How developing robots for the solar industry can take you to new areas

Before and after cleaning

SolarCleano has been developing and selling robots to clean solar panels for 3 years. Based on the cleaning experience of its founder, Pol Duthoit, it created a robot usable by lone workers. Along the way, SolarCleano made a few discoveries that helped it tackle more issues.

Safety glider

Solar panels exist in all shapes and sizes

When the main SolarCleano F1 was developed, the objective was simple. A robot that could be used, unmounted and displaced by one person. It was already known that providing a power supply that would work independently on the robot would be a great add-on. Indeed, not every installation provides power sockets, and carrying a generator, or even just electricity cable, can prove to be a huge inconvenience. SolarCleano therefore developed a machine that would be dismountable, remote-controlled and battery-powered.

Soon, it also appeared necessary to develop pads that would allow the robot to clean steeper panels, most installations in Europe being tilted for instance. The key to this balance was the pads placed on the Solarcleano robot. With constant innovation, we now offer a robot capable of climbing 25° steep slopes. Also, 4 types of brushes are available, depending on dirt type. They can be combined at will.

For steeper slopes, we decided to go for an alternative solution: a safety glider. Attached on top of the robot, it accompanies it in its movements while connecting it to the panels.

Also, we received feedback from cleaners about smaller surfaces: while happy with the SolarCleano F1, they were still hand cleaning most smaller installations for practical reasons. This observation led to the release of SolarCleano Mini, easily lifted by one person and dedicated to smaller surfaces.

Where balance is everything: floating panels

Space on ground can be scarce due to agriculture, industry, housing... In some countries, few are willing to 'give up' several acres of useful land for the sole implementation of solar panels. One of the solutions is the setup of solar installation on water: floating panels.

However good the idea might be, this type of panel is not free of dirt: algae, drops of water, salt and the vicinity of birds, who tend to find solar panels particularly warming in cold weather, tend to soil these installations quickly. Finding a solution for its cleaning is therefore important, but complicated: floating solar panels are moving installations.

SolarCleano robots have a low centre of gravity, for heightened stability. This capacity is key in environments such as floating solar panels, which move with the waves. The detachable brushes have an articulated linked to the central part, compensating the difference of levels between panels.

In order to make the robot go even more smoothly from one panel to the next, two wheels were added on top of the brushes, stabilizing the panel before the robot rolls onto it.

The demand is increasing considerably

Since the beginning of our adventure, we have sold close to two hundred cleaning robots. Customers started with one robot and soon requested a second one in order to keep up with the increasing workload. Seeing this, we started considering more solutions to enable professional cleaners to clean more surface with their robot. Two leads emerged: cleaning more panels at once and cleaning for a longer period of time.

The first solution was to offer 2.2m wide brushes as an alternative to the standard 1.2m ones. Covering two rows of panels, these brushes increased the average speed of cleaning by 600m²/h. This solution is particularly efficient for flatter installations where many panels are organized together. However, increasing the size of the brushes slowed down the speed of the machine. Also, the adherence of pads on the panels being impacted by the extra weight, the

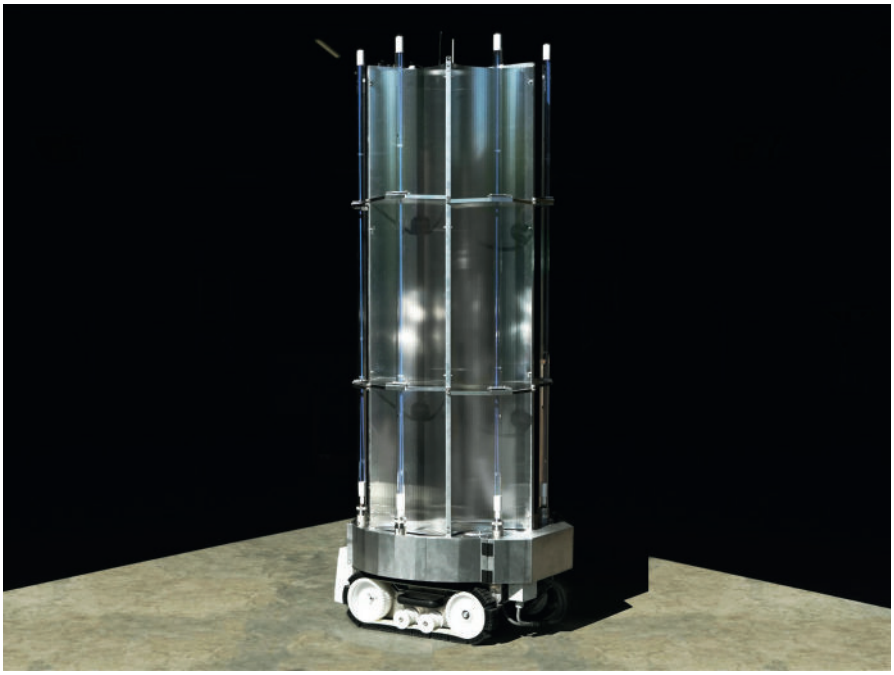
C0388T01 contrast

Transporter

SolarCleano cleaned flatter slope. The maximum reached was however still 22°.

The answer to it was the safety glider: set on top of the panel and fixed to the robot, it compensated the gravity and secured the robot whilst working.

The second option for cleaning more was to increasing the amount of time in which the robot would be capable of cleaning. Not only by providing longer-lasting batteries, but also by taking into account the external factors impacting the duration of cleaning. One of them being the amount of light available, more so in winter or in the early months of spring. Times in which the weather conditions might be good enough for cleaning, but with a sun setting too quickly for it to be a proper work day. Also, in desertic areas, with the aim of cleaning outside of the hot hours of the day.



Lighthouse body

For this, SolarCleano installed a set of LEDs on top of the robot, associated with a 360° camera. This way, the LEDs light up the panels surrounding the robot. The camera captures the image and sends it to a screen fixed to the remote control. With them, the user can maneuver their robot safely and clean the area independently from the amount of natural light available.

Glass roofs need cleaning too

The specificity of Solarcleano is its particularly light weight. Focusing on this strength, a test was done on glass to develop the cleaning capacities of the robot.

Using soft brushes, in order to ensure the most delicate cleaning possible, a SolarCleano was mounted on a glass canopy in the center of Paris. This first successful tryout was the proof that the concept and the technology behind it could be used for more than solar panel cleaning.

Using the technology for fighting COVID-19

The latest evolution of the COVID pandemic has not left anyone indifferent. So, we decided to take action by starting with what we mastered best: robotic solutions. On the basis of a SolarCleano Mini robot, we set up a range of UVC-lights. UVC lights are aggressive lights that quickly and efficiently disinfect any type of surface, as they are deadly to most microorganisms and dangerous to humans. The Lighthouse bot could be used in several situations to provide chemical-free disinfection.

www.solarcleano.com