

Transportation Active Aerodynamics



Dr. Daniele Gallardo
VP Biz Dvlp & Co-Founder

CEOCFO: *Dr. Gallardo, what is the vision behind Actasys?*

Dr. Gallardo: Our vision is to become the world leader in active flow control, and to introduce our groundbreaking technology into numerous markets bringing a revolution in modern aerodynamics. We started by targeting the transportation segment because of its impact on the global economy, but the goal is to expand to many different markets in the clean energy sector.

CEOCFO: *What is the technology?*

Dr. Gallardo: The technology comes from the aerospace industry and it allows us to change the aerodynamic performance of any object without changing its actual shape. Its core is based on synthetic jet modules, which are devices of variable size capable of generating extremely powerful jets of air consuming very small amount of energy. Traditional aerodynamic approaches rely on shape changes to improve the performance, but we change the way objects and airflow interact, solving the problems at their roots. By placing these modules in key locations of a vehicle, for example on a tractor-trailer, we can generate very powerful jets of air that can literally deflect the incoming airflow in the directions that we want. That is what we call virtual aero-shaping. Therefore, although a tractor-trailer might look to you as a brick-shaped object, by using our technology we can virtually shape it so that, to the incoming airflow, it will look like as a streamlined object, such as a bullet.

CEOCFO: *Have people been looking for a better method of controlling aerodynamics?*

Dr. Gallardo: Absolutely, aerodynamics is fundamental in a countless number of applications and many companies are working on different solutions. So far our competitors have been relying on standard approaches for improving aerodynamic performances, which consist solely in physical shape changes. The problem is that with shape changes the performance can only be improved to a certain extent. Moreover, in several applications, the shape cannot be changed easily because it is defined by other parameters and requirements. A typical example is a tractor-trailer: its shape has not significantly changed in the last decades because it is extremely efficient for loading purposes. That is why you still see these boxy looking trucks on the highways. This is where our technology comes in, because we can increase the aerodynamic performance of objects, in this case tractor-trailers, without changing their actual shape. We do so by placing our synthetic jet modules in key locations and by literally bending the airflow in the directions that we want.

CEOCFO: *Are people skeptical?*

Dr. Gallardo: Yes, and for two reasons: the first reason is that in the past nobody ever reached the level of performance that we are currently getting from the synthetic jets: many scholars and scientists performed some work on them, but could never figure a way to completely exploit their potential. The second reason is represented by the transportation industry itself, which is very conservative. However, things are changing very quickly; fleet operators are getting more aggressive in adopting new technologies because they started to understand that reducing fuel costs is the most effective way to get ahead of their competitors. From an OEM perspective, there are new government regulations that will force manufacturers to significantly lower the levels of vehicles' emissions. For this reason, similarly to what is happening to fleet operators, OEMs are quickly becoming more open to innovation.

CEOCFO: *Where are you in the process of development and bringing your product to market?*

Dr. Gallardo: Last year (2014) we secured about \$1 million from both private investors and NYSERDA (New York State Energy Research and Development Authority). Those resources were used to develop a full scale prototype that is now being tested. We went literally from a scaled model in a wind tunnel, to a full scale working prototype that is capable of withstanding a wide range of environmental conditions in less than one year. Our current testing partner is Price Chopper,

which is a chain of grocery stores here in the North East. By the end of the testing effort, which will conclude in August, we will have a strong database that will show the effectiveness of our product. We are planning to start trials of our beta version with a group of selected fleet operators in as early as fall 2015.

CEOFO: *What is involved in an installation?*

Dr. Gallardo: The installation is very simple since our system is designed to be easy to integrate onto existing trucks, independently from make or model. The only thing that fleet operators need to do is to mount our modules on the side fairings of the tractors, and connect our central control system and electronics to the computer and battery of the truck. Our control system will take care of anything else and will tune the system to get maximum savings for that specific configuration of tractor-trailer. It takes less than an hour of installation time, and Actasys will support the installation in the initial phase.

CEOFO: *Are there any interactions that could present a potential downside in using your product?*

Dr. Gallardo: There is not any downside to try our product, especially because our technology is not a passive technology, which could impact fleet operations. Moreover, we are not adding a significant amount of weight, and the system is fully automated, so the drivers won't have to do anything. Additionally, one of the biggest advantages of our product is that, since our control unit is connected to the tractor's computer, we can deliver fuel efficiency data much faster than our competitors, which sometimes require months and months of testing to prove their fuel savings.

"People should pay attention to Actasys today because its platform technology will bring a revolution into modern aerodynamics and will make a huge impact on modern society."- Dr. Daniele Gallardo

CEOFO: *Would a driver on the road notice the difference? Does it affect the feel and handle of the truck?*

Dr. Gallardo: Absolutely. Anytime you are dealing with aerodynamics you do not deal just with the fuel efficiency aspect of it, but also with vehicle's stability and handling. When we started talking with drivers to get their feedback on our technology, they would mention that some of the passive technologies added to tractor-trailers, such as roof fairings, would significantly change the driving experience, because they would add a certain vibration to the steering wheel. Our technology not only will improve the fuel efficiency of vehicles, but it will significantly improve the drivers' experience due to its active and virtual shaping nature. Moreover, for future versions of the product, we are planning to integrate sensors that will detect the stability conditions of tractor-trailers, and activate our modules accordingly to compensate for instabilities. This means that, not only will we be able to increase significantly the fuel efficiency, but we will also improve the driving experience and the safety of the vehicles.

CEOFO: *Would you tell us about the tail unit?*

Dr. Gallardo: The tail unit is something that we are working on as the next product, following the gap unit. So far, we have been focusing on the gap between tractor and trailer, but the vision is to apply our technology following a holistic approach, covering any area in the tractor-trailer that is a significant source of drag. For the trailer tail, what is available on the market are what they call, Boat Tails, which are curved or straight surfaces added to the back of the trailer to give a more streamlined shape to its end. The problem with those is that they very often affect the loading and unloading operations. , With our unit, we will be able to create a virtual Boat Tail, providing fuel savings without impacting fleets operations.

CEOFO: *What has surprised you as you have developed the product and started testing?*

Dr. Gallardo: There are many things that surprised us. When we started developing a solution for the transportation market, we decided to focus on the trailer tail but surprisingly many fleet operators have given us the feedback that tractor-mounted solutions would have been much more marketable. They brought many reasons for this, one of them being the fact that, according to them, tractor-mounted technologies typically lead to a pay back (from a fleet operator point of view) that is almost 3X faster than trailer-mounted technologies.

The reason is that trailers can be left in parking lots for months without generating any fuel savings. That was a very unexpected yet extremely useful feedback, which led us to a very early pivoting.

Another surprising thing is the amount of saving that we are currently getting from our road testing efforts. We thought that it would have taken us much longer to get to real world results similar to what we got in the wind tunnel, but our technology is proving to be extremely effective in full scale.

CEOCFO: Are you making inroads with the OEMs?

Dr. Gallardo: There are two commercialization directions. One is the retrofit, for which we are currently developing a product that we will sell directly to fleet operators. The medium to long term direction is to work with the OEMs to integrate our technology into the design of new parts and vehicles. On that aspect, we are currently establishing several relationships with OEMs and their Tier 1 Suppliers and we are indeed planning to execute road testing with them as part of the validation of our integrated solutions.

CEOCFO: Is it frustrating that it takes so long for people to pay attention, when you have something that you see clearly can make a difference?

Dr. Gallardo: Of course, but I think that it is something that happens with anything revolutionary. In the beginning, people are very skeptical, but when you start showing real world results to them, they start fighting to get your technology.

It is frustrating when an audience does not understand, but it is very rewarding to see their expressions when the light bulb turns on in their minds and hear “Oh, now I see what you mean! This is amazing!”

CEOCFO: Put it all together for our readers. Why pay attention to Actasys today?

Dr. Gallardo: People should pay attention to Actasys today because its platform technology will bring a revolution into modern aerodynamics and will make a huge impact on modern society.

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