

DRONE SOFTWARE PROVIDES THE APPROPRIATE RESPONSE

DroneSAR has become the first company in the world to develop software that can effectively turn a commercial drone into a search-and-rescue platform, which the Irish start-up aims will make a vital difference to first responders during search and rescue operations across the country. Report by Elaine O'Regan.

Software developed by Donegal-based start-up DroneSAR is now gaining traction internationally under a high-profile partnership with Chinese drone company DJI, in addition to a separate disaster relief contract with Scottish company Astrosat.

DroneSAR's flight-planning software uses commercial drones to scan large areas from above, thereby shortening search times and reducing the risk to search and rescue personnel.

DroneSAR had its origins in a Donegal Mountain Rescue project, which was selected as a pilot test site by Chinese drone company DJI and the European Emergency Numbers Association (EENA).

"The software, which was over 18 months in development with input from search and rescue teams across the country, allows first responders a greater depth of overview, through the addition of drone footage to the interface," according to DroneSAR Chief Executive Oisín McGrath.

EARLY RESEARCH

Research conducted by DJI and EENA, in conjunction Donegal Mountain Search and Rescue Team, found that while a five-person rescue team on foot needed an average of two hours to find a victim in one square kilometre, a drone could do the job in 20 minutes or less.

At the time, Leo Murray, Lead Co-ordinator at Donegal Mountain Rescue Team, was already collaborating with app designer and team member Matthew Kelly on the development of an early version of the app.

"DJI and EENA selected four test sites around Europe to investigate the use of drones in emergency response," said



The software allows first responders a greater depth of overview, through the addition of drone footage to the interface – Oisín McGrath, DroneSAR Chief Executive.

McGrath, who subsequently came on board alongside Gearoid O'Briain. Both are military flight instructors who run unmanned aircraft training centre FlyRyte Drone Academy.

"We found that, while the drones used at that time by emergency response teams were okay, the software available wasn't really fit for purpose, and we thought we could address that gap," he noted.

Following on from the initial Donegal Mountain Rescue project, DroneSAR partnered with DJI, one of the world's foremost drone manufacturers, on the development of the new flight-planning application.

The company was incorporated in July 2016 and a prototype was showcased at Drones Data X Conference in Dublin in November of that year.



|| The DroneSAR app allows drones to scan large areas from above, flying automated search grids, equipped with a customised sensor. It has the capacity to stream live images and video captured by the drone to command and control units. ||



FLIGHT-PLANNING APP

The DroneSAR app allows drones to scan large areas from above, flying automated search grids, equipped with a customised sensor. It has the capacity to stream live images and video captured by the drone to command and control units.

Additional functionality means victim location data can be shared instantaneously with ground search teams. Images of the victim and their location, captured on regular or thermal imaging cameras, are sent to the command centre as well as rescue teams on the ground.

The software also tags the GPS coordinates of a victim and transmits them automatically by email or SMS to ground crews. A live stream function means drone patterns can be managed remotely and live camera feeds can be viewed from any computer browser.

“At its simplest, DroneSAR is an app you can download on to an iPad and, when the iPad is connected to the drone, it facilitates fully autonomous flight patterns, so the pilot can concentrate on what’s important, which is the live video coming back,” said McGrath.

The app is suitable for emergency response missions on all types of terrain. Flight paths can be adjusted, and different patterns selected for specific terrain, including hills, mountains, trees or flat land.

Emergency response teams can choose an automatic, customised aerial search pattern, which is filled automatically, based on variables such as altitude, field of view, battery life and probability of detection.

Completed search patterns are recorded and logged for easy handover to oncoming rescue crews. “What sets us apart

from similar software out there is that we provide a kind of IoT [Internet of Things] solution,” said McGrath.

“By selecting ‘stream’, for example, you get the live video stream that can be viewed on any internet browser, so people can see the footage captured by the drone whenever it is airborne.”

ASTROSAT AGREEMENT

Under DroneSAR’s new contract with Astrosat, the Irish company’s software will be used in international disaster relief missions. East Lothian-based Astrosat is incorporating the drone software developed by the Irish company into the new Recovery and Protection in Disaster (RAPID) system.

“We plan to integrate both platforms to give near-realtime satellite imagery to both Unmanned Aerial Vehicle (UAV) pilots and to Command and Control for better informed decision-making,” said McGrath.

Astrosat analyses data from space satellites and has developed RAPID to give emergency responders access to satellite images in the aftermath of natural disasters.

The idea is that, by getting this data to where it is needed as soon as possible, it can help to mitigate the potential risks posed these disasters, including the immediate threat to public safety and longer term economic and environmental impacts.

“DroneSAR’s technology will fit beautifully with our RAPID system,” said Astrosat Chief Executive Steve Lee. “With RAPID’s ability to provide up-to-date mapping images in less than three hours, and the ability to interlace footage from drones, we are giving first responders the most detailed picture available.”

EMERGENCY DRONES



DroneSAR's technology will fit beautifully with their RAPID system, according to Astrosat's Chief Executive Steve Lee.

EUROPEAN COMMISSION PRIZE

DroneSAR secured the Astrosat deal after winning the Copernicus Masters Services Challenge at the European Satellite Navigation Competition (ESNC) in the Estonian capital of Tallin last November.

The Copernicus Masters Services Challenge is one of a range of challenges and prizes on offer to the 321 finalists in the ESNC competition. It is awarded for innovative uses of the European Commission-operated Copernicus programme products.

DroneSAR Ltd was presented with a cheque from the European Commission, which is in addition to their award as Ireland Region Winner. The Ireland Region Competition for the annual ESNC awards has been organised and sponsored by National Space Centre Ltd since 2012.

"We won based on our proposal for the use of drones in disaster management. Our proposal looked at how we could take that satellite data and make it more consumer-friendly," noted Oisín McGrath. "At the time, one of the mentors on

the programme was Astrosat's Steve Lee and that's how we met him," he added.

Rory Fitzpatrick, CEO of the National Space Centre, described the EU award as "worthy recognition for an outstanding product that has both commercial and lifesaving potential". He said that the team at the National Space Centre, based at the Elfordstown Earth Station in Midleton, Co. Cork, was "incredibly proud to see this young Irish company perform so strongly on the international stage".

ENTERPRISE FUNDING

To date DroneSAR has secured funding from the European Space Agency (ESA) and Enterprise Ireland. "We've done a lot of work on the introduction of satellite imagery in the last few months and we have just won a place on the Copernicus Incubation Programme," said McGrath.

The programme is aimed at start-ups in Europe with innovative and commercially promising business applications ideas based on Copernicus data and services.

The company also partnered with Clare County Council last year to boost lifeguarding operations by trialling the use of drone technology, which were deployed as automated beach patrols for the first time ever in Ireland.

And as previously reported in *'Emergency Services Ireland'* the new partnership now equips lifeguards in Clare's Spanish Point Beach with the most modern drone technology and software. DroneSAR will provide the drones and the Irish Aviation Authority (IAA) drone instructors to supervise the drone flights in the early stages, within the bounds of the IAA drone



Pictured at the presentation of the award for winning the Copernicus Masters Services Challenge at the European Satellite Navigation Competition (ESNC) on 7 November 2017 were (l-r): DroneSAR's Matthew Kelly and Leo Murray; Kathryn Iervain, Head of Competitions & Events, AZO; Andreas Veispak, Head of Space Data/Copernicus at European Commission; Oisín McGrath, CEO of DroneSAR, and Bruce Hannah, CTO at National Space Centre.



Following the initial Donegal Mountain Rescue project, DroneSAR partnered with DJI, one of the world's foremost drone manufacturers, to develop the new flight-planning application.

regulations.

After the unique partnership was announced back in July 2017, Clare McGrath, Clare County Council's Water Safety Development Officer, said: "Our lifeguards are tasked with quick response times and do so over large distances. Fast detection is crucial in the drowning chain of survival.

"DroneSAR's flight management technology will enable our county's beach lifeguard operations to quickly search for missing or injured people, or get early notification of people in distress. Any piece of equipment that allows a quicker dispatch time for

ambulances, medical assistance and increased beach patrols will be a huge advantage."

Essentially it means that a live-video downlink will enable the search pattern of each drone to be monitored by the lifeguard from the lifeguard hut, while the Water Safety Development Officer can use the live browser secure link to remotely monitor search progress from any computer or laptop.

FRONTLINE PARTNERSHIPS

DroneSAR has developed a number of other important



The new partnership with Clare County Council has equipped lifeguards in Spanish Point beach with modern drone technology and DroneSAR software.

EMERGENCY DRONES

partnerships over the last few months. It has integrated its product with the outdoor-pursuits app 'ViewRanger', which allows its users to view drone track and history, so it gives mountain rescue teams a better situational awareness.

And the company is collaborating with medical distress location software provider Medimee (the Irish developer of a new online emergency medical profile, which compiles the user's medical information, alongside their health and travel insurance information and 'SOS contact' details).

In the event of a medical emergency, the app can give first responders and emergency services personnel instant access to this information.

"We're working with Medimee to develop functionality whereby, if the app is activated, we'll be able to send a drone to that position," said McGrath.

DroneSAR has also linked up with SafeTRX, the Cork-based developer of a smartphone-based tracking app designed to alert emergency contacts when vessels fail to return from sea on time.

"When a distress call is activated, it will also come through DroneSAR software, allowing the drone to fly automatically to that position to provide real-time situational awareness for command and control before they send out helicopters," according to McGrath.

"So, the next few weeks and months will be really important for DroneSAR. We've released an early version of the app and we're refining it as we go. Now, it's really about preparing for the worldwide release."

USEFUL LINKS

- European Satellite Navigation Competition www.esnc.eu/
- Copernicus Programme www.copernicus.eu/
- DroneSAR Ltd <https://dronesarpilot.com/>
- National Space Centre Ltd www.nationalspacecentre.eu