

## Smart plug for startup: Gulplug Drives Innovation in the Charging Industry with Altair's Startup Program



As e-mobility is undeniably one of today's most pioneering industries, companies and startups developing electric vehicles, motors, new battery technologies, autonomous driving or charging technologies are at the forefront of innovation. One of these pioneers is French startup Gulplug, located in Grenoble, France. Founded in 2014 as a spin-off of Schneider Electric Group, Gulplug has set out to revolutionize plug and charging technology used in today's electric and hybrid vehicles. To create new products and to drive innovation in the market, Gulplug is using Flux and the Altair startup program.

### Automatic for the people: high-end comfort for clean mobility

With their innovative magnetic technology to connect electrical machines, Gulplug addresses two different markets – cleantech business and clean mobility. For the first one, the company offers energy efficiency by supporting factories and plants with a monitoring device to monitor, analyze, and reduce energy consumption with wireless and battery-less, self-powered energy sensors. Gulplug's very simple, easy to use solution helps them to consume energy very smartly and efficiently, thus reducing costs significantly.

For clean mobility, the second line of Gulplug's business, the startup provides a new way to connect electric vehicles to electricity via an automatic, self-plugging conductive charging system. With the aim to improve their development process in the clean mobility area, the company was looking for simulation tools to predict and improve the performance of the system by creating and analyzing virtual models. Thanks to the Altair startup program, the Gulplug entrepreneurs and engineers had access to the full range of Altair tools and were able to start using Flux without overspending on their budget. Gulplug's e-mobility innovation, developed with the help of Flux, is a simple, automatically self-plugging charging solution, which provides high comfort and ease of use to electric vehicle owners by freeing them from the necessity of having to plug in his or her car for charging on a daily basis.

gulplug  
A NEW WAY TO CONNECT

### Industry

e-mobility, charging industry, clean mobility, cleantech

### Challenge

Creating an automatically self-plugging, magnetic based charging solution for electric vehicles.

### Altair Solution

Altair Flux™ helped Gulplug to model and create an innovative, clean, automatically self-plugging, magnetic based charging solution for electric vehicles.

### Benefits

Virtual models give confidence in the device before the product is physically built and help startups to get their products faster to market.

"Some might say, to plug in something is not a big deal. I plug in my phone and any other electrical device, so if I need to plug in my car to get it charged one would assume I would do that as well. However, a study undertaken by a car maker revealed that when it comes to hybrid vehicles, people charge them only for the first few times, after that they stop, since it's not a pre-requisite to drive the car. As a result, the car will not use its electrical sources and will produce emissions, and hybrid car owners then don't benefit from the advantages of owning an electric vehicle. With our invention we avoid this by automating the process of charging the car," explains Xavier Pain, CEO of Gulplug.

The Gulplug device can be used without having to actively plug the car in. Vehicles are becoming more and more autonomous and in just 1 or 2 years from now, cars will probably be able to park themselves, so they also need to autonomously charge themselves. "If your next car parks itself, it also has to be able to plug itself in, which is what we provide with our solution," says Xavier Pain.

While there are already some contactless charging solutions available in the automotive industry, these use induction, are very expensive, and the power is limited. The new magnetic based, self-plugging, conductive solution Gulplug offers on the other hand, is more competitively priced, provides more power, and there is no HF radiation at all.

### Innovate the charging technology of the next generation using Flux

The Selfplug® solution comprises a ground connector of about 50 cm in diameter with a vehicle plug fitted into the vehicle. The plug has to be placed right at the center of the ground unit. To guide and fix the plug in the center of the device Gulplug developed an electromagnetic solution and used a permanent magnet.

"We have been using Flux for two years now. Before that, we worked with a 2D system but switched to Flux because it offered a 3D solution. Thanks to Flux we are now able to get our products to market faster – and we are also a lot more professional, when taking all parameters into account."

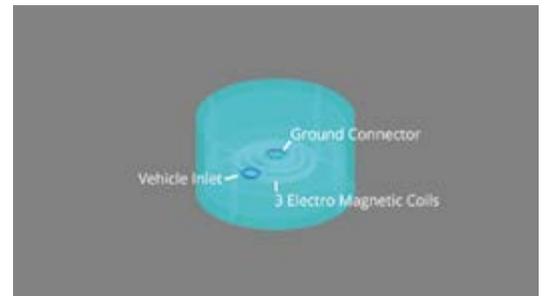
Xavier Pain, CEO gulplug

Employing Flux for modeling all magnetic issues, Gulplug engineers could make sure the plug was guided and fixed in the right spot to make it run. The Altair tool helped them to define the sizes and placement of the coils used inside the device which are required to create the electromagnetic force to guide the plug. All in all, Flux offers guidance on where to place the electromagnetic force, and how to develop the plug and fix it on the socket. The engineers still provide mockups and do tests to verify the Flux results. The software tool offers a comfortable way to make a model of the device, that can be easily shared with customers, car makers, and equipment suppliers before spending money on building a physical device or prototype.

Every startup has limited funds to start their business and spending large amounts of the budget on software may not always be possible. Altair has created its very own startup program to support technical startups by offering access to all kinds of simulation, IoT, and HPC solutions at an affordable price.



The Selfplug® solution comprises a ground connector of about 550cm in diameter with a vehicle plug fitted into the vehicle.



Gulplug's e-mobility innovation is a simple, automatically selfplugging charging solution, which provides high comfort and ease of use to electric vehicle owners.



Altair Flux helped to define the sizes and placement of the coils used inside the device.

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