



# Shaping the comfort for the drive and the rest

Vacust Technology uses a vacuum system, made in Italy, that's applied inside the cushions of the driver and passenger seats to copy the ergonomic shape of the user. To prevent the inflammation of the sciatic nerve, this modern evolution uses vacuum polyurethane to keep the memory of the shape, but can also create a variable massage system

Words Giorgio Carpi

**V**acust® Technology uses a patented system that creates a vacuum system that adapts perfectly to any surface or shape, which was created 10 years ago by the intuition of an Italian entrepreneur. There are several applications for this technology, but one of the most interesting ones for the automotive and RV sector relates to driver's seat. For some time, Vacust® has been working on various development projects with prestigious global car brands. The vacuum system technology is applied inside the seat cushions and allows it to copy the ergonomic shape of the user. In other words, the chair takes the shape of the user and allows a correct distribution of weight, and thanks to the greater support surface, it avoids the compression of the deep nerves which consequently allows better blood circulation and allows the user not to feel the need to keep changing position during long journeys. Vacust® technolo-

gy can also be applied to the backrest of the seat with the integration of a lumbar support equipped with a second pneumatic system. This increases the support surface and offers a very large point of contact with the body.

### The origins

Originally, the system was made of microspheres which, once the air was pumped out, got compacted while maintaining the memory of the chosen shape. The density and type of material used varied with the absorption capacity of shocks, vibrations, thermal insulation and seat stiffness.

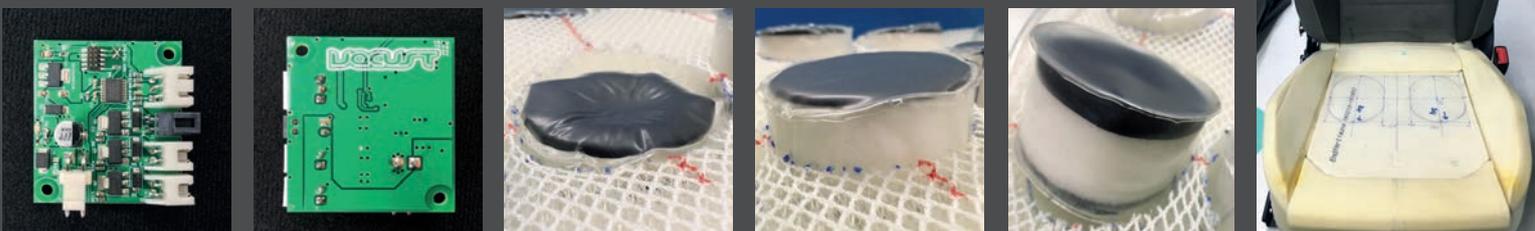
"For more than 20 years we have developed extreme sports equipment, such as safety systems for paragliders, hang gliders, harnesses, neoprene wetsuits, and much more," – says Alessandro Mazzucchelli, Vacust CEO. "During the development of a kitesurf harness, we needed to create a back support capable of



The inventor Alessandro Mazzucchelli with the Matrix seat awarded with the DAME

distributing the heavy load that the back is subjected during kitesurfing. We created the first Vacust application and were a finalist at the ISPO Munich in 2012. Two years later, Vacust has received the special "Nikola Tesla Award" from the Union of Croatian Innovators during the 42th International Exhibition of Inventions of Geneva (Inventions Geneva), and won the Gold Medal and a Diploma. In 2017, the P400 Matrix helm seat from Besenzone with Vacust vacuum custom shape technology won the DAME Design Award at the

Below: cylinders with controlled collapse direction



Above: control board for moving the pressures in the seat cushion

Above on the right: areas of movement of the foam in the seat cushion



2017 Mets Trade in Amsterdam," Alessandro Mazzucchelli added. The problem with standard inflatable supports is that they are always dome-shaped and don't give any real back support because under compression the air moves where it's not needed. The Vacust patented system comes to life and enhances an existing technology used in vacuum mattresses in ambulances. Removing the air from the PVC bags filled with EPS balls creates a solid block. Originally, this system was only possible while in horizontal position, but Vacust overcame this limitation with a special air-permeable membrane capable of keeping the material in place, even when upright.

**The evolution with the Foamvac**

A few years ago, Vacust's creator entered a partnership with Toscana Gomma Spa, part of the Olmo group, a European leader in the production of slab and moulded, flexible polyurethane (=PU) foams for several markets, such as: automotive, mattresses and furniture; in the automotive sector, they are one of the main suppliers of PU slab foams, PU seat foams, PU head-rests and arm-rests for several OEMs. Thanks to the collaboration with Toscana Gomma's chemistry department, Vacust identified a system to vacuum the polyurethane and control both the density and the bearing capacity of the padding and the direction of the collapse, something which, until now, had not been possible. By increasing the frictional resistances between the materials gave these vacuum polyurethane pads a shape memory performance. This evolution of the performance of the polyurethane in vacuum is an improvement over the initial Vacust technology. It means that in driver and passenger seats today there is soft polyurethane that is vacuum-packed and allows the

size of the seat to change, making it wider, much more supportive and sporty. When the air can re-enter the pneumatic bag, the foam recovers its original volume and softness.

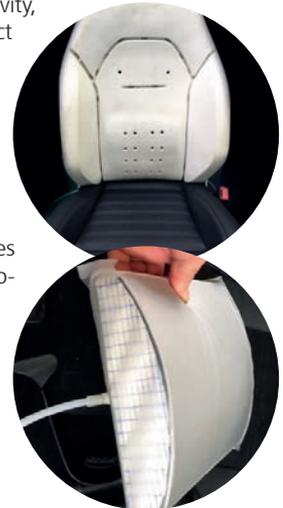
**Vacust massage technology**

By using two different kinds of foam, it's possible to change the seat's stiffness and support without changing the shape. This patented technology creates an amazing massage system that can be applied to the driver and passengers seats in a car or motorhome. The Vacust Ischial Massage (VIM) creates a decompression in some specific areas while sitting. The massage system uses high-density foam that is compressed using a vacuum process and released via a solenoid valve. The firmness of the foam is pleasant and progressive and still soft to push with a gentle pressure. A special solution allows the system to decide which direction the foam can collapse and compress. The Vacust control module board, developed entirely by the Vacust electronics department, manages up to nine different channels and is activated during timed ignition sequences. It monitors the external pressure and the negative pressure inside the pads, records individual adjustments and compensates for pressure changes at different altitudes. It is able to communicate with any device, from a PC to a tablet via a dedicated app. The insertion of the pads is programmed according to the geometry of the seat in such a way that when totally collapsed (about 10 mm) they are in line with the surface of the backrest cushion or seat cushion. The process developed with Toscana Gomma allows Vacust to perform a joint process whereby the whole system is integrated into the cushion, offering 5mm to 10 mm of foam to cover the system, depending on the

direction of the seat occupant.

*"The golden rule of sciatica prevention is to avoid sitting for hours. With our system, we simulate a walk by alternatively decompressing the buttocks. In this way, tiredness of the legs, and tingling and pain in the buttocks are prevented. The need to stop the vehicle to get out and walk is not required as frequently,"* says Alessandro Mazzucchelli.

Another extraordinary application of Foamvac is the use of foam inside the lumbar support bladder. The "D" shape that the foam is able to remember and maintain perfectly fills the lordosis cavity, offering a large contact surface and a softness that increases with increasing volume. The new advanced lumbar Vacust Massage System, allows the control of four independent volumes. It provides normal lumbar, high support, low support, and asymmetrical support in case of an oblique position on the seat, integrated with the massage system.



*Above: back cushion with co-molded lumbar support and FOAMVAC lumbar support*



**Simple but brilliant**

How many uses can a cushion have? You can rest your head to sleep, it can support your back, keep your legs raised in bed, on a chair or on the sofa. Born from the creativity of Alessandro Mazzucchelli, CEO of Vacust, and produced in collaboration with Toscana Gomme, the Folding Pillow is a multifunctional pillow based on

a solution that is as simple as it is ingenious. A transverse (not perpendicular) cut preserves all the original support of the cushion when extended, but allows a section to be bent up to 180 degrees. Filled with polyurethane memory foam and coated with fabric 100% Cotton, the Folding Pillow seems to be a great solution for rec-

reational vehicles where space is always limited and a multifunction pillow would definitely be useful. With a dimension of 730 x 430 x 138 mm, this pillow can be used in an RV bed to sleep, but also to watch TV or read, offering a much more functional and practical solution than the classic pillow.

