Renu Hero 2

Game-changing robotics solving vegetation problems

PES caught up with Renu Robotics' CEO Tim Matus to gauge the up-to-the-minute thinking on autonomy in the solar industry. Is it taking off and what direction could the latest technology be headed next?

PES: Thanks for taking time to speak to us again Tim. When we spoke earlier in the year, you explained much of Renu Robotics' autonomous technology and how it's being used in the solar industry for vegetation management. You mentioned then that things were developing fast for the company, so is the rate of growth still continuing?

Tim Matus: It's great to talk to PES again and, yes, we're still growing and fulfilling orders for existing customers and talking to new ones daily. As I mentioned last time we spoke, we're four years old now and have more than doubled in size, as our primary core market remains US utility-scale solar power plants. We're operating in 16 states, from Maine to Hawaii.

PES: The solar industry is growing globally, of course, and in the US where Renu is based, there's already a vast number of solar fields to be maintained, isn't there?

TM: In the US alone, it is estimated there are more than one million acres to maintain. Although it was on hold for a while because of supply chain issues, the growth of the solar industry in North and South America, Europe and worldwide is expanding rapidly and likely to do so for a decade.

As the industry continues to grow, so do the annual problems of vegetation management. Even before Covid, labor shortages, reliability issues, damage, safety and environmental concerns were constant problems, so the Renubot has become the preferred solution.

Tim Matus

We say we have a panoramic understanding of vegetation management and how to meet utility solar plants' various needs, while increasing safety. Every solar site is different in its design and specifications, so the Renubot's ability to navigate precisely is a prerequisite, especially on utility-scale solar power plants, considering the limited space between the rows of panels and the wiring underneath.

Our Generation-3, all-electric, fully autonomous vehicle is designed specifically for vegetation management on solar plants and other energy facilities. Real-time Kinematic GPS provides horizontal accuracy within two centimeters or within an inch.

The Renubot is safe, reliable, can mow during the day or night and significantly cuts vegetation management costs and carbon emissions.

We've developed artificial intelligence for autonomous operations and use multiple sensors for situational awareness. There are a number of other technological and communications capabilities that make it an autonomous vehicle unlike anything on the market today.

But the fact the Renubot can mow at night has been a game changer for some O&M managers since it has never been done before. They like the fact that the grass can be mowed at night in a certain sector of the facility, before crews arrive in the morning for maintenance or repairs.

PES: So with more and more Renubots now out in the field in the various states, what has the company learned from experiences in the field and how have lessons learned translated into the bot's performance and capability?

TM: We're continually learning, but our collective experience internally and conversations with asset owners and O&M managers were the guidelines we used in manufacturing.

The Renubot has a streamlined body frame, that is only 28 inches high to safely mow under panels and solar site infrastructure. The bot's powered by a sizable lithium battery, so its weight is optimized by utilizing the latest battery storage techniques and rapid-charging capabilities, extending performance through seasonal changes and cutting requirements.

Renu Robotics' ecosystem complete with Recharge Pod, Renubot and Solar Charger, consisting of three solar skids

It can mow an estimated 100 acres or more per month. Each day the bot can mow four to six acres during a six-hour cycle on a full charge.

When its lidar detects something in its path, maybe some equipment workers may have left behind, the bot stops, can go around it as well as wait for the object to be removed. It can mow a 15-degree incline easily, go through ditches and has a self-adjusting mowing deck, from 1.5 inches to 9.5 inches, for maximum flexibility.

Its innovative features include controls for energy usage optimization, self-diagnostics and operational area setup. The bot's enhanced environmental assessment capability will allow it to utilize data so it can learn and assess the facility infrastructure as it travels.

As the world's use of renewable energy increases toward a carbon-free economy, the Renubot is great for the environment and certainly helps in the fight against climate change.

Two Renubots cutting grass on a utility-scale solar facility

PES: You mentioned in our last interview about plans to expand Renu's Robot as a Service, or RaaS model. Can you elaborate on those plans now?

TM: Of course, since a lot of people are familiar with a SaaS model for software, our RaaS model is a complete system for vegetation management. The Renubot can mow in the field anytime in a 24 hour period and when it completes its 'cycle,' it returns to its Recharge Pod to replenish its battery and can receive software updates there or in the field from Mission Control.

The Recharge Pod is 7.5 feet wide and 11 feet long. It's five feet in height, so the bot has plenty of room. It houses the electronics for charging and RTK communications. The pod weighs about 1,200 pounds and we coordinate with customers so there's a flat level surface where it will sit, preferably on concrete or a gravel base.

When the bot approaches, the pod doors are opened and the bot slowly enters, connecting the charge contacts on the back of the bot and near the base of the pod to recharge in an eight-hour period or less until the next cycle. The pod provides protection in all climates and is normally equipped with three individual converters for charging. A customer can add converters for a quicker charging cycle, up to six, in fact. But a pod with three converters is typical and its electrical setup can be either standard AC or DC or both, depending on the electrical availability.

The other critical piece we've built in the RaaS model is Mission Control. It is located in Renu's corporate offices where technicians continuously monitor, control and update the bots in the field. System access can allow for security checks, software updates and adjusting maintenance schedules.

A Renubot cutting grass underneath panels

Mission Control gives owners and operators peace of mind, with a secured and encrypted data flow, allowing for a high-level overview of their facilities' maintenance plan. Whenever it's convenient, asset owners and O&M providers can monitor performance, location and schedules with computers, tablets or cell phones.

This center also allows for automatic reporting, triggering of alerts and allowing for text or email messages to be sent to any device. Mission Control is also linked to a Service Management System, allowing for a seamless transition for 'trouble tickets' and maintenance repair documentation.

It also offers automated predictive analytics through machine learning. This leverages the built-in automated reporting and notification system to alert users of reliability and/or maintenance concerns.

PES: Also new since we last spoke is the introduction of the Solar Charger, right? Could you tell us more about that?

TM: The new Solar Charger is our redesign of the original Solar Skid, but now each skid is a more compact three-panel configuration. Our new standard configuration is three skids together to comprise one Solar Charger, which is connected to the Recharge Pod. Each skid is a self-ballasting unit that produces 1,200 to 1,500 watts with a 5 to 25 kilowatt-hour (kWh) battery storage option. If a customer wants a faster charge, then we can add more skids or another complete Charger.

If remote location is a problem, the Solar Charger can be deployed anywhere, regardless of how remote the facility is in a carbon-free and stand-alone configuration. That's another environmentally friendly point because owners and operators will never have to worry about fuel spills again.

PES: So it seems like as the solar industry grows, technology continues to develop to meet demand, would you agree?

TM: For us, we saw an increasing demand for vegetation management in which an industrial autonomous mower was the solution and it needed an ecosystem around it that we developed. At the same time, we've responded to customers' requests on how the Renubot can be a turn-key solution for their solar or energy facility and have continuous oversight and data collection that benefits their facility. We see a lot of potential products for the future.

From a sales standpoint, we offer either ownership or a lease model, giving customers flexibility. But when they compare what they're currently paying for vegetation management, owning a fleet of Renubots makes fiscal sense.

PES: For a relatively young company you've been making big strides already in the US haven't you? Are there plans afoot for future expansion in the US and, eventually, globally?

TM: We're working hard to maintain our growth trajectory. There are several ideas being discussed about the future of the Renubot. Most of them range from possible tracks to concepts dealing with other O&M measures, such as cleaning, inspection or security.

When we're talking to customers we're also asking, 'what do you need a bot to do for your facility?' Many times the answers are similar to the concepts I've mentioned and sometimes they're not, but, in the end, we'll make market-driven decisions.

We've already discussed our new Solar Charger and the Recharge Pod's future modifications could range from slight aesthetic design changes to standardizing AC/DC charging capabilities.

It's really Mission Control that will have the most extensive future expansion. That will range from enhanced reporting and mapping to video and image capture from the Renubot. There also will be far more data collection possibilities to help O&M managers. Additional real-time communications and chat capabilities between operators and a facility's O&M staff also are on our radar.

As I've said before, we're not only solving problems in the field, but Mission Control is giving owners and operators more confidence with a secured and encrypted data flow about their facilities' maintenance. It's true that more and more asset owners and O&M managers are realizing the Renubot can significantly cut maintenance costs and provide an invaluable carbon-free solution to their annual maintenance issues.

By the way, Renu Robotics will be at SPI 2022 on Sept. 19-22 in Anaheim, CA, out on the Grand Plaza, Booth No 3. If you're planning to attend SPI, please come to see the Renubot and we'll be happy to answer any questions.

PES: Tim, we really appreciate your time and thanks again for giving us an update on Renu Robotics' growth. We look forward to talking again soon.

TM: Thank you for the opportunity and we believe our future's bright, as is that of the entire solar industry. I certainly look forward to catching up again in the future.

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