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# AED Drone Delivery In Sweden

Every second counts in a cardiac emergency. In Sweden, more than 10,000 people suffer sudden cardiac arrest outside hospitals each year – and for many, emergency help arrives too late.
But what if help could fly? Enter the Drone AED Delivery System: a groundbreaking initiative launched in Sweden that uses autonomous drones to deliver defibrillators faster than ambulances. Developed through a partnership between Karolinska Institutet, the region of Västra Götaland and the commercial company Everdrone, and in close collaboration with Swedish emergency services (SOS Alarm), the project is transforming the response to time-critical medical emergencies.

## What is it, where and how is it used?

The AED drone delivery solution autonomously delivers defibrillators to suspected out-of-hospital cardiac arrest cases. Integrated into Sweden's emergency response network in the Västra Götaland region, the system automatically deploys drones from one of six strategically placed launch sites in parallel with ambulance dispatch when a 112 call indicates a cardiac arrest. Within about 15 seconds, the nearest drone is launched, flies autonomously beyond visual line of sight to the location, and safely lowers an AED using a winch. The service currently covers a population of approximately 200,000-250,000 in western Sweden under a long-term public contract with the region.

## Statistics of use and effectiveness of the solution

Since spring 2022, the AED drone delivery system has been deployed in more than 390 missions, successfully completing around 260 AED deliveries. A recent study of 55 suspected out-of-hospital cardiac arrests in western Sweden found that drones arrived before ambulances in 37 cases, around 67% of the time, with a median lead of 3 minutes and 14 seconds, and in some cases, over 8 minutes faster. This is crucial, as survival chances drop by roughly 10% for every minute without defibrillation. In about one-third of confirmed cardiac arrests, dispatchers successfully guided bystanders to use the drone-delivered AED. One notable case occurred in December 2021, when a drone reached a 71-year-old man in cardiac arrest within just over 3 minutes, enabling early defibrillation and ultimately saving his life. Modeling also shows that in rural areas, drones could outpace ambulances in up to 93% of cases, with an average time reduction of 19 minutes. These findings underscore the system's potential to dramatically improve emergency response times and outcomes in critical situations.

Funded by the European Union

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## Technical and organisational aspects

Everdrone's Drone Emergency Medical System uses fully autonomous drones to deliver AEDs within minutes of a 112 call, launching from weatherproof Skybases and navigating via GPS, intelligent route planning (GridPlanner™), and obstacle avoidance systems like ADS-B and visual sensors. Supervised remotely by certified pilots, the drones operate safely in urban and rural areas, even in adverse weather, and are equipped with fail-safes including parachutes and autonomous landing. The system is integrated into Sweden's emergency response workflow, and enables dispatchers to guide bystanders in using the AEDs, which are compatible with local EMS protocols. Backed by close regulatory collaboration, it was the first received approval for BVLOS medical drone flights over populated areas in Sweden.

## Benefits and key challenges

AED drone delivery greatly improves survival rates in cardiac arrest cases by reducing response times, often arriving 3-6 minutes before ambulances and boosting survival odds by up to 50%. Drones provide fast, consistent coverage, enable early defibrillation by bystanders, and support EMS with live video and remote diagnostics. However, challenges remain around regulatory approvals, integrating drones into existing emergency systems, and addressing legal and organisational barriers to data sharing and inter-service coordination. The region is working to solve these issues and establish the drone service as a permanent part of emergency response.

## Future potential of the solution

Efforts are underway to expand life-saving drone operations across Sweden over the next 1-3 years, with potential deployment in Stockholm and growing interest from other European regions. The jointly developed platform is evolving to support longer range, heavier payloads, and reliable all-weather operation. As EU regulations such as U-space advance, routine deployment is expected to become more feasible. While AED delivery remains a key use case, the system could soon support additional critical supplies like epinephrine, naloxone, and trauma kits. The shared long-term vision is to establish drones as a standard, integrated component of emergency response systems – improving speed, reach, and early intervention.

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