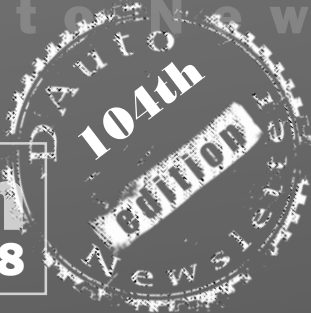


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2018

D A U T O Newsletter

Edition
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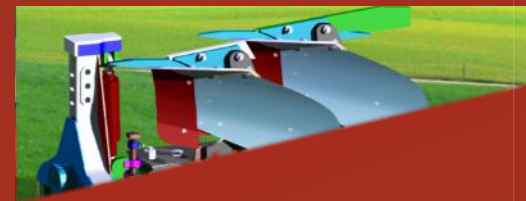
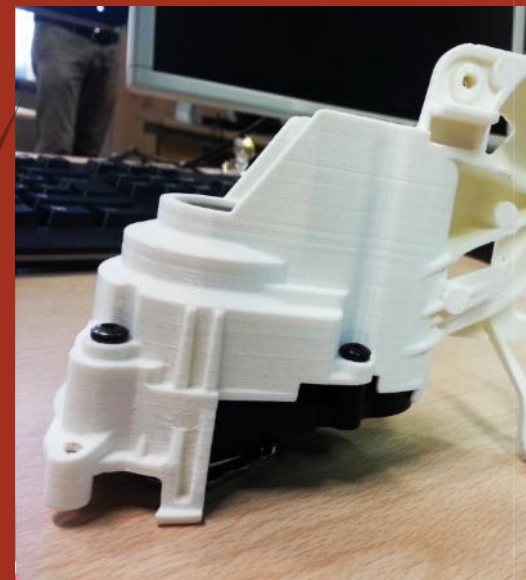


“ Design engineers turn designs into reality.
Without them, a great idea but nothing more
than,... well, a great idea. ”

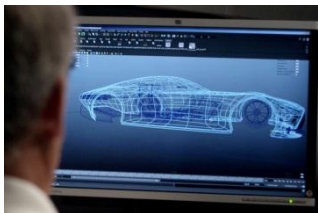
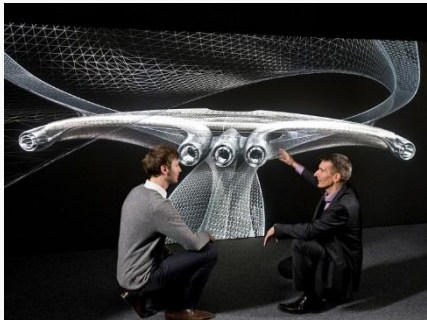
March 2018 refresh

- ✓ Honda unveils all-new CR-V
- ✓ Insulating bricks with microscopic bubbles
- ✓ 3-DIY: Printing your own bioprinter
- ✓ Telematics technology steering toward smarter EU roads
- ✓ Jellyfish-inspired electronic skin glows when it gets hurt
- ✓ Exclusive: the Pininfarina HK GT Concept
- ✓ A bridge so far: China's controversial megaproject

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Sculpting Cars in Virtual Reality



While this futuristic option looks extremely fascinating, transferring a complex task that requires multiple tools and functions into an augmented reality environment appears challenging, and poses some questions about the possible benefits it may have in terms of efficiency and ergonomics.

Future 3D modeling and sculpting software could offer designers an immersive experience thanks to the new VR headsets and haptic devices.

Recently there has been great interest, mostly sparked by the launch of the Oculus Rift project, in affordable, high-quality VR headsets, which have existed for quite a while for professional applications.

The potential – and expected – commercial success of this type of product is likely to encourage 3D software companies to develop and integrate innovative UIs, and this is a great time for thinking about possible applications in the design world.

One of the uses that come to the mind is the review of full-scale models in virtual reality. The observation of a vehicle in its actual dimensions is crucial for evaluating its design.

This is already part of the car makers' design process, but it currently involves specific facilities with large projection screens – such as the Power Wall – or other expensive proprietary solutions.

The availability of a new generation of relatively inexpensive VR headsets could make this type of process affordable for smaller studios and independent professionals, as well as enable virtual design review meetings among designers working at different facilities.

A further step could be the integration of interactive editing tools, which would allow designers to evaluate alternative solutions in real time and in “virtual full scale” without the need to go back and forth from the computer to the VR room.

Oculus VR, developer of the Rift headset, and now owned by Facebook, has recently acquired Nimble VR and 13th Lab, two companies that specialize in hand tracking and 3D modelling, so there is actually a great interest in exploring virtual 3D modeling tools.

500-year-old Leaning Tower of Pisa mystery unveiled by engineers



Results from the study have been presented to international workshops and will be formally announced at the 16th European Conference in Earthquake Engineering taking place in Thessaloniki, Greece next month [18 to 21 June 2018].

Why has the Leaning Tower of Pisa survived the strong earthquakes that have hit the region since the middle ages? This is a long-standing question a research group of 16 engineers has investigated, including a leading expert in earthquake engineering and soil-structure interaction from the University of Bristol.

Professor George Mylonakis, from Bristol's Department of Civil Engineering, was invited to join a 16-member research team, led by Professor Camillo Nuti at Roma Tre University, to explore this Leaning Tower of Pisa mystery that has puzzled engineers for many years.

Despite leaning precariously at a five-degree angle, leading to an offset at the top of over five metres, the 58-metre tall Tower has managed to survive, undamaged, at least four strong earthquakes that have hit the region since 1280.

Given the vulnerability of the structure, which barely manages to stand vertically, it was expected to sustain serious damage or even collapse because of moderate seismic activity. Surprisingly this hasn't happened and until now this has mystified engineers for a long time. After studying available seismological, geotechnical and structural information, the research team concluded that the survival of the Tower can be attributed to a phenomenon known as dynamic soil-structure interaction (DSSI).

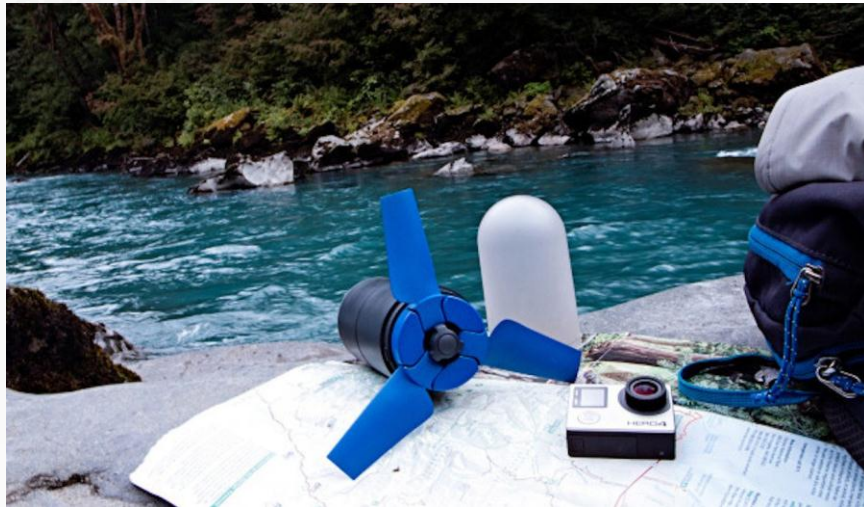
The considerable height and stiffness of the Tower combined with the softness of the foundation soil, causes the vibrational characteristics of the structure to be modified substantially, in such a way that the Tower does not resonate with earthquake ground motion. This has been the key to its survival. The unique combination of these characteristics gives the Tower of Pisa the world record in DSSI effects.

Professor Mylonakis, Chair in Geotechnics and Soil-Structure Interaction, and Head of Earthquake and Geotechnical Engineering Research Group in the Department of Civil Engineering at the University of Bristol, said: "Ironically, the very same soil that caused the leaning instability and brought the Tower to the verge of collapse, can be credited for helping it survive these seismic events."

This portable USB charger generates energy from any type of moving water and stores it for off-

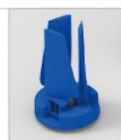
The US startup Enomad has developed Estream, a portable water-powered generator that when suspended in moving water, such as a river or stream, converts its kinetic energy into stored energy in order to charge USB-connected mobile devices. Able to also work in shallow, low-velocity streams, the turbine can generate between 2.5 and 5W of electricity, enough to charge up to three devices twice as fast as a regular outlet, while 4.5 hours are needed to fully charge the its 6,400mAh built-in battery. The device is ideal for hikers or for any other off the grid activity, as it is light and durable and can double as a flashlight as well.

Behind Estream, there is a team of young, professional designers and engineers who dreamt of making powerful portable green energy available to backpackers and hikers, while taking clean, affordable electricity to parts of the world that had never experienced it before. "Whether it comes in through the tap or it is collected from a stream, water is present in the daily lives of everyone on the planet. Enomad wishes to expand sustainable energy on a personal level by allowing people to discover and utilize the natural energy resources around them," says the team. In mid-2016, the startup run a successful crowdfunding campaign, the money of which helped the team further develop the system, adapting it to salt water energy generation.



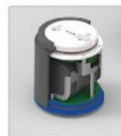
2 Generator

Shaft, Sealing, Bearing
Generator, Main PCB



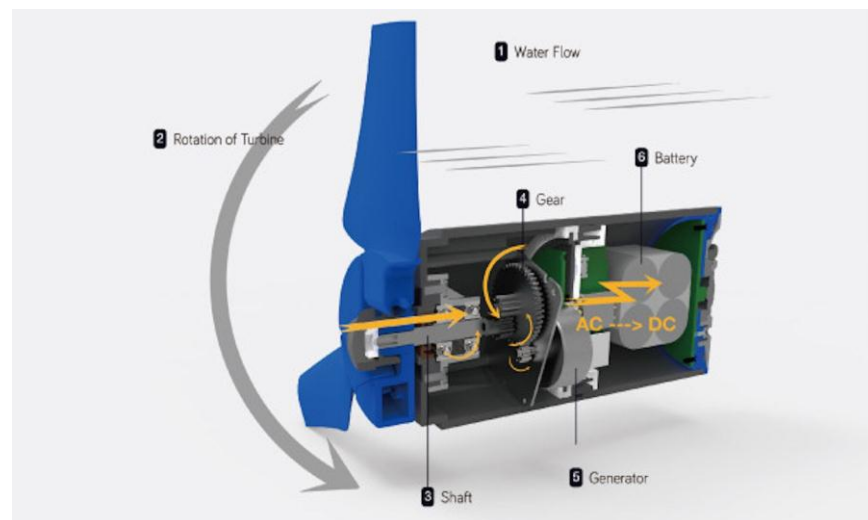
1 Turbine

Turbine, Lock



3 Battery

USB Port,
Micro USB Port,
Power LED, PCB
Li-ion Battery,
Indicator, Button, Hook



Aston Martin and Triton announce Project Neptune design completion



Aston Martin and Triton Submarines have revealed the final look and specifications of the Project Neptune, the upcoming limited-edition luxury submersible, expected to be launched later this year.

Since the announcement of the creative collaboration in September 2017, Aston Martin and Triton have worked to refine the detailed design of the submersible's hydrodynamics, body styling and luxurious interior packaging.

The vehicle aims at combining the performance, beauty and elegance of Aston Martin cars with the safety, reliability and 360° visibility typical of the Triton brand.

The final technical specifications confirm that the submersible will be able to dive to depths of 500 meters and carry two passengers and a pilot.

By improving the hydrodynamic efficiency, reducing frontal area, and increasing the power; the submersible will have an anticipated sprint speed in excess of 5 knots and approximately four times the acceleration of Triton's flagship 3300/3 model.

Marek Reichman, Aston Martin EVP and Chief Creative Officer commented: "The exterior design of Project Neptune owes a lot to the pursuit of performance. As with the Aston Martin Valkyrie, the hyper-car we are developing with Red Bull Advanced Technologies, we have afforded as much attention to the hydrodynamics of the underside as we have the visible surfaces. Some of that detail may never be seen, but its effect will certainly be felt.

"Project Neptune's interior was a great challenge. Unlike a sports car where the interiors are installed into an open-sided cabin before the doors are fitted, everything you see inside will be lowered through the upper-hatch and assembled within the completed sphere of the pressure hull. We have been able to present a congruous aesthetic that defies its multi-part complex installation."



Italian researchers develop lighter, cheaper robotic hand

Italian researchers on Thursday unveiled a new robotic hand they say allows users to grip objects more naturally and featuring a design that will lower the price significantly.

The Hennes robotic hand has a simpler mechanical design compared with other such myoelectric prosthetics, characterized by sensors that react to electrical signals from the brain to the muscles, said researcher Lorenzo De Michieli. He helped develop the hand in a lab backed by the Italian Institute of Technology and the INAIL state workers' compensation prosthetic center.

The Hennes has only one motor that controls all five fingers, making it lighter, cheaper and more able to adapt to the shape of objects.

"This can be considered low-cost because we reduce to the minimum the mechanical complexity to achieve, at the same time, a very effective grasp, and a very effective behavior of the prosthesis," De Michieli said. "We maximized the effectiveness of the prosthetics and we minimized the mechanical complexity."

They plan to bring it to market in Europe next year with a target price of around 10,000 euros (\$11,900), about 30 percent below current market prices.

Arun Jayaraman, a robotic prosthetic researcher at the Shirley Ryan Ability lab in Chicago, said the lighter design could help overcome some resistance in users to the myoelectric hands, which to date have been too heavy for some. Italian researchers say the Hennes weighs about the same as a human hand.

In the United States, many amputees prefer the much simpler hook prosthetic, which attaches by a shoulder harness, because it allows them to continue to operate heavy equipment, Jayaraman said.

Italian retiree Marco Zambelli has been testing the Hennes hand for the last three years. He lost his hand in a work accident while still a teenager, and has used a variety of prosthetics over the years. A video presentation shows him doing a variety of tasks, including removing bills from an automated teller machine, grasping a pencil and driving a stick-shift car.

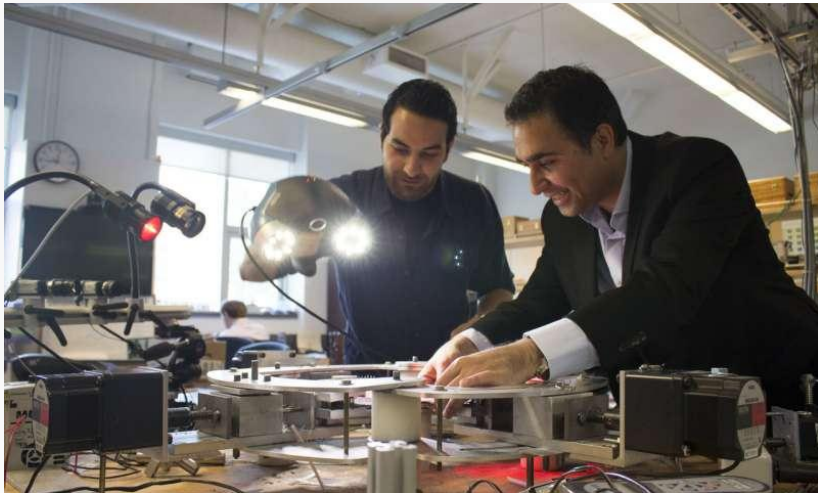


Marco Zambelli shows his prosthetic hand during an interview with the Associated Press in Rome Thursday, May 10, 2018. An Italian government-funded research institute and prosthetic maker unveiled a new robotic hand that they say amputees to grip objects with more precision, and with a mechanical design that will significantly bring down the price of a myoelectric prosthetic hand.



"Driving, for example, is not a problem," Zambelli, 64, said, who has also learned to use a table knife. "Now I have gotten very good at it. I think anyone who's not looking with an expert eye would find it difficult to spot that it's an artificial hand."

Researchers improve textile composite manufacturing



Engineering professor Abbas Milani and graduate student Armin Rashidi use 3D scanning equipment to analyze textile composites.

It is important for designers to be able to predict the right amount of force needed to diminish the wrinkles in the final product, explains Milani. To do this, his team of students has created a multi-step test to assess the magnitude of the required forces needed to smooth out wrinkles of different sizes that were formed at different shear angles of a comingled fibreglass-propylene plain weave fabric.

While wearing a crisply ironed, wrinkle-free shirt makes a good impression, researchers at UBC's Okanagan campus are working to solve the issue of wrinkling when it comes to making textile composites.

Textile composites are known for their strength and durability. But as Abbas Milani, a professor in UBC Okanagan's School of Engineering explains, a simple wrinkle in the manufacturing process can significantly alter the end product—sometimes diminishing its strength by 50 per cent.

Milani says wrinkling is one of the most common flaws in textile composites, which are widely used for prototypes, as well as mass production within prominent aerospace, energy, automotive and marine applications.

To iron out the problem, researchers at UBC's Composite Research Network-Okanagan have investigated several de-wrinkling methods and have discovered that they can improve their effectiveness by pulling the materials in two directions simultaneously during the manufacturing process. They did this by creating a custom-made biaxial fixture—a clamp that stretches the textile taught and removes unwanted bumps and folds.

"The challenge was to avoid unwanted fibre misalignment or fibre rupture while capturing the out-of-plane wrinkles," says graduate student Armin Rashidi. "Manufacturers who use these types of composites are looking for more information about their mechanical behaviour, especially under combined loading scenarios."

The research included stretching the material and then using specialized image processing and 3D scanning to analyze the required forces and its impact on the wrinkling and de-wrinkling of the material.

"Composite textiles are changing the way products are designed and built in advanced manufacturing sectors," says Milani, director of the Materials and Manufacturing Research Institute. "As we continue to innovate in the area of composite textiles to include more polymer resin and fibre reinforcement options, this research will need to continue in order to provide the most up-to-date analysis for manufacturers in different application areas."

Computer-controlled 'greenhouses' in kitchens grow fresher, healthier produce



People can grow a variety of plants in the Heliponix GroPod. This photo shows Genova basil, red Russian kale, cherry tomatoes, cilantro and arugula being grown.



A Purdue University-affiliated startup that seeks to redefine "farm-to-table" when it comes to garden vegetables by delivering its first orders of an appliance that fits under a kitchen counter and grows produce year-round.

Heliponix LLC, founded by two Purdue University graduates, has begun taking orders on its GroPod, a dishwasher-sized device its creators believe will disrupt the landscape of how food is produced in the face of looming worldwide food shortages and increasing concerns about chemical runoff polluting water sources, rampant food waste and water supplies diminishing on a global scale.

"It's great for consumers and for the environment," said Scott Massey, CEO of Heliponix.

The Heliponix GroPod allows people, even those living in inner cities with no access to land, to create perfect climate conditions so lettuce, spinach and other crops can flourish in their kitchens without using soil. The GroPod uses aeroponics, an efficient form of hydroponics that mists the plant roots rather than submerging the roots in a nutrient reservoir. It also uses targeted light-emitting diodes that give off the optimal light spectrum for photosynthesis.

"Each Heliponix GroPod is connected to the internet through IoT software that eliminates the need to know how to farm by automating ideal growing conditions through aeroponics, which uses no pesticides and 95 percent less water than conventional agriculture. You don't need to know how to program software, design hardware, or understand how to farm, the patented design has mastered that form and function," said Ivan Ball, also a Heliponix co-founder.

The Heliponix GroPod recently won the Best New Tech Product award from TechPoint, Indiana's technology growth initiative.

The GroPod also uses less energy than conventional farming and can grow crops up to three times faster. It also takes up no land and reduces the need for food transportation. The GroPod is self-cleaning and can be taken apart in less than 30 seconds to wash the pieces in their dishwasher.

The founders estimate most Americans would save enough money growing their own organic produce that the GroPod could pay for itself in a couple of years.

Computer-controlled 'greenhouses' in kitchens grow fresher, healthier produce



Growing a variety of crops in the Heliponix GroPod is easy. Users purchase seed cups, which are put inside the GroPod, and use aeroponics to grow.

"We chose the name "Heliponix" by combining the word 'helix' with 'hydroponics.' Our goal is to find the most efficient form of agriculture, and that means farming with the least amount of space, energy and water without compromising our commitment to growing the highest quality food. For inspiration we looked to nature, and were influenced by the helix found in DNA segments. Through survival of the fittest, nature has already determined this to be the most efficient shape, and this has been a powerful influence on our work."

Consumers can rip off a leaf of lettuce while letting the rest of the head to continue to grow, even when it is the dead of winter outside.

"You can't get any fresher than this," Massey said. "You never have to throw anything away. We hope this is going to shake things up in the ag world."

The Heliponix founders believe the device could be as disruptive to the kitchen as refrigeration, which allowed people to safely store food inside their homes for longer periods without someone delivering ice. The GroPod will allow people to grow fresh food inside their kitchen daily without the need of going to the store. The common theme is the innovation eliminates the perishability of the goods.

"The moment you separate a plant from its roots, the nutrients begin to decay exponentially," Massey said. "By the time it's on display at the grocery store, some of the nutrients are gone. It's amazing what happens when you let nature run its course, and flourish in the Heliponix GroPod."

Massey and Ball, both graduates of Purdue's Polytechnic Institute, were introduced to controlled environment agriculture (CEA) on a NASA funded research study to develop life support systems for future space colonies.

Inspired by their NASA research, they started a company called Heliponix (formerly Hydro Grow LLC) to commercialize their space-age appliance. The company was funded through business plan competition victories at other universities until Ball and Massey's graduation at Purdue.

Since graduating in 2017, they both worked for Heliponix full time. The company has begun selling the first Heliponix GroPod and plans to eventually begin selling refrigerator-sized GroPods.

Pininfarina HK H500 Sedan Concept



The H500 sedan concept car was premiered at Auto China 2018 along with the K350 compact SUV – with which shares the electric drivetrain – and the GT show car already seen in Geneva.

Like the other concept cars designed by Pininfarina for the Hybrid Kinetic Group, the H500 features a clean design and refined details, trademarks of the Italian design studio.

The body is characterized by a sloped ribbing that spans the entire vehicle, giving tension and lightness and defining full, sober volumes.

The front grille, which has become a signature HK styling feature, has even more character, while the two side air intakes emphasize the sporty, youthful positioning.

The interior, featuring four individual seats that act like comfortably protective cocoons, is focused on the multimedia experience.

The infotainment system features adjustable touch screens for both front and rear passengers, as well as a touchscreen that slides on the door panels making it easier to share entertainment.

The all-electric powertrain delivers over 300 kW and integrates a range extender that allows to achieve a total range of over 1000 km. The main performance figures are a 0-100 km/h sprint time of 4.5 seconds and a top speed of 250 km/h.



Blue Pilot project promises to push down cost of offshore wind farm installation



“On top of that the energy level is very high, more than six times higher than the largest hydraulic hammer in the industry, meaning fewer blows are needed,” said Winkes. Consequently, it could reduce underwater noise levels by up to 20dB, and reduce fatigue damage during installation on the pile by up to 90 per cent. A full-size monopile will be installed off the coast of the Netherlands this summer, for tests to validate the predicted noise levels and fatigue damage.



The cost of electricity generated by offshore wind farms could be reduced thanks to Blue Pilot, a European project testing new installation technology.

The Blue Pilot project will test a new type of pile driver, designed to reduce the cost and underwater noise associated with the construction of offshore wind farms.

Conventional hammers used for installing offshore foundations use a steel ram that hits the pile to drive it down into the soil. This steel-on-steel impact results in high stresses in the pile, and also creates underwater noise that can impact marine life.

The new Blue Hammer pile driver was developed by Dutch technology company Fistuca, a spin-off from Eindhoven University of Technology.

The project partners, which also include the UK's Carbon Trust Offshore Wind Accelerator (OWA), E.ON, Statoil and Shell, among others, claim it could lead to savings of up to euro €33-40m over the lifetime of a 720MW offshore wind farm, or a levelised cost of energy reduction of €0.9-1.2 per MW/h.

The Blue Hammer consists of a large water tank containing an open combustion chamber, according to Jasper Winkes, founder and managing director of Fistuca.

“Instead of using a steel ram the Blue Hammer uses a large water column that is thrown up in the air using the combustion of a gas mixture,” he said. “The water then falls back, creating a long lasting blow that pushes the pile into the soil.”

This cycle is repeated until the pile is driven into the soil.

The hammer produces a blow that lasts between 100 and 200ms (milliseconds), compared to 4-8ms for conventional pile drivers, while the force builds up and reduces gradually.

This limits the acceleration and vibration of the pile, reducing noise.

Bertone Pandion Concept goes on auction

The iconic concept car presented at the 2010 Geneva Show will be sold at an auction organized by Bolaffi that will take place in Milan on May 23rd.

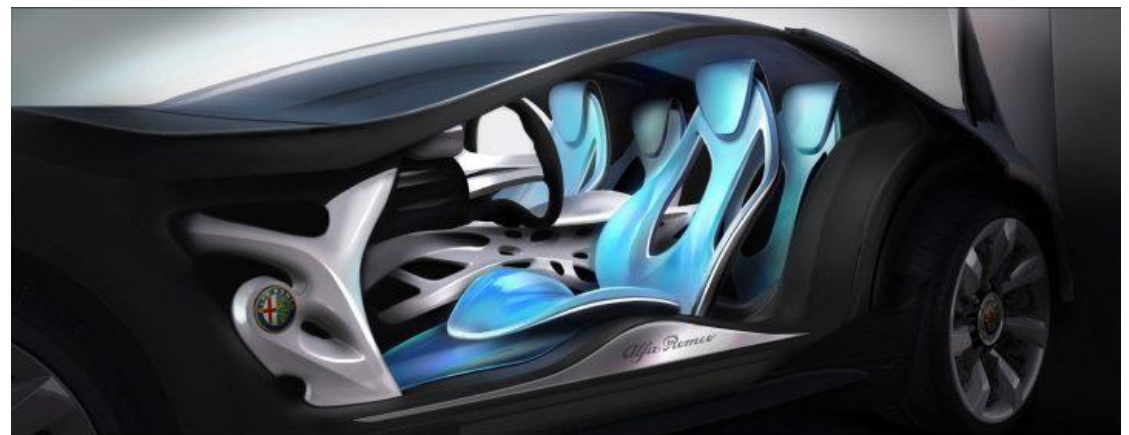
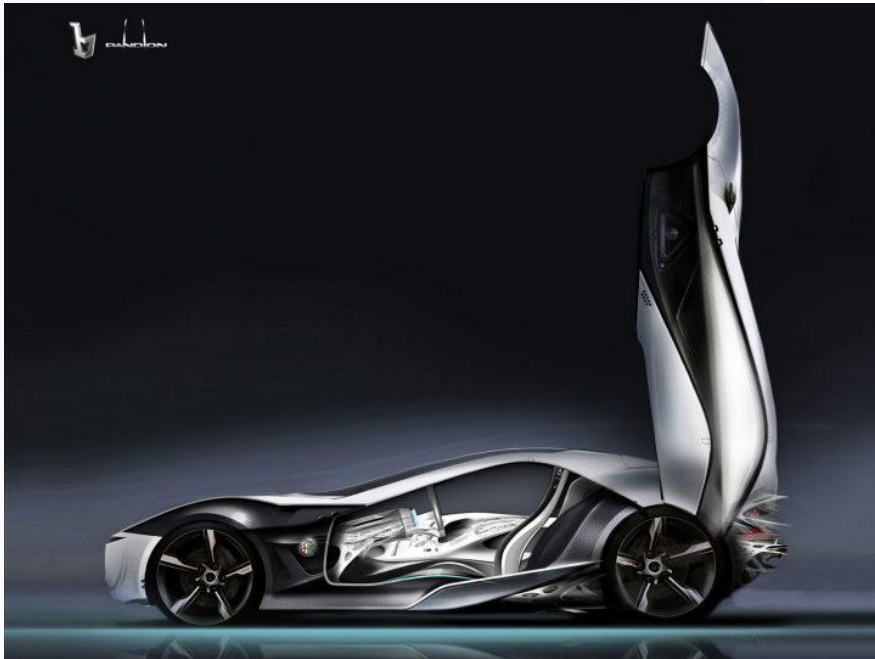
Based on the Alfa Romeo 8C, the Pandion Concept was presented by the Italian design studio in 2010 to celebrate Alfa Romeo's centenary.

The show car was designed by Mike Robinson and features very distinctive side doors which integrate the front fenders and wheel-arches.

The scissor door opening system took inspiration from the wings of birds of prey ('Pandion' is the scientific name for an Osprey). When opened, the side doors reach an impressive – and impractical – height of 3.4 meters.

The powertrain is the same as the 8C, and features a 4.7 liter V8 engine delivering 450 CV.

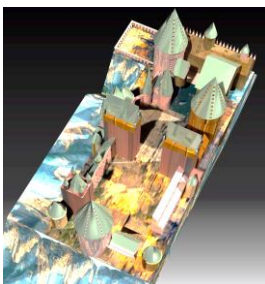
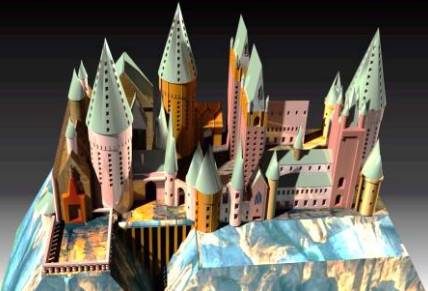
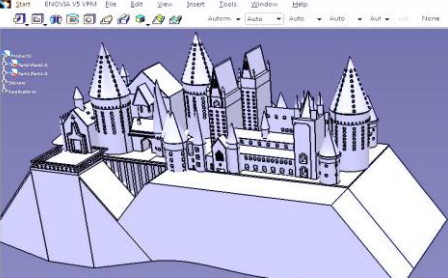
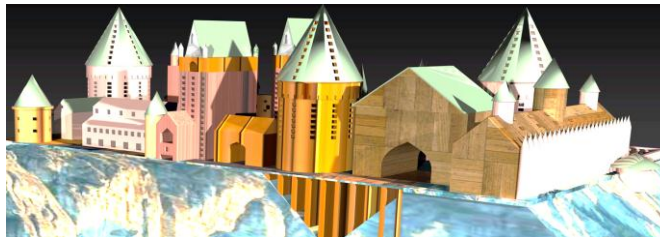
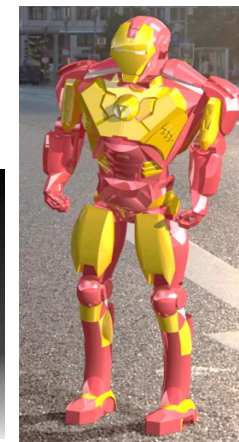
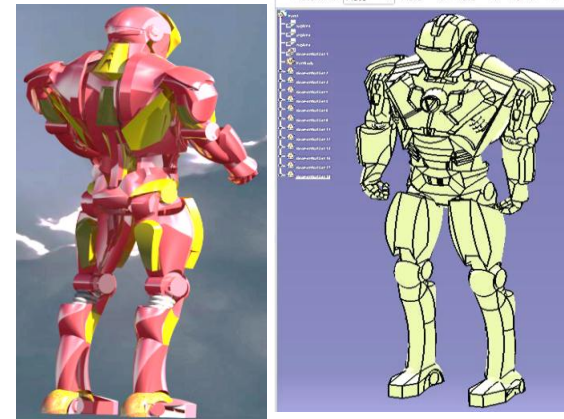
The estimated price ranges from 220K and 260K Euros – which is relatively reasonable given that this is the only prototype ever built.





By :
Danish Khan
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Design Tool : CATIA V5.

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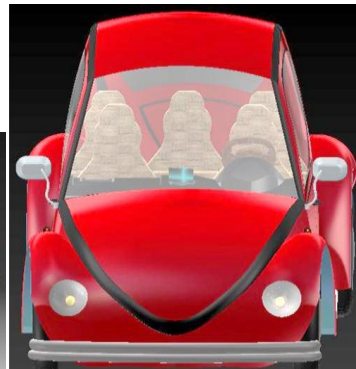
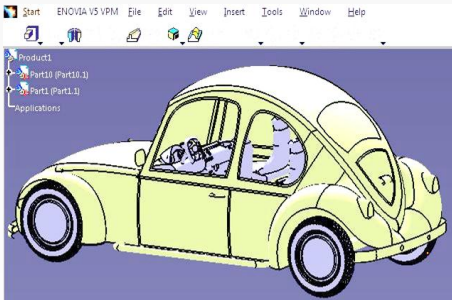
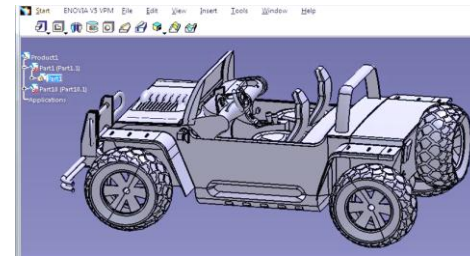
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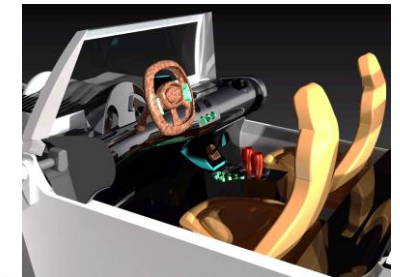
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Student's Corner

DAuto Training Yield



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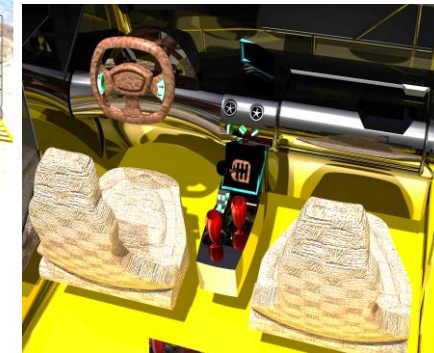
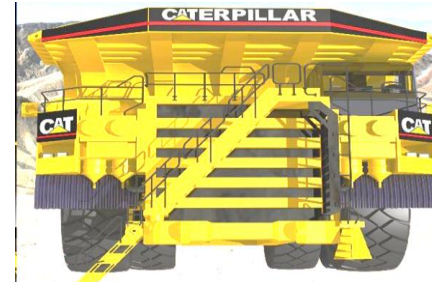
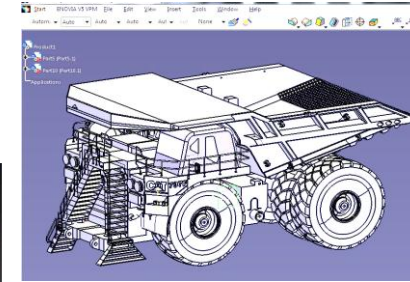
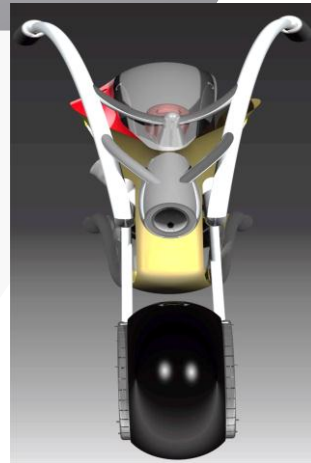
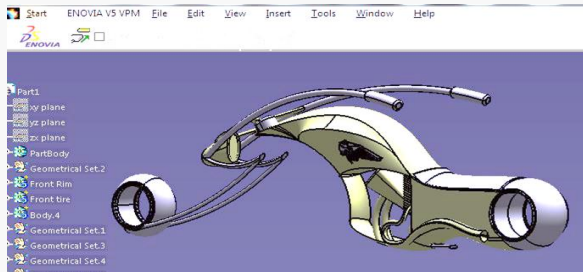
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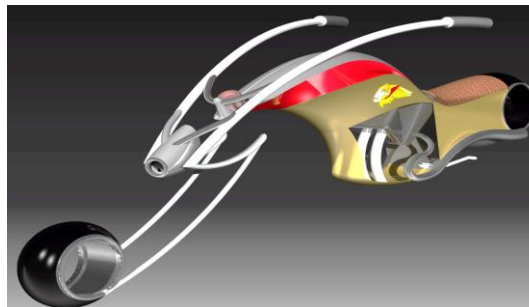
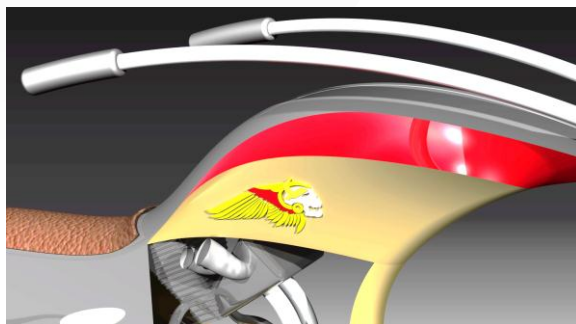
DAuto Training Yield



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“Never be satisfied with inaction. Question and redefine your purpose to attain progress”

Jeffrey K. Liker, The Toyota Way

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