

GLOBAL BUSINESS REPORTS



— GBR SERIES —

MINING IN ONTARIO AND TORONTO'S GLOBAL REACH 2023



Finance - Production - Exploration - International Projects - ESG
Engineering & Consulting - Battery Materials - Innovation



Introduction to Mining in Ontario

- 8. Mining Becomes Pillar of Economic Transformation
- 10. Interview with Ontario Minister of Mines
- 11. Map of Ontario Mining Operations
- 12. Interview with Ontario Mining Association
- 13. Interviews with the Prospectors and Developers Association of Canada (PDAC) and with the Canadian Institute of Mining, Metallurgy and Petroleum (CIM)
- 14. Cultivating the Next Generation of Miners
- 17. Interview with University of Toronto
- 18. Interview with Laurentian University
- 19. Interviews with Cambrian College and Collège Boréal
- 20. Interviews with Northern College and Queen's University
- 23. Interviews with Lincoln Strategic International and C.J. Stafford

Production and Development

- 26. Ontario Miners Weather Market Volatility
- 28. Interview with BHP
- 30. Interview with Barrick Gold
- 31. Interview with Agnico Eagle Mines
- 33. Interview with Alamos Gold
- 37. Interviews with Evolution Mining and McEwen Mining
- 38. Interview with Compass Minerals
- 39. Interviews with Impala Canada and KGHM International
- 41. Development Spotlight
- 43. Interview with Marathon Gold
- 44. Interview with Generation Mining
- 45. Interviews with Argonaut Gold and Equinox Gold

Mining Finance and Investment

- 48. Toronto Remains the Epicenter for Mining Capital
- 49. Interview with Toronto Stock Exchange and TSX Venture Exchange
- 52. Interview with BMO Capital Markets
- 53. Interview with Resource Capital Funds
- 56. Interview with Franco-Nevada
- 57. Interview with Triple Flag Precious Metals Corp.
- 58. Interview with Ormiston List Frawley LLP
- 59. Interviews with Star Royalties, Vox Royalty Corp. and Oberon Capital
- 60. Interview with PearTree Securities
- 62. Expert Opinion: Insights from Onyen Corporation
- 63. Industry Thoughts: Musings on Mining Markets

Canadian Exploration

- 66. Juniors Eye Long-Term Payoff
- 69. Interview with First Class Metals
- 70. Interview with Noble Mineral Exploration
- 71. Interviews with Auteco Minerals, Red Pine Exploration and Talisker Resources

Toronto's Global Reach

- 74. Headquartered in Toronto, Mined Abroad
- 77. Interview with Torex Gold Resources
- 80. Interview with Largo Inc.
- 82. Interview with Rupert Resources
- 83. Interview with Eloro Resources

Critical Minerals

- 86. North America Moves Toward a More Secure Supply Chain
- 90. Interviews with Wyloo Metals and Magna Mining
- 92. Interview with Clean Air Metals
- 93. Interviews with Electra Battery Materials and Rock Tech Lithium
- 97. Interview with ION Energy
- 98. Interview with Avalon Advanced Materials Inc.
- 99. Interview with Green Technology Metals
- 100. Interview with Frontier Lithium
- 102. Interview with Northern Graphite

Equipment and Innovation

- 106. Cutting Edge Technology Permeates All Aspects of Mining
- 108. Interviews with NORCAT and Centre for Excellence in Mining Innovation (CEMI)
- 109. Interview with Sofvie
- 110. Geophysics and Geological Modelling
- 113. Interview with Ronacher McKenzie Geoscience
- 114. Industry Thoughts: Revolutionizing Mining
- 115. Interview with Xcalibur Multiphysics
- 116. Interview with Expert Geophysics Limited
- 117. Interview with MPX Geophysics
- 118. Interview with Drone Delivery Canada
- 119. Mining Equipment
- 121. Interview with Maestro Digital Mine
- 122. Interview with Howden
- 123. Interviews with Liebherr-Canada and MacLean Engineering
- 124. Interviews with Kal Tire Mining Tire Group
- 125. Interviews with Hitachi Construction Machinery and Wajax

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- 126. Interviews with FLSmidth and Weir Minerals
- 127. Drilling and Blasting
- 129. Interview with Novamera
- 130. Interview with Boart Longyear
- 131. Interview with Major Drilling
- 132. Interviews with StratumAI, Dyno Nobel and iRing
- 133. Industry Thoughts: Make Your Pitch

Engineering Consulting and Construction

- 136. Market Challenges Necessitate Business Evolution
- 140. Interview with Ausenco
- 141. Interviews with DRA Global and Redpath Mining
- 142. Interview with Technica Mining
- 143. Interview with Dumas Mining
- 144. Interview with Cementation
- 146. Interview with Ernst & Young
- 147. Interview with CSA Global
- 148. Interviews with Ecometrix Incorporated and Titan Environmental
- 149. Interview with Thorn Associates
- 150. Industry Thoughts: Service Solutions

- 152. Company Directory



“One component of our mandate is to once again become the number one jurisdiction for mining. We want to do that because it is imperative that we modernize into a green, carbon neutral economy. The reality is the world needs Ontario’s minerals. If we are going to be green, we must mine.”

George Pirie,
Minister of Mines,
Government of Ontario

INTRODUCTION TO ONTARIO

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Image courtesy of R.M. Nunes through Adobe Stock



Geophysics and Geological Modelling

Maximizing discovery in a mature jurisdiction

Image courtesy of MPX Geophysics

Innovation in the Air

Traditionally there has been a certain mystique that goes with a classical boots on the ground reconnaissance of a property. However, in an era where there is pressure to make discoveries faster, and with fewer geologists available to make them, it is a huge benefit that new sensor technologies are coming online to augment and expedite the exploration process. One might assume that the further a sensor is from the ore source, the less likely it is to provide a detailed visualization and geological interpretation, but Expert Geophysics has developed a suite of sensors that defy this. The company's flagship MobileMT (Mobile MagnetoTellurics) system works by exploiting passive electromagnetic fields arising from lightning events and storm activity that cause variations in the earth's magnetic field. It possesses several advantages over existing airborne electromagnetic technologies, and compared to active source airborne electromagnetic technologies, MobileMT has much greater depth of investigation. Expert Geophysics founder and president, Andrei Bagrianski, points out: "Most of the near surface deposits have been discovered by now, and many companies are looking for deeper targets. That is where our technology is most helpful."

Compared to other commercially available AFMAG airborne systems that measure just one component of magnetic variations in the air, Expert Geophysics is able to measure three, which means it can recover the geology of any shape. The technology has also been proven to work in de-

tecting many different commodities. "The fact that the system is versatile and applicable in such a wide range of topographic, geographic and geologic conditions means that if an electromagnetic survey is suitable for your mining and exploration objectives, the MobileMT system can most likely deliver the results you are looking for," Bagrianski affirmed.

Expert Geophysics does not stop at providing customers with raw data alone. The company also delivers the interpretation while working closely with geologists to help them better understand what the data means.

According to Daniel McKinnon, President and CEO of MPX Geophysics, a company that offers advanced modern airborne technologies on fixed and rotary wing platforms, as well as drones, one of the historical drawbacks that geophysics has had is that geologists are ill-trained to process and interpret the data resulting from geophysical acquisition. For this reason, those who assumed the role were mathematicians or physicists, with minimal knowledge of geology. "Today, in order to carry out processing, and especially interpretation, there has to be teamwork between physicists, geophysicists and geologists who understand the geological model of the area from which the acquisition is being made," McKinnon suggested, adding that MPX employs a team that provides clients with real and adjusted geological information of the surveyed area.

McKinnon has seen remarkable advances in the sensitivity and resolution of the sensors on board his fleet

of aircraft. Depth of investigation, interpretability of the airborne geophysical data, system power, noise reduction, and target detectability have all markedly improved. "Modern systems now allow for three-dimensional subsurface modeling, which is a huge advance compared with older systems where targets at depth were often not well defined. These same targets can now be both detected and better displayed for strategic interpretation," McKinnon said.

While there is undoubtedly a strong push toward identifying deeper targets, Mandy Long, general manager of SkyTEM Canada Inc., points out that over the past few years there has been something of a trend in Ontario with clients seeking a clear picture of their near surface geology. "Traditionally, groups were all looking at depth, and the philosophy was to go as deep as you can and find as much as you can. We have now seen a shift back towards understanding what is going on in the near surface in Ontario," Long commented.

M&A Drives Product Improvements

In reckoning with the build versus buy dilemma, in 2021 Xcalibur Multiphysics, formerly a leading player in magnetics and radiometrics and typically specialized in doing larger scale country mapping programs in Africa, decided to diversify and expand its business with the acquisition of CGG Multiphysics. This added CGG's expertise in gravity gradiometry and electromagnetics, and instantly helped Xcalibur grow its market presence in the Americas, Australia and Asia.



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Mobile MagnetoTellurics (MobileMT) is the most advanced generation of airborne AFMAG technology for the fast and effective solution for 3D geoelectrical mapping applied to any kind of geological prospecting projects.

MobileMTm is a lightweight version of MobileMT plus two total field magnetic sensors in the horizontal gradient configuration.

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mTEM is a time-domain system designed for high resolution near surface electromagnetic investigations.

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» **Compared to active sources airborne electromagnetic technologies, MobileMT has much greater depth of investigation.**



Andrei Bagrianski

President & Founder
EXPERT GEOPHYSICS LIMITED

What was the inspiration behind founding Expert Geophysics and your flagship MobileMT system?

Myself, along with Peter Kuzmin, who is one of the best engineers in the industry, decided that there was an opportunity for us to build a company that offers airborne geophysical surveys with advanced electromagnetic systems. I knew from previous experience that the technology was lacking a number of features, so when I talked to Peter, he laid out a clear vision on how to improve the technology.

Ultimately, we came up with our MobileMT system, which possess several advantages over existing airborne electromagnetic technologies. Compared to active sources airborne electromagnetic technologies, MobileMT has much greater depth of investigation. That is very important because most of the near surface deposits have been discovered by now, and many companies are looking for deeper targets. Of the airborne electromagnetic technologies, MobileMT is the deepest penetrating. We are measuring three components of magnetic variations in the air, and we have X, Y and Z components, which means that we can recover the geology of any shape.

Can you provide a brief overview of the suite of products Expert Geophysics offers?

We have three primary technologies that we have launched. The first system is the MobileMT system, which is our flagship system. That system exploits passive electromagnetic fields arising from lightning events and storm activity that cause variations in the earth's magnetic field. This is what we are measuring. Our MobileMTm system, is a further development of that technology, and that is built to identify discrete targets and strong structural features with a focus on the relatively near surface depth range. The final system that we are flying is the mTEM system, which is a time domain system. That is designed for very detailed near surface investigation. What differentiates this system is its ability to reject industrial voids and electromagnetic destruction. By the end of 2022, Expert Geophysics will be offering clients the full range of electromagnetic services.

Does MobileMT work across a variety of geological settings?

This technology works with a wide range of minerals because of the wide resistivity range we are able to detect.

The technology has proven to work well with orogenic and epithermal deposits, kimberlites, and uranium deposits in the Athabasca basin. Here we have flown surveys to pick up not only conductive units in the basement but the zone of alterations in the sandstone. In Ontario, we recently completed a survey for lithium pegmatites. We flew our MobileMTm which has a smaller sensor, and it has a magnetic gradiometer.

The biggest thing that we want to emphasize is that we have used the technology for many different commodities. The fact that the system is versatile and applicable in such a wide range of topographic, geographic and geologic conditions means that if an electromagnetic survey is suitable for your mining and exploration objectives, the MobileMT system can most likely deliver the results you are looking for.

Is MobileMT still able to perform effectively in areas with existing infrastructure?

The infrastructure creates noise in any kind of electromagnetic data. However, we have several examples where we flew close to existing infrastructure and collected good data. It is an issue, but we can deal with this particularly because our system better handles any infrastructure noise because of our wide range of frequencies. Usually the noise is not on all frequencies. That means we can still connect useful data in looking at alternative frequencies.

To what lengths does Expert Geophysics go to translate the raw data it collects into a format that is easily interpreted by customers?

Our clients are looking for the geological answers, not just geophysical data. At Expert Geophysics we emphasize this part of our product offering because we do not only deliver the data, we also deliver the interpretation while working closely with geologists to help them better understand what the data means. We have expertise in both geophysics and geology, so we advise our clients to provide us with the geological information they have on the property we are surveying. We can then interpret the data, and provide them with the geological information they require. ■



» **There have been significant improvements in sensitivity and resolution, depth of investigation, and the interpretability of airborne geophysical data via robust analytical software.**



Daniel McKinnon

President and CEO
MPX GEOPHYSICS

Can you provide an overview of the products and services MPX offers for mineral exploration?

MPX offers the most modern airborne technologies on both fixed and rotary wing platforms, as well as state of the art drones. We also offer full data processing and interpretation services. The technologies we work with include Magnetics, Radiometrics, Gravity, Time Domain EM (TDEM), VLF-EM, MobileMT, and LIDAR.

To what extent have technology and sensors used for exploration evolved over time?

Multi-parameter systems have evolved substantially. They allow for multiple mineral applications, and they help locate mineral deposits essential for the transition to a climate neutral economy. There have been significant improvements in sensitivity and resolution, depth of investigation, and the interpretability of the airborne geophysical data via robust analytical software. There have also been massive improvements in system power, noise reduction, and better target detectability. Modern systems now allow for three-dimensional subsurface modeling, which is a huge advance compared with older systems where targets at depth were often not well defined.

Multiparameter system sensors are rapid, low cost means of targeting areas of high mineral potential, which delivers overall risk reduction to drilling programs. There are four main geophysical methods: Magnetics, Radiometrics, Electromagnetics, and Gravity. However, there has also been significant technology innovation in airborne Electromagnetics, GNSS, Gradient Magnetics, and Drones.

What would you say are some of the most significant macro trends that are driving MPX's business?

With the increased demand for electric vehicles, batteries, and greener energy storage options, both exploration and funding for technology metals such as cobalt, copper, nickel, platinum group elements, graphite, lithium, rare earth elements and silver has increased which is driving our business to new levels of growth.

Do you view drone surveys as competition to MPX or is this an additional method MPX could use in the future?

For me, in 2022, UAV still have a very limited and specific application. They have improved over the last decade, but they are still not in a position where they are in competition with

fixed wing or helicopter platforms. The UAV market does not replace what an aircraft or helicopter can do at this particular stage of the game. The limitations are cargo space, weights and measures, and duration. We do have a UAV LIDAR platform, and we are currently flying a survey in Manitoba and in LATAM. We only use this for very small, specific areas in part as some of these UAVs duration is limited to 20 or 60 minutes.

To what extent does MPX add value in processing and doing interpretation modelling?

One of the historical drawbacks that geophysics has had is that many geologists had not assumed the challenge of being trained to process and interpret the data resulting from geophysical acquisition. For this reason, those who have assumed the role were mathematicians or physicists, with minimal knowledge of geology. Today, in order to carry out processing, and especially interpretation, there has to be teamwork between physicists, geophysicists and geologists who understand the geological model of the area from which the acquisition is being made. This allows us to provide the client with real and adjusted geological information of the area. We have addressed this, and we have a group of professionals capable of carrying out the teamwork that provides the client with the added value in the processing and interpretation of the acquired data.

What are the key factors that differentiate MPX?

Rather than offering a technology we like to offer the solution to a particular client depending on the problem they are facing. It is a complex process, and there is not one technology or one discipline that you can do to find a particular mineral. We are results driven and committed to offering solutions, we are recognized for our customer service and full satisfaction. All our surveys combine not only our technology but our industry leading health and safety practices. We are known for our strong strategic partnerships with airborne vendors and suppliers, we supply superior efficiency in acquisition and product delivery, our team are all experienced and professionals. ■

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