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Radai adds further safety features to its novel drone prototypes

In an earlier write-up, we shared the exciting update that independent experts of the European Commission's Innovation Radar ranked the **Novel electromagnetic (EM) survey system on UAV for mineral exploration** as “a top innovation product with high market potential in the near future”.

For this write-up, we invited **Ari Saartenoja**, CEO & Founder of the Finnish company **Radai**, as the main developer of this highly innovative exploration technology, to provide us with an update on the company's advances which have been made possible through the EU funded **Horizon 2020 New Exploration Technologies (NEXT)** project.

Could you tell us more about Radai's most recent advances with respect to the use of UAV for mineral exploration?

During the last 12 months, we have achieved significant progress in the development of our drone-based magnetic field survey system. In fact, our **VM Prototype-3 UAV survey system** has not only significantly improved the hardware capabilities of UAV's orientation measurement system we have also paid special attention to the autopilot system software that controls the plane and flight mission.

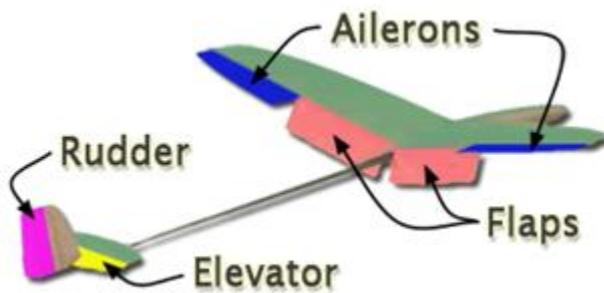


Figure 1. Schematic diagram of aircraft surfaces that enable to control the route and altitude of a flight

As you can see from this schematic diagram, the flight route and altitude of a flight can be controlled through aircraft surfaces that include ailerons, rudder, elevator, and flaps. As we are dealing with an unmanned aerial vehicle (UAV), we depend on the development of an autopilot which consists of sophisticated algorithms that fully control these respective aircraft surfaces as well as its motor. This enables us to make the drone flight much more stable and predictable and improves the overall safety of a flight.

Aside from flight safety, how would you rate the drone operators' safety and the environmental risks of your UAV?

Radai assigns the highest value to the safety of its drone operators and avoids causing damage to the environment in which operates at any cost. For these reasons, we have added an additional safety layer which consists of an in-house developed **geofence system and a parachute launch trigger**. These have been implemented by adding new instruction commands into the VM Prototype-3 datalogger, allowing the data logger to give direct



commands to the autopilot. The geofence is a GPS-based virtual perimeter that determines the area in which the plane is expected to operate and orders the drone to take corrective action whenever it reaches the boundaries of this virtual perimeter. Should the drone still go beyond the predesigned perimeter, a further command triggers its parachute to be launched and effectively stops the drone from continuing its flight.

Figure 2. UAV outfitted with a parachute as a further safety measure

What motivated you to start a company which has clearly been highly successful in developing a new generation of drones?



“My interest in flying machines and technology goes back to my teenage years. Together with a friend, I started to innovate and find applications for drones back in 2012. Both of us were keen to develop something new. We meticulously went through the scarce information we were able to find and started building our first drones and sensors in

my garage. It proved an intense period of my life, characterized by initial failures and starting all over again. Then, at some stage, the outcome of our passionate efforts proved to work surprisingly well. Looking back, our ambition to put into practice some of our innovations, which were quite many at this initial stage, came quite naturally I would say. We kept pushing our development work forward and little by little our first prototype of a drone-based survey system was completed. Our teenage obsession that things can always be improved is part of our small company’s culture today: striving all the time to do better, never being happy with mediocre results.

Through the European Commission’s financial assistance provided to the NEXT project, we came up with a breakthrough solution for the mineral exploration industry, but things can be done better in so many other domains... and drone technology opens up to so many new possibilities... so hopefully, in the future, we will add our bit in improving the outcome of other industries.



At Radai, we much look forward to keeping ‘playing’ with flying machines and technology as I did in my teenage years, and in the process, our team definitely will maintain its focus on innovating!”

Ari Saartenoja is CEO & Founder of the Finnish company Radai Ltd

More about NEXT: www.new-exploration.tech

