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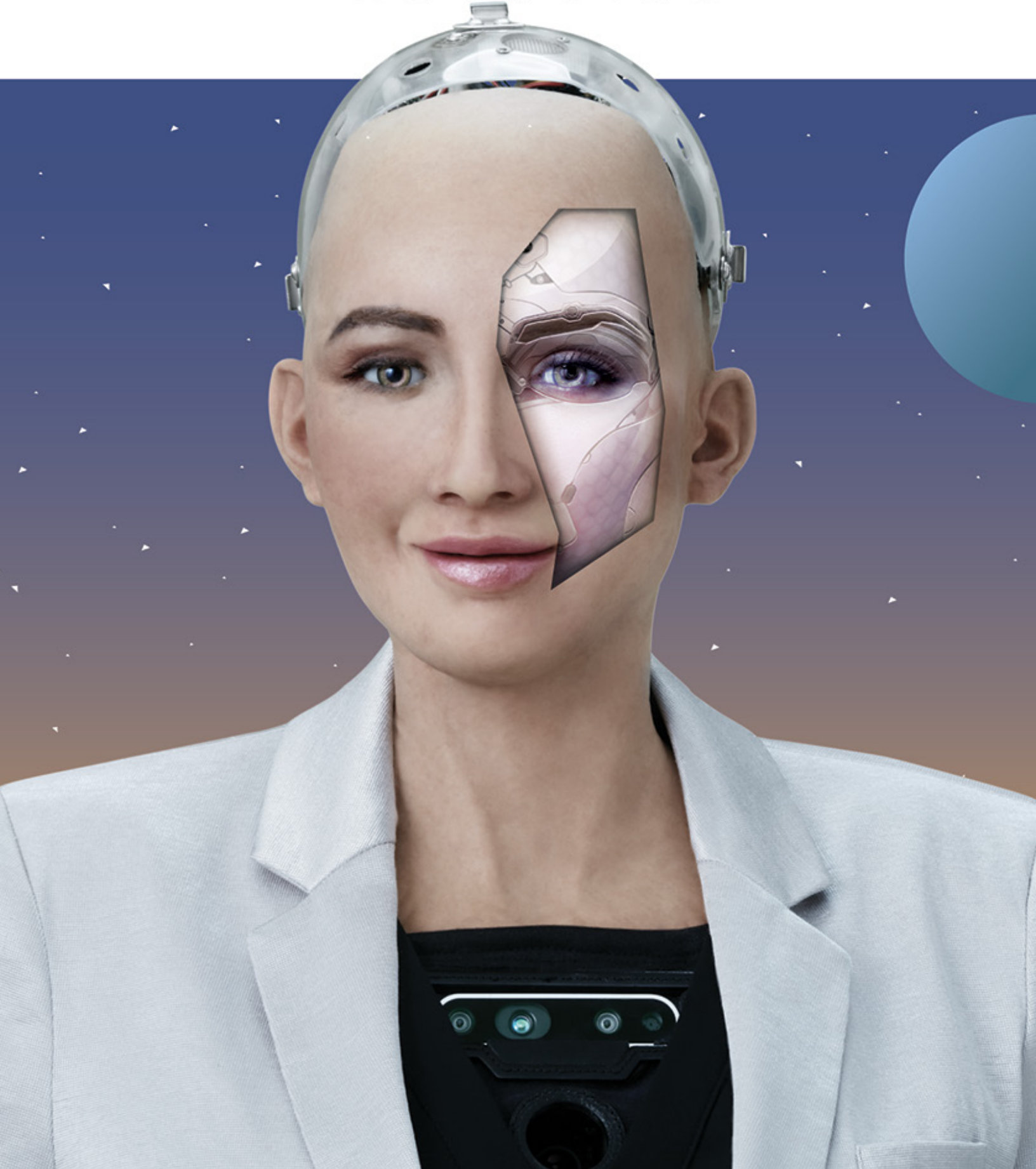

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THE TEAM

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DRONES

doing good

All around the world, drones
are being used for breakthrough
social and economic good.

Drones generally get a bad rap. For years, these unmanned aerial vehicles, or UAVs, have been making global headlines as instruments for executing swift, hard-to-anticipate military strikes. Surveillance drones used by law enforcement have also opened a Pandora's box of privacy and security issues, along with a side industry for makers of drone countermeasure technology.

However, drone use is growing. Venture capital funding for the drone industry reached record levels in the first half of 2019, soaring to $350 million, according to the Teal Group. The research firm projects that the global consumer drone market will triple over the next decade, while the commercial drone segment grows sixfold to $9.5 billion in annual sales by 2028.

UAVs take all shapes and sizes to address a variety of airborne missions. And most of them have absolutely nothing to do with harming people or trampling on privacy rights. On the contrary, drones are increasingly being used to assist in humanitarian, conservation, and social efforts that save lives and protect the planet.

On the economic front, drones are also helping level the playing field for local businesses in rural areas.
Here are just a handful of examples of how drones are helping fight the good fight around the world.

Re-Seeding Forests Ravaged by Wildfires

Researchers predict that as climate change causes temperatures to rise, wildfires are likely to increase too. Intense wildfires can burn through inches of topsoil, torching tree seeds and making forest regrowth nearly impossible.

"Normally, fires go through and trees grow back. That's natural. But what we're seeing is about 40 percent of the time now, with climate change, that's not happening," says Grant Canary, CEO of DroneSeed.

Canary's company uses heavy-lift drone swarms to drop seed vessels over fire-ravaged areas. "We do exactly what nature would be doing, which is spreading the seeds out, getting more trees, and making the forests grow," he says.

The drones also capture aerial images of scorched land within a centimeter of accuracy. The images help the DroneSeed team pinpoint the most desirable areas to drop the seeds.

Moving six times faster than human planters with the capability to plant 20 million trees in six months, DroneSeed is the most cost-effective reforestation alternative available today, according to Canary.

Delivering Lifesaving Medical Supplies

Drones are helping deliver blood, vaccines, medical supplies, and even human organs to patients when fractions of time can be the difference between life or death.

In April 2019, for the first time ever, a drone was used to deliver a donated kidney for transplant. The custom-built drone, equipped to monitor the kidney during transit, sent updates to the transplant team awaiting delivery at the University of Maryland Medical Center in Baltimore.

Doctors often can't see an organ's progress in transit, says Dr. Joseph R. Scalea, head of the transplant team and assistant professor of surgery at the University of Maryland School of Medicine. But this drone provided timely updates, the way someone might track an approaching taxi on their phone, he notes.

"We can monitor in real time," says Scalea. "It's like Uber for organs."

The surgeons successfully transplanted the kidney in a Maryland woman who waited eight years for the lifesaving donation.

Although the Baltimore flight was less than three miles, the drone creators see it as a potential game changer in significantly speeding up time-sensitive organ delivery, especially in big cities congested by traffic.

The world's largest medical drone-delivery service, Zipline, whisks emergency blood packs to thousands of rural clinics in Rwanda and Ghana. A 31-mile trip through the hills of Rwanda can take more than an hour by car but less than 14 minutes by drone.

All Zipline's drones are autonomous and fly beyond visual lines of sight into the hardest-to-reach areas. The drones deliver more than one-fifth of the blood supply outside the Rwandan capital of Kigali, and Zipline's dependable drone service has led to a 175 percent increase in blood product usage and 95 percent decrease in waste.

Outsmarting Poachers in Africa

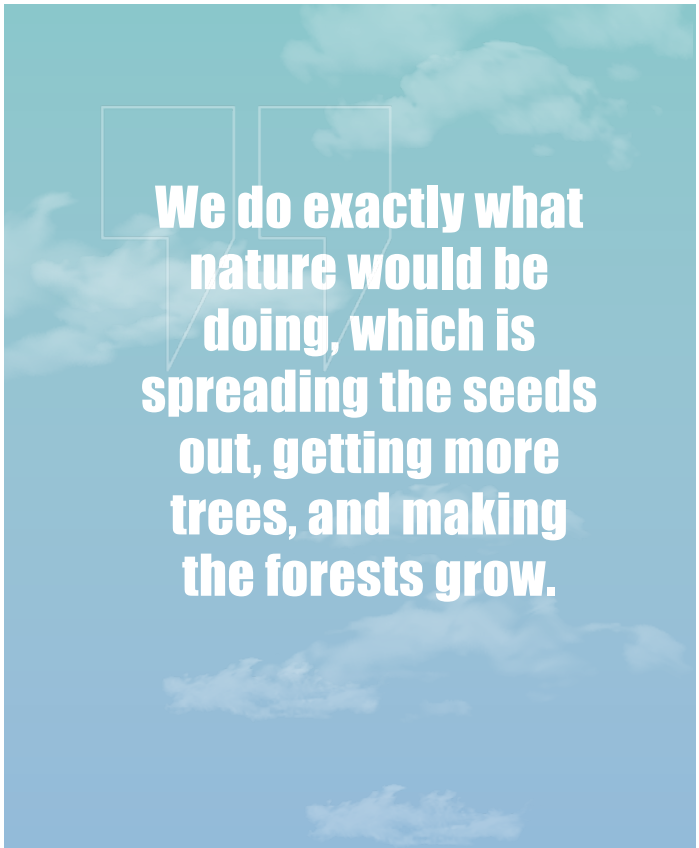
Anti-poaching drones are saving the lives of rhinos, tigers, elephants, and other endangered animals in Africa. Covering hundreds or thousands of acres in a short timeframe, the silent, mostly fixed-wing drones patrol reserves and beam live video back to park rangers. Pre-positioned in mobile command-and-control units, rangers can deploy quickly within a threatened area.

Using infrared sensors and thermal imaging technology, the drones can detect heat signatures of animals and humans at night when poachers like to strike. Drones can also be outfitted with strobes to illuminate poachers, magnetic sensors to detect weapons, and recorders to detect and determine the location of gunfire.

Anti-poaching drones also integrate predictive analytics to help rangers identify threat areas and organize drone flight plans. Among the collected data are poachers' known past behaviors, terrain characteristics, and wildlife movement patterns.

Improving Disaster Recovery Efforts

In the wake of hurricanes, floods, earthquakes, and other natural disasters, drones have a proven track record in helping organizations identify critical areas of need. They accurately can assess damage, locate victims, and deliver aid to people trapped in areas where it's difficult or dangerous for emergency responders to get to quickly. Aerial views captured by drones can also help guide emergency responders on the ground.



In November 2019, a squadron of unmanned drones were dispatched around Paradise, California, after the state's largest wildfire devastated the area. In just two days, 16 teams of emergency responder agencies conducted 518 drone flights to map 17,000 acres of affected land and survey the damage.

In the hours and days after the drone flights, the data collected was used to create maps that assisted in planning recovery efforts and gave victims of the fire their first glimpse into the condition of their homes and surrounding property.

In 2017, the FAA approved the use of drones to restore cell service in areas of Puerto Rico devastated by Hurricane Maria. Operating like flying cell towers, drones can help quickly restore voice, data, and Internet service after disasters when Wi-Fi and cell service could be down for weeks or months.

Leveling the Playing Field for Local Businesses

As Iceland's largest online marketplace, Aha provides white-label e-commerce services for local restaurants, retailers, and grocery services. In 2017, Aha partnered with Israeli-based Flytrex, creator of a cloud-based drone logistics system, to launch the world's first operational drone delivery service.

Today, many residents in Reykjavik, Iceland's capital, can choose to have their sandwiches, sushi, and other foods from their favorite local eateries transported by electric car. And in many cases, delivered right into their backyard via drone.

"We believe in strengthening local economies," says Aha CEO Maron Kristófersson. "We want to help businesses compete on a technical scale with the likes of Amazon, while maintaining the product and service expertise locally."

Like Grubhub in the U.S., Aha customers can select from the menus of a variety of local restaurants, placing their orders online or via a smartphone app. If customers live along one of the 13 main routes the drone is authorized to fly by the Icelandic Transportation Authority (ICETRA), customers can choose to have their food delivered by

drone. Aha's drone can deviate up to 700 meters, about half a mile, from the ICETRA-approved routes to make home deliveries. For customers whose homes are outside the permissible flight paths, the drone flies to a predesignated area where an Aha courier completes the delivery by car.

For drone home deliveries, Aha communicates with customers via the smartphone app. When customers are ready to receive their food, they simply press a button. The drone hovers 50 to 60 feet above the ground while the food is lowered by wire tethers into the yard.

In addition to the environmental edge drones have over cars, they're free from the topography that can make on-demand delivery challenging in Reykjavik. The city is subdivided by rivers and bends around a large bay, which effectively cuts Reykjavik in two and makes it nearly impossible for road-faring vehicles to avoid taking circuitous paths from point A to B. A delivery that might require driving 4 miles and take up to 20 minutes during peak-hour traffic spans about one mile and takes four minutes by air.

Boasting significant time savings, drones will eventually cut Aha's delivery costs by 60 percent compared to ground delivery.

Within five years, Kristófersson would like 50 percent of Aha's restaurant deliveries done by drones. However, the weather in Iceland is one of his biggest obstacles. Inclement weather prohibits drone deliveries for about 10 to 20 weeks out of the year.

Kristófersson is also mindful of not moving faster than the public's acceptance of drones as a method of transport. "Our general hungry customer wants food—at that stage he doesn't care about the delivery method. We therefore need to generate demand with early adopters to test the drone delivery—the early adopters don't care if they are getting a full meal or an apple but are thinking more about the tech."

With the experience he's gathering in Iceland, Kristófersson is confident that he can expand the Aha marketplace model and drone deliveries overseas, setting his sights on less densely populated areas like Reykjavik where local businesses and restaurants don't have the expertise or resources to compete on an e-commerce scale.