Over the past decade, notable progress has been made in the performance of Unmanned Aircraft Systems (UAS). Now the challenge is to make them useful for geoscientific observation and to determine where they are the most applicable to the exploration industry. Because of recent technological advancements and legislation this UAS business is ready to rapidly expand. Thanks to the smartphone industry and advanced software programs UASs take advantage of miniaturized electronics. Drones provide the means to acquire spatially exhaustive, high-resolution data in less time, at lower costs, and in smaller areas than has previously been possible. Nowadays UASs are equipped with lasers, high definition cameras, thermal imaging cameras, high definition magnetometers and an array of other sensors. It dramatically reduces the costs for small- to medium-scale airborne surveys and opening new markets for mineral exploration, geotechnical surveys, unexploded ordnance detection, and periodic monitoring, and, most importantly, opens the geophysical mineral exploration services market for SMEs. These systems and their associated sensor technologies are a game changer with the potential in very short order to forever change our concepts of exploration and monitoring in the applied geosciences.

In this lecture the trends in exploration and the concepts of a UAS geophysics are presented. Further, various UAS types, which are used by MGT, and their technical capabilities are described. A third section describes various sensors and methods developed and integrated by MGT for use on UAS. Finally, several case studies are presented.