



## Robots to the rescue — researching how drones can help save lives

In early 2016, senseFly took part in a European Commission project, tasked with assessing the value of drones in search and rescue situations. The trials were challenging, but the results encouraging.

Equipped with an eBee mapping drone and an albris inspection UAV, senseFly's team headed to Aix en Provence in France alongside [CartONG](#) and [Entente Valabre - Pole Nouvelles Technologies](#). The goal: complete two different trials—part of the EC-commissioned [Trimodex](#) field exercises—that would provide evidence of drone technology's potential, and potentially useful applications, within search and rescue (SAR).

"This research will define the best use of drones for SAR teams to increase the capacity of their efforts, in terms of monitoring disaster zones, assessing needs and providing relief efforts," says Sylvie de Laborderie, GIS Officer at CartONG, which has been using drones for humanitarian projects since 2014. "This will support better, more effective solutions for firefighters and civil security workers in evaluating disaster scenarios."

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For CartONG, the choice to bring in senseFly drones for this particular project was clear, de Laborderie says, since "they are operational and easy to use for non-technical humanitarian workers".

## Setting up disaster scenarios

The purpose of the project's first mission, a post-disaster simulation, was to create quick, accurate maps of an old commercial centre in an urban area called Les-Pennes-Mirabeau and a farm in Gardanne. The second mission meanwhile called for the active monitoring of these sites where the SAR team actively uses the drone's video feedback to search and identify priority objects or areas.

The project required the drones to provide an orthomosaic (or orthophoto) of each of the two sites; an up-to-date, high-resolution map of the disaster zone for the SAR team to work with from on the ground.

For the active monitoring portion of the project, this was less about data outputs and more the viewing of a drone's live video feed. This RGB feed would be used to aid manual, visual searches, for people while thermal sensor information overlaid onto that feed would, hopefully, provide staff with clear enough data to identify hot spots (i.e. potential casualties).

The senseFly drones were trialled over two days. The first day was dedicated to producing orthomosaics (maps) of these sites using senseFly's fixed-wing eBee mapping drone and quadcopter albris inspection drone. On the second day however, the albris was used to monitor the 'post-disaster' sites



An eBee-sourced orthomosaic of the farm from the first day.

via staff watching its live RGB/thermal video feed. This included flying indoors, in GPS-deprived environments beyond the line of sight, using the drone's thermal camera to identify survivors and its additional situational awareness sensors to remain safe by avoiding surface contact.

## Day 1: Horizontal mapping

The teams planned their eBee and albris missions by defining the required image overlap and ground resolution in the drone's supplied eMotion flight planning software, activating the program's SRTM elevation data option in order to keep its automatically generated waypoints and flight lines at a consistent height above ground level.

The albris' ground resolution was set to 8 mm (0.3 in) and the flight altitude was 45 m (148 ft) at the commercial centre. The eBee's flight altitude at the farm was 200 m (656 m) and its image overlap was set at 80% since they need to fly low and want to ensure good results. A total of 3.3 ha (8 ac) were covered at the farm while 1.8 ha (4.4 ac) were mapped at the commercial centre.

Ground control points (GCPs) were not used for these mapping flights since, says de Laborderie, "we just needed an updated map, so one to two meters of difference didn't matter for this particular type of project". Once the maps had been generated, the teams marked out entrances and physical obstacles to improve the accuracy of their mission planning.

## Day 2: Quadcopter monitoring

In day 2's recovery simulation, the SAR team used the maps produced on the first day to scout the sites on foot, analysing where potential victims might be and strategizing where they would need to fly the albris to inspect buildings and identify survivors.

After this initial walk through, the albris' live RGB video feed with thermal overlay was activated, flying the drone from outside the building in its interactive ScreenFly mode, both when flying above the farm and the commercial centre.

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The albris enabled the team to make an assessment of the environment and search for people both around and inside the building, in addition to their routine checks by listening and looking for victims. Based on live feedback, the drone and SAR teams could determine if the situation is urgent and define exactly how many people were needed. They could also take still pictures when required—a total of 123 images were captured—to analyse after the search.

The albris' ScreenFly flight mode—effectively a highly assisted manual method of flying—is key for this particular type of SAR mission, says de Laborderie, since in this mode a team can use all the drone's various cameras during the same flight. "The drone's navigation cameras were used for navigation and to look backwards and to the sides, checking for obstacles. The infrared camera helped us to search for hotspots inside the building, meaning potential victims. The drone's main RGB camera helped us to confirm or reject whether or not a hotspot was a civilian outside. The albris' cruise control feature was also helpful when scanning the area with the infrared camera for hotspots to easily take images during the flight."



Using the first day's drone-sourced map, the SAR team worked alongside the drone team to determine their next move based on the albris' live feed, flying in interactive mode.



Assessing the inside of the commercial centre with the senseFly albris drone.

As a result, the SAR team identified several hotspots and confirmed there were two victims to rescue at the commercial centre. In fact, one of these victims was missed during the SAR team's walk through, but found a few minutes later with the output from albris' infrared camera.

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## Positive feedback

The drone proved itself to be a viable and valuable complementary solution to existing search methods such as on foot and using trained SAR dogs.

CartONG's de Laborderie was very pleased with the results. She explains that the drones' data "helped staff to strategise for deployment, to see where they wanted to focus, save time in the field, and provide safer searching techniques. The results we saw prove that SAR teams should use an experienced drone operator for all their missions".

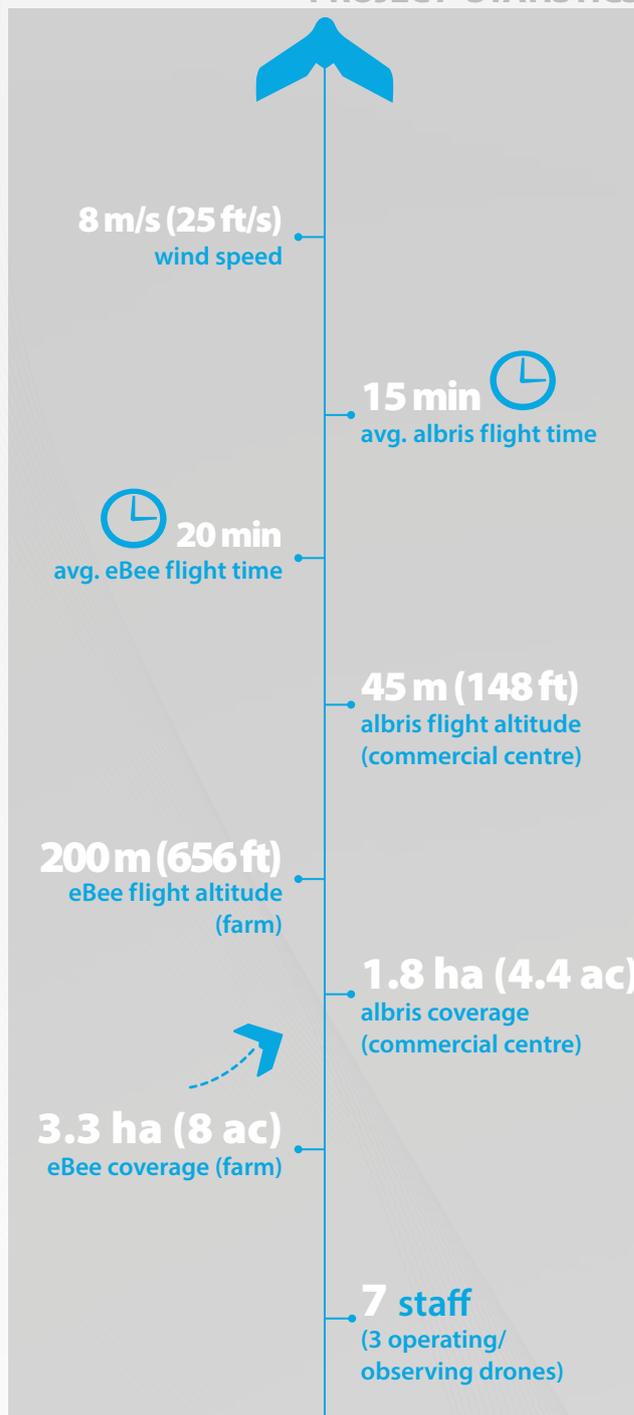
## About CartONG

Founded in 2006, CartONG (<http://www.cartong.org/>) is a French non-governmental organization committed to furthering the use of geographic information tools to improve data gathering and analysis for emergency relief and development programmes around the world. CartONG enables emergency relief and development organizations and local governments to manage their own existing data, integrate other data sources and then use that data to plan programmes and monitor progress and impact. CartONG is a registered non-profit organization headquartered in Chambéry, France.

## About Trimension

Trimension (<http://www.trimension.nl/>) is the host of the Trimodex exercise. Trimension provides advice and support in order to increase the resilience of crisis organisation by making plans and providing courses, training programmes, practice sessions and evaluations. Trimension combines crisis expertise with business continuity management, communication, human behaviour and technology to support operation and management teams.

## PROJECT STATISTICS



### Discover eBee:

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### Discover albris:

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