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PRESS RELEASE

MAAL - MOBILE AUTONOMOUS AUTOMOBILE LABORATORY

AN FULLY AUTONOMOUS, FULLY ELECTRIC RACE CAR

GENEVA AUTO SHOW 2015

Geneva, March 3, 2015

MAAL is a full-electric, fully functional Autonomous Automobile (AA) development project by ED Design, which will become a Mobile Laboratory for automotive OEMs, IT companies, Research Institutes, Universities, and Governmental lawmakers, allowing many, many more people to experiment with AAs. Today, only a few automobile OEMs, tech giants, and certain Universities have created their own AAs, meaning that the majority of researchers around the world simply cannot participate in the future of digital mobility. MAAL intends to fill that gap, supplying prototypes to these researchers on a rental basis, allowing them to create futuristic experiments with real cars, real installations, with real-life reactions tangible results.

The primary objective of the MAAL project is to address passenger wellbeing inside the Autonomous Automobile, through sophisticated digital technology, aimed at helping ex-drivers forget their fanatic need for steering wheels, for full control of their automobile. According to the World Health Organization, that “full control” of the driving act produces 1.2 million deaths in car crashes every year, and that staggering number they declare, could triple by 2030 as emerging countries like China and India increase their car pro capita levels continuously. In order to not only reduce those terrifying numbers, but actually eliminate them, the act of driving must be eliminated, prohibited, becoming a thing of the past, like the Beatles and phone booths. But the transition will be difficult, since most drivers, according to popular blogs, swear they will “never” give up their steering wheels. These Doubting Thomases will be the toughest tests for the MAAL project. If we take away their steering wheels, we must replace them with something much more interesting, more exciting, if we hope to convince them that driving is no longer necessary. For this reason the MAAL project is inviting all types of researchers around the world to actively participate by requesting a MAAL prototype and conducting their own experiments, in order to expand the powerful potential of solving this difficult problem.

MAAL asks researchers around the world to join this noble endeavor in the automotive industry to stop killing millions of people. It will take lots of creativity and technology, but there is plenty of both in the world. They are simply not focused on Autonomous Automobiles at the present. According to Navigant Research, by 2035, nearly 75% of all automobiles will be autonomous.

First question: When all cars are completely autonomous (without steering wheels), what will happen to motorcycles? They too must become autonomous vehicles, with fixed handlebars, (like the Tron bikes), perfectly integrating all two and three wheeled vehicles into the “Internet of Things”, into a worldwide network of moving objects on all public and private roads.

Second question: When all streetcars will be 100% driverless, what about racecars? Historically, racecars have been the forerunners of automotive technology, testing advanced concepts destined to arrive on streetcars in the future. So if streetcars will soon become autonomous, then racecars must test this technology first, proving its worth in the extreme conditions of racing.

Why a Mobile Laboratory?
The 2015 ED TORQ represents the world premier for fully autonomous, fully electric racecars. TORQ is a Mobile Laboratory, and is part of the MAAL family of cutting edge, autonomous automobiles created by ED. Because the world simply doesn’t know enough about how autonomous automobiles will react with people, with society, with lawmakers, with wellbeing. We need to do years of experiments to catch up with our expectations. Not just simple road testing, like the Google cars, which concentrate almost exclusively on technology testing, while MAAL/TORQ mobile laboratories are designed to test human wellbeing, by inviting app developers from around the world to push back the frontiers of technology and human experience. In fact MAAL prototypes will soon be making a world tour to demonstrate how a car without a steering wheel can make people happy while traveling.

Tough Questions
Racecars have historically tested the technology of the future of streetcars. Torq pushes the unknown aspects of autonomous automobiles into the ultimate extremes of the racing world, asking many important questions:

1) How fast can electric cars go?
Today the world speed record for electric cars is 342.17 km/h. Torq max speed is 250km/h.

2) How long will batteries last in race conditions?
It depends on many factors, including battery technology, vehicle weight-to-power ratio.
Torq engineers at ED have declared the following tech data:
Combined 4 engine power output - 320Wh
Combined 4 engine torque output - 1800Nm
Overall weight - 1000km
Battery type - Lithium Ion
Battery volume - 450 liters = 550kgs
Battery output - 160 Wh/kg x 550kgs = 88KWh per charge LeMans track distance = 13.653 km
LeMans GT winner 2014 = 339 laps = 4620 km + 27 pitstops (1 every 172 km) - 14 laps/hr
Torq Performance goal = 4 min / lap at LeMans
Torq battery autonomy goal = 170km @ 4 min/lap

3) How can batteries be charged (or changed) during a race?
The methodology of the supply Torq currently can be performed using the fast replacement of the battery pack to be carried inside the garage of the circuit thanks to the positioning of the vehicle on a suitable bridge tire able to lift the car to allow you to take out the batteries in the bottom of

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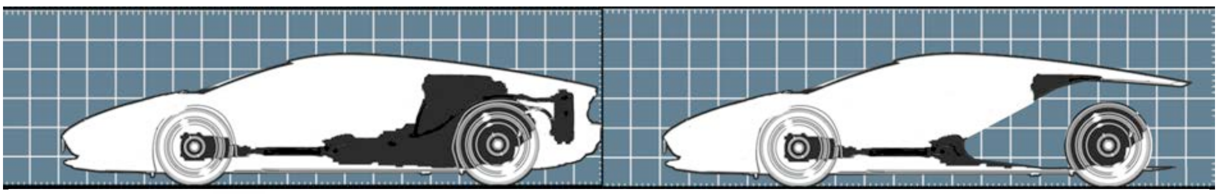
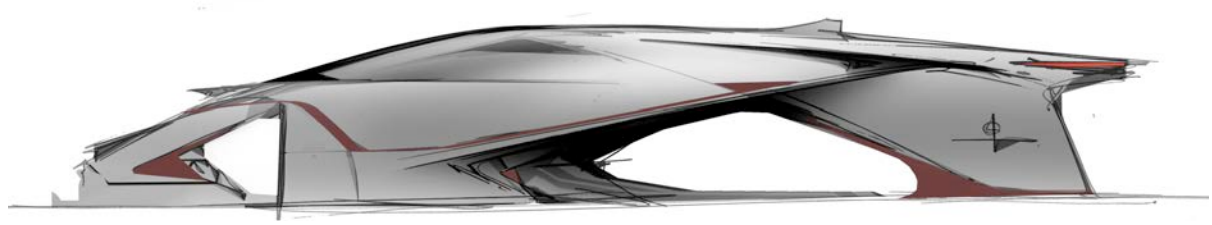
the frame. Suitable equipment must be specifically designed and manufactured for each team. The pitstop time can be estimated in 4 minutes.
In the future you will be able to think, as an alternative to replacing the battery pack, the fast charging plug when, in the circuits, systems can be developed that provide the real possibility of delivering large amounts of energy required for performance of these cars.

4) How will autonomous, electric racecars differ architecturally from traditional cars?

The most popular engine position in most sports cars and racecars today is the mid-engine, thanks to their excellent front-to-rear axel weight balance. Mid engines were invented by Bertone on the Lamborghini Miura in 1966, followed by the 1967 Alfa Carabo and the 1970 Lancia Straos Zero concept cars, and finally, in 1971, Bertone produced two car design icons, the Lancia Stratos HF and the Lamborghini Countach, which completely changed production automobile architecture directions forever.

Today, with electric engines replacing fossil fuel engines, the overall architecture of the vehicle is again being transformed into exciting new directions, leaving a gaping hole where a giant mid-engine used to be, reducing weight and visual volume of the vehicle, accentuating the fighter jet like “cab-forward” architecture previously invented by the mid-engine layout.





ED designers began experimenting with the unorthodox shapes, looking for new directions in car design. Some used a central backbone and hung the passenger compartment below it, in a dynamic, tilting solution. Others used a central backbone layout below the passengers, with two exoskeletons to support the seats. The winning solution matched a techno-skateboard, with holds all the batteries and 4 powerful electric motors near each wheel, with a floating passenger compartment above. At first glance, the most striking visual impact of the vehicle is the total lack of external glass. This advanced technology concept allows for a completely different form language, impossible with traditional automotive configurations.

5) How will drivers see out of a car with no external glass?

The most amazing feature of this concept car is the total absence of transparent external glass surfaces. This choice is motivated by the autonomous driving nature of the vehicle, replacing the heavy external glass with the ultra thin, curved OLED screens, which give the passengers a perfect, unobstructed, 360° view of the horizon outside the car. These latest technology screens offer many new, unprecedented opportunities, like offering image overlapping possibilities which

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put markers right onto the track, with sweetspot indications on each curve, G force feedback with lap-on-lap comparisons, also window-in-window inserts with rearview mirrors to see all those blind spots all around the car. You could even see yourself from your adversaries point of view, to try to understand what tactics they may be preparing. The most unexpected part of the Torq is the interior, because it will be driven by “Ambrogio”, a patented, “intuitive computer” we call a VPA (Virtual Personal Assistant). The car has a retractable steering wheel so that top drivers can teach Ambrogio how humans attack racetracks during testing. The idea is to use machine learning in the car’s software allps to continuously improve performance. The same mechanism can teach inexperienced drivers how to become a champion. During professional races, all steering wheels will be retracted, and all drivers will team up with their personal, onboard “Ambrogios” to try and win the race.

6) How can drivers win the race with no steering wheel?

If we look to science fiction movies we can find many suggestions. For example, in Star Wars, Luke Skywalker teamed up with his droid R2D2 to fly his X-Wing fighter. There is no reason that humans should be excluded from the process of Autonomous Driving. Ambrogio will be very smart and also very “social”, asking how he can help the driver win the race. At this point, one has to ask: “What is the difference between a winner and a loser, in car racing, or in any sport for that matter?” The will to win is a fundamental ingredient in all champions in all sports. Here, these champions sitting inside a Torq, working side-by-side with Ambrogio, will most certainly find a way to win. How? We don’t know yet. And that is why the Torq and the MAAL projects are all based on the Mobile Laboratory concept. We need to experiment, with many professional drivers and many app developers in order to find the best path from human to machine. Mechanical connections (steering wheels, pedals, etc.) are quickly becoming a thing of the past. But we still don’t have robust alternatives to replace them. Taking the drivers out of the Self Driving Race Cars and hoping the public will come to watch the race, at the race track or at home on TV, is nonsense. They won’t, and car racing will die. So we know we have a giant opportunity in front of us, but with it comes a giant responsibility. And that is why ED is developing Mobile Laboratories, and not simply futuristic concepts.

7) How will Ambrogio assist us outside the car?

Once we learn to live with a digital chauffeur (Ambrogio) in our autonomous cars, be they streetcars or racecars, we will want to take him (or her) with us wherever we go. Ambrogio will become our personal trainer/shopper/driver/ etc., helping us with every detail, automotive or non-automotive, professional or personal, at home, at the office, or at school, etc. and this will transform social relationships, when we become members of the Internet of Things world. It will be very interesting to see how humans will deal with artificial intelligence in machines, especially if they are Virtual Personal Assistant machines. Experiential Design is a term that Robinson has used and diffused for many years, and one that still today has giant barriers in the car design world. But it will soon change automotive architecture. External glass is no longer necessary, drastically transforming external and internal proportions, on both streetcars and on racecars. That same Experiential Design philosophy/technology, born inside Autonomous Automobiles, will soon become part of our everyday lives, inside and outside the car. Then every designer will need to learn Experiential Design. The future comes faster than we think.

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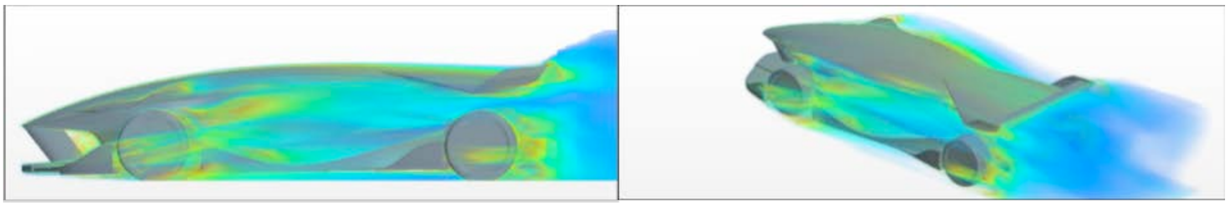
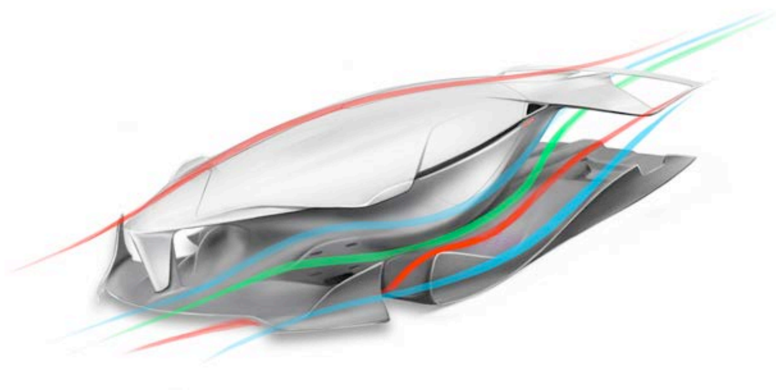
Active Aerodynamics

Every racecar has extensive attention paid to aerodynamics, constantly looking for new ways of reducing wind resistance while increasing downforce (350 kilos) for improved tire adherence. For this reason, Torq has undergone extensive CFD (Computational Fluid Dynamics) testing, fine-tuning all the critical surfaces involved in the active aerodynamics of the vehicle. Downforce is one of the first and foremost elements in racecar aerodynamics, and Torq has been designed to generate an incredible ground effect, thanks to the flat surface under the chassis (skateboard) and the finned surface above the chassis to help guide the airflow around the passenger compartment and the four wheels. The white passenger compartment has been streamlined around the two passengers, thus minimizing the overall dimensions, offering a more extreme aerodynamic effect, in order to improve the aerodynamic efficiency, and guaranteeing a well balanced behavior of the car at high speeds on the track.

Extensive CFD research



Aerodynamics Tech Data



v=250 Km/h
Frontal area = 1,9876m2
Cx = 0,80
Aero performance = 444 Cv
Cza = -0,300 – F Lift
Czp = -0,300 - R Lift
Fa = - 179 kg - F Downforce
Fp = - 179 kg - R Downforce

The name Torq derives from the huge torque transmitted to the ground by the four electric motors, which reach 1800 Nm. As a simple comparison, modern Formula One racecars have 1000 Nm of torque.

The vehicle is composed of two distinct parts.
The lower part, called the “skateboard”, is the flat aerodynamic underbody close to the road, designed to maximize the ground effect, guiding the air flow above the skateboard instead of below, to avoid areas of lift and turbulence. The upper surface of the skateboard is full of fins and contains the battery packs and the hardware for the management of the electronic.
The upper part of the passenger compartment, is designed around the two pilots, thus minimizing the overall dimensions, and an extreme aerodynamics, in order to improve the CX, the aerodynamic load, and guaranteeing a behavior as neutral as possible of the car.

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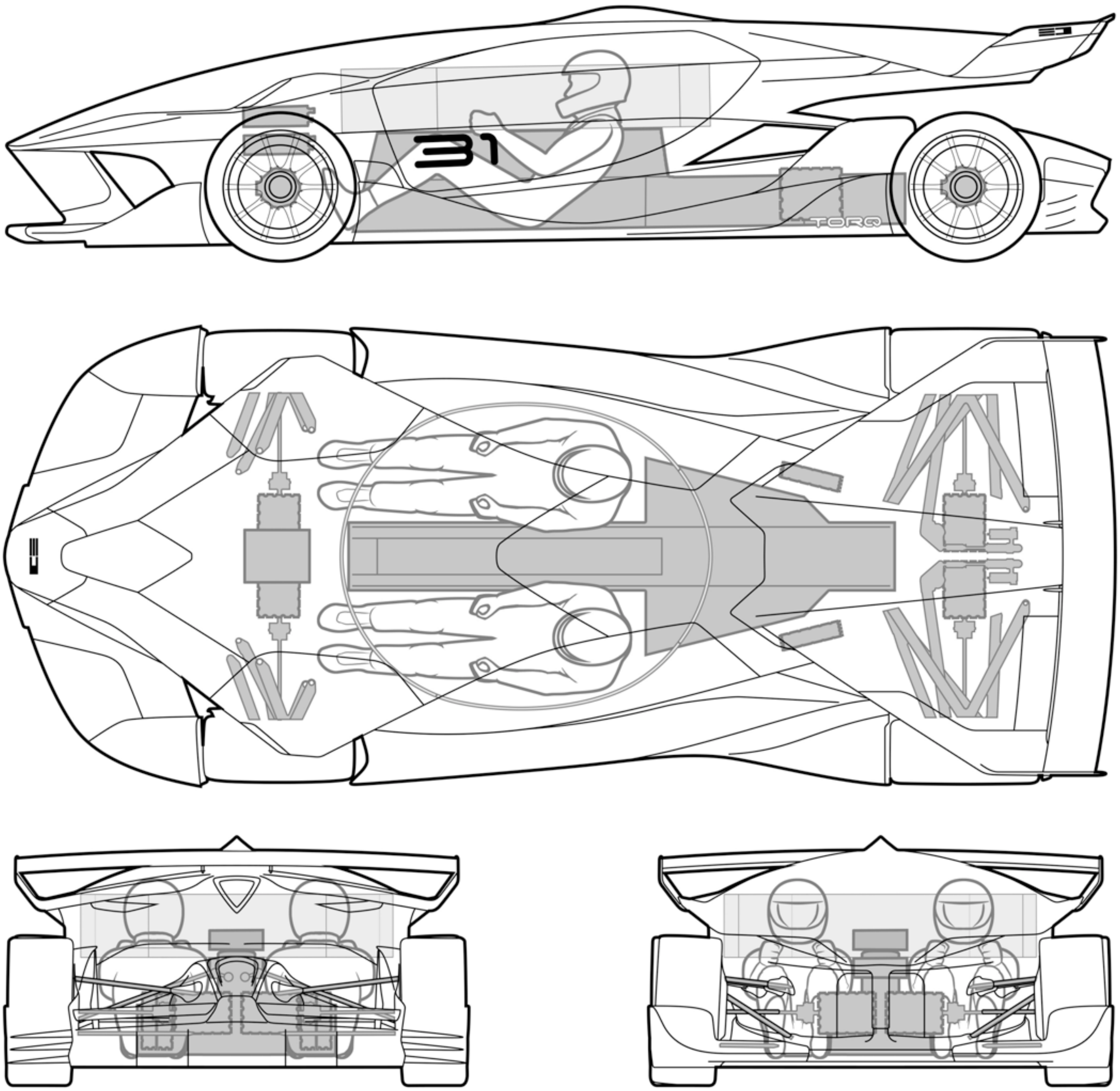

DIMENSIONS

OAL 4890mm
OAW 2125mm
OAH 1105mm
WB 3165mm

Other details: http://www.eddesign.it/press/ginevra2015
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