

SEG 2024 Conference: Sustainable Mineral Exploration and Development

Toward Automatic Airborne Magnetic Mapping – VAMPair Colibri

Laurent Ameglio¹, Francis Galluser²

1. EXIGE Australia Pty Ltd, Sydney, NSW, Australia, 2. Coleoptere s.a.r.l., Strasbourg, France

Airborne magnetics is an effective and routinely used technology for natural resources exploration. It is however commercially provided by specialised contractors implying poor agility, responsiveness and cost effectiveness for exploration programs. The use of innovative technologies such as drones and non-absolute scalar magnetometers, along with data processing automation and artificial intelligence, can change the face of the modern green- and brown-field mineral sectors.

We integrated a true backpack transportable, ultra-light (~1 kg), small (size of a hand), quick to deploy (5 mn), easy to use and safe (no towed sensors), single person operated, affordable, UAV-born (DJI Mavic series), fluxgate magnetics mapping platform—VAMP^{air} Colibri.

Fluxgate magnetic sensors are more versatile and a better value-for-cost than traditional scalar magnetic sensors. They still provide similar data quality with the unique added values of: light weight, lower power requirement, and correction of remanent and induced fields from other equipment carried with the sensor. Their drift issue is resolved with a robust calibration procedure used onboard satellites. Results of surveys in South Africa are presented.

The flying hardware comes with a tablet. All operations aspects are managed by a newly developed software—SUAVE. While survey design still requires minimal inputs from the user for the time being, all other aspects of magnetic mapping such as flight management (e.g., generation of reflight navigation files), magnetic data quality control (including data compilation between flights) and infield magnetic mapping, including targets generation, are all automatized.

The Colibri is destined to become a companion of the geologist's hammer, compass, and magnifying glass for geological investigations. Also, paired with third-party 3D holographic services (such Microsoft Azure with HoloLens) it will provide a field-to-boardroom direct link for exploration companies. With the growing offer of drone nest technologies, it will also become a complete autonomous solution for the mining industry.