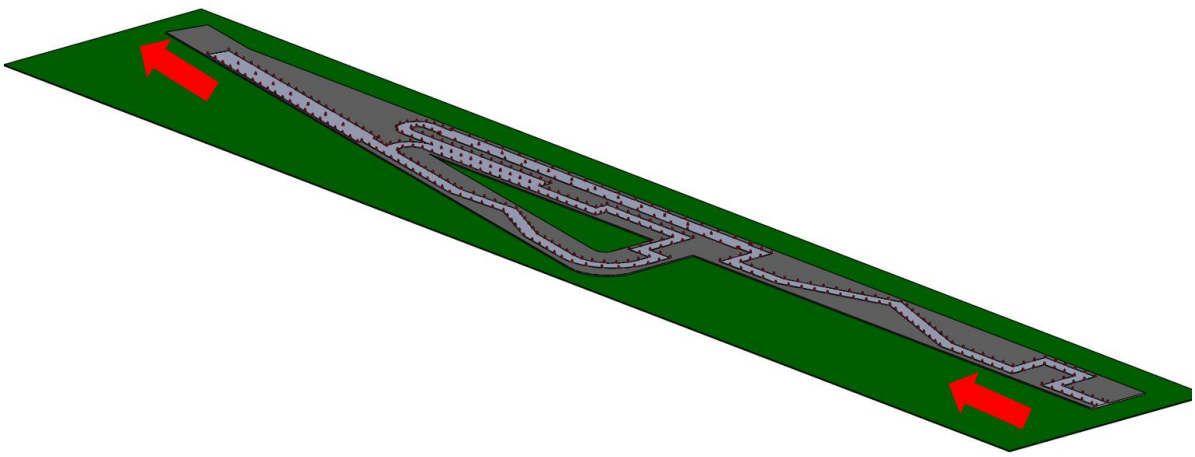
Where D_B is the best distance, D_W is the worst distance, D is the distance to evaluate, and S is the respective score. The result will be rounded to nearest.

2.J Handling Test

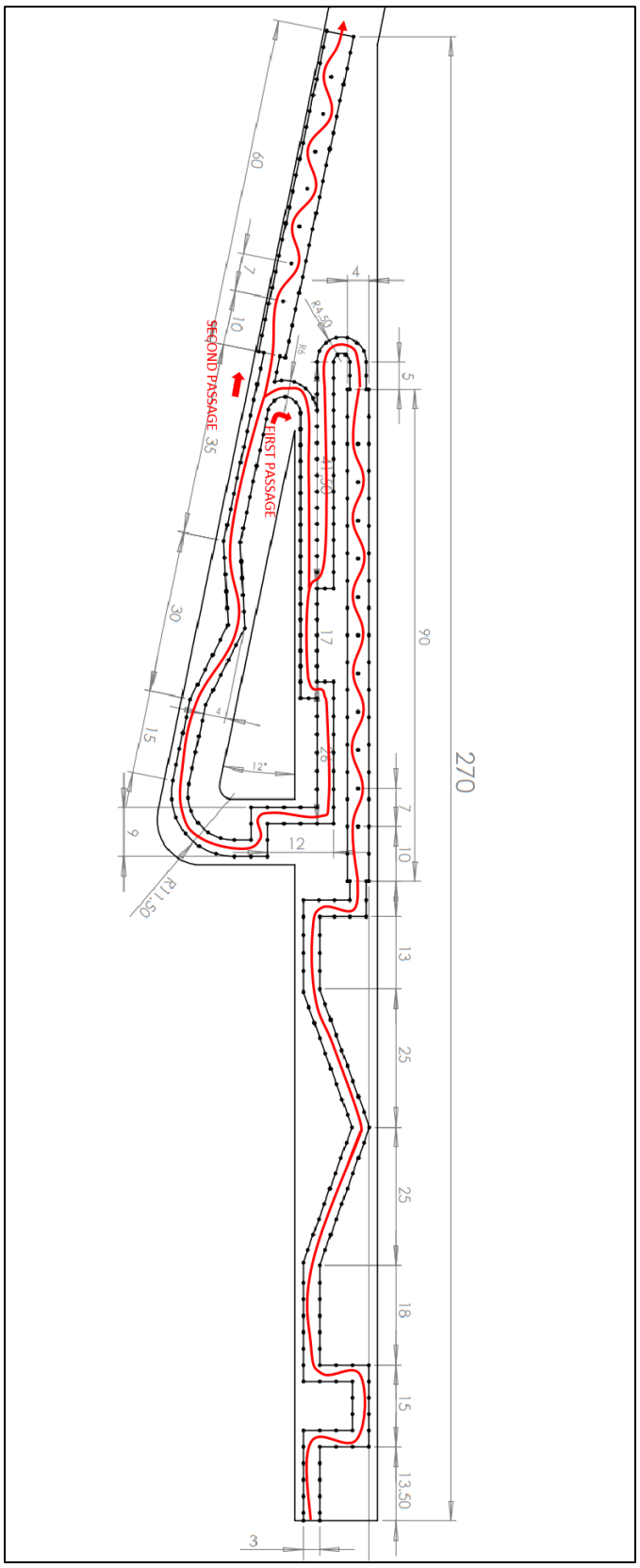
This test is aimed to verify the handling of the prototype in a narrow-cornering circuit. The route will be signaled by mean of cones. The time needed to cover the complete route will be recorded by means of cells at the start and finish gates. This test will take place right after the Brake Performance.

There will be penalties for failures: if a cone is touched, 5 seconds will be added to the final time, while if a cone is “bypassed” the penalty will be 10 seconds.

The following picture shows a graphic representation of the area:



Detailed dimensions of the Handling track are showed in the next page. Dimensions are expressed in meters.


SECOND PASSAGE
FIRST PASSAGE
270
90
60
35
30
15
4
7
10
5
17
12
9
13
25
25
18
15
13.50
3
R11.50
R4.50

2.K Handling Test Score

The maximum score during the Handling Test is 200 points. The first classified will gain the maximum score, while the other Teams will receive points according to the following formula:

$$S = 200 - 199 * \frac{T_B - T}{T_B - T_W}$$

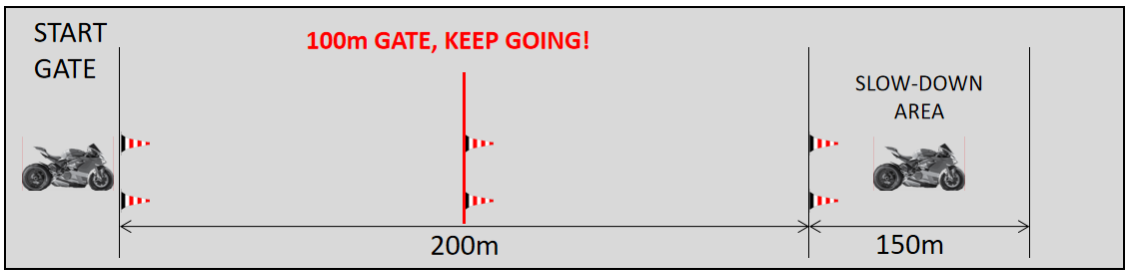
Where T_B is the best time, T_W is the worst time, T is the time to evaluate and S is the respective score. The result will be rounded to nearest.

2.L Best Acceleration

This test is aimed to find what is the best acceleration time of each prototype both on a 100m and 200m strips.This test will take place right after the Handling Test.

The rider must complete a 200m straight route where the time after 100m and the final time will be recorded.

The following picture shows a graphic representation of the area:



2.L Best Acceleration Score

The maximum score during the Best Acceleration is 100 points for the 100m strip and 200 points for the 200m strip. The first classified will gain the maximum score, while the other Teams will receive points according to the following formulas:

$$S = 100 - 99 * \frac{T_B - T}{T_B - T_W}$$

$$S = 200 - 199 * \frac{T_B - T}{T_B - T_W}$$

Where T_B is the best time, T_W is the worst time, T is the time to evaluate, and S is the respective score. The result will be rounded to nearest.

2.M Dynamic Tests Score

The total score of the Dynamic Tests will be given by the sum of the scores of each test. To resume the total points available:

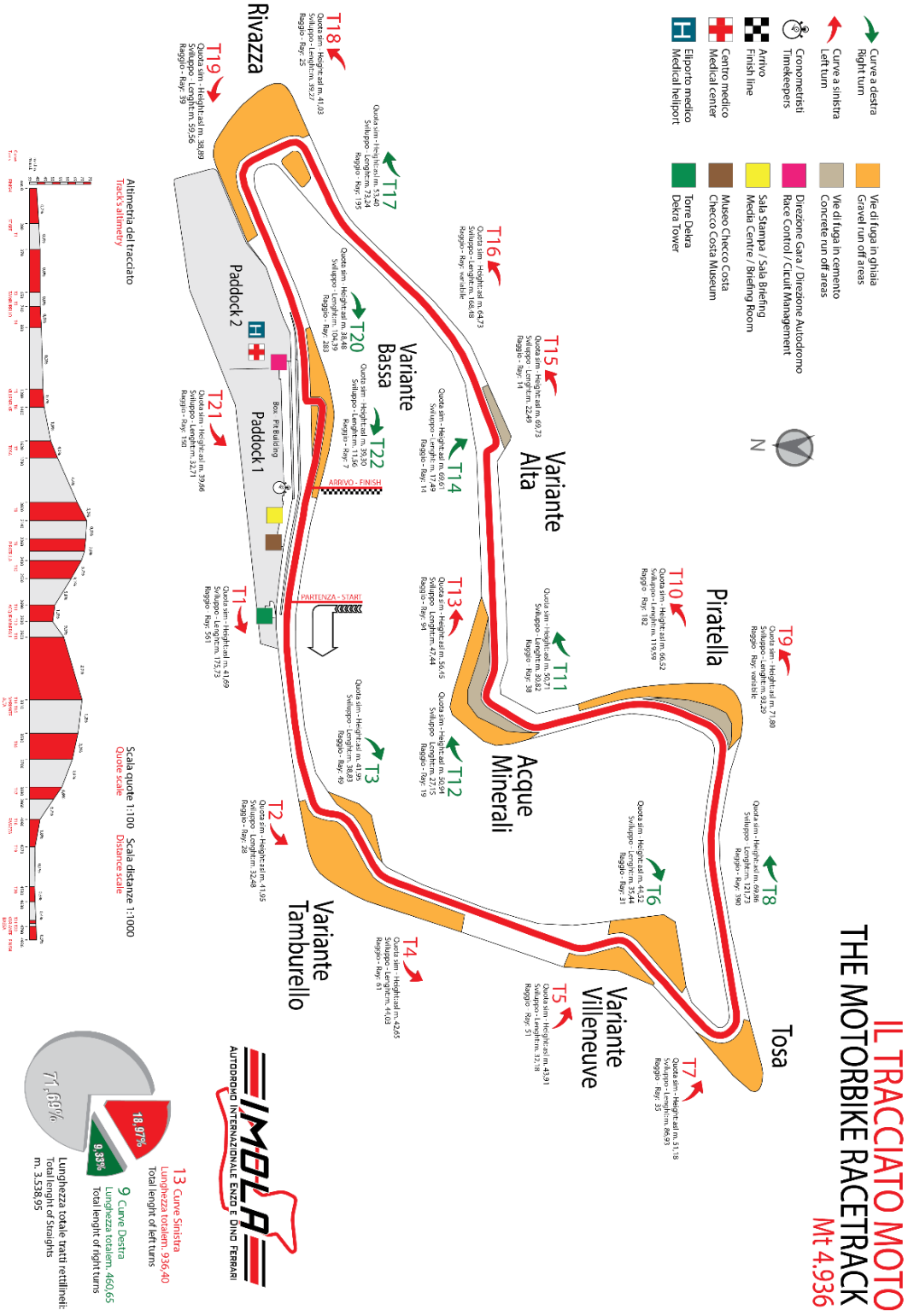
1. Brake Performance: 100 Pts
2. Handling Test: 200 Pts
3. Best Acceleration - 100m: 100 Pts
4. Best Acceleration - 200m: 200 Pts

For a total of **600** points.

2.N Full Track Parade

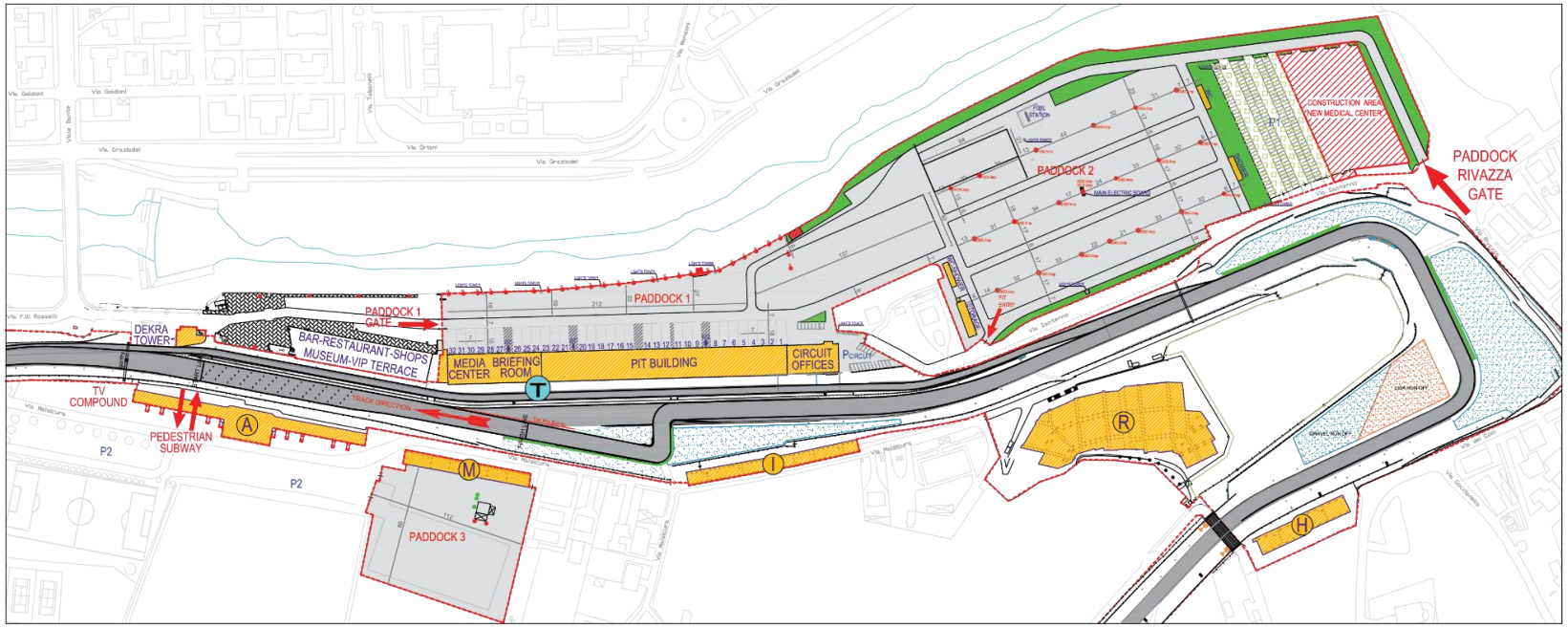
The last Dynamic Test is a non-competitive event where it will be possible to perform 4 full laps on the Autodromo Internazionale followed by a Safety Car. This will be the best opportunity to gain telemetry data for the upcoming Moto Engineering Italy 2022, where a race on the full track will be included in the schedule.

3. TRACK LAYOUT



IMOLA
AUTODROMO INTERNAZIONALE ENZO E DINO FERRARI

SCALA DI RIFERIMENTO 0 20 40 60 80 100m
INDICATOR SCALE



LEGENDA - *LEGEND*

- STRUTTURE - *BUILDINGS*
- CONFINE AUTODROMO - *CIRCUIT BOUNDARY*
- AREA PISTA - *RACETRACK*
- PADDOCK AREA
- PRESE ELETTRICHE-TV-ACQUA *ELECTRIC-TV-WATER PLUGS*
- CABINA CRONOMETRISTI - *TIMEKEEPING ROOM*

INFO STRUTTURE A SERVIZIO GARA - *RACE SERVICE STRUCTURES*

PADDOCK 1: AREA 18.600 MQ

PADDOCK 2: AREA 30.000 MQ

PADDOCK 3: AREA 10.000 MQ

BOX: N°32 (16X6,6 MT)

CIRCUIT OFFICES: DIREZIONE GARA, UFFICI ORGANIZZAZIONE *RACE CONTROL, ORGANIZATION OFFICES*

MEDIA CENTER: N°300 POSTAZIONI GIORNALISTA *NETWORKING PLACES*

BRIEFING ROOM: N°100 POSTI *SEATS*

INFO STRUTTURE A SERVIZIO PUBBLICO - *PUBLIC SERVICE STRUCTURES*

TRIBUNA A (COPERTA): 3.000 POSTI
GRANDSTAND A (COVERED): 3.000 SEATS

TRIBUNA M (COPERTA): 2.370 POSTI
GRANDSTAND M (COVERED): 2.370 SEATS

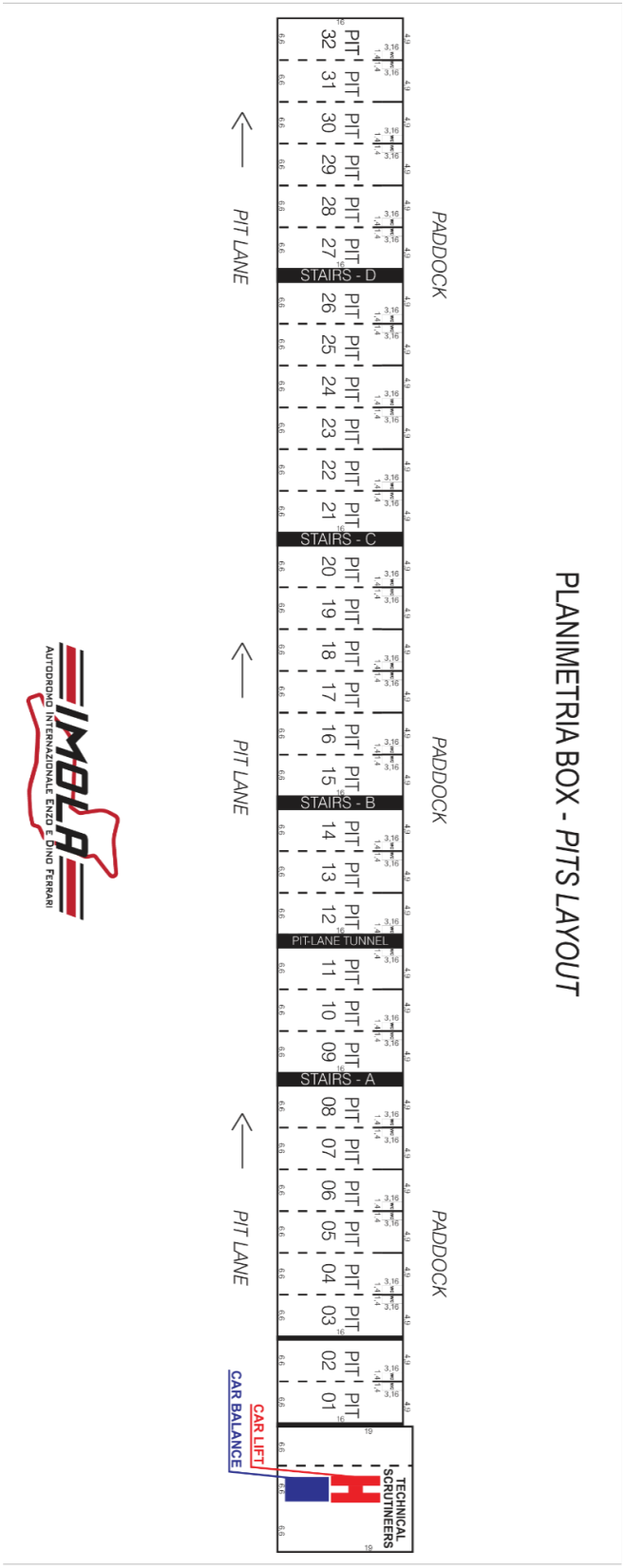
TRIBUNA I: 2.831 POSTI
GRANDSTAND I: 2.831 SEATS

TRIBUNA R: 8.278 POSTI
GRANDSTAND R: 8.278 SEATS

INFO PARCHEGGI - *PARKINGS*

P1: 150 POSTI AUTO *CAR PLACES*

P2: 400 POSTI AUTO *CAR PLACES*


PLANIMETRIA BOX - PITS LAYOUT
PADDOCK
PIT LANE
STAIRS - D
STAIRS - C
STAIRS - B
PIT-LANE TUNNEL
STAIRS - A
PIT 01
PIT 02
PIT 03
PIT 04
PIT 05
PIT 06
PIT 07
PIT 08
PIT 09
PIT 10
PIT 11
PIT 12
PIT 13
PIT 14
PIT 15
PIT 16
PIT 17
PIT 18
PIT 19
PIT 20
PIT 21
PIT 22
PIT 23
PIT 24
PIT 25
PIT 26
PIT 27
PIT 28
PIT 29
PIT 30
PIT 31
PIT 32
CAR LIFT
CAR BALANCE
TECHNICAL SCRUTINEERS
AUTODROMO INTERNAZIONALE ENZO E DINO FERRARI
IMOLA

END OF DOCUMENT