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UTILISATION OF REMOTELY PILOTED AIRCRAFT SYSTEMS VERSUS CONVENTIONAL SURVEYING METHODS IN MINING OPERATIONS

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ABSTRACT

The most commonly used methods of obtaining geospatial data are terrestrial laser scanning and tacheometric surveys using Total Stations and Global Navigation Satellite Systems (GNSS). The accessibility of mining areas whilst collecting geospatial data sometimes poses a risk to mine surveyors and the actual collection of data may disrupt operations which may lead to downtime and thus having a negative impact on productivity. Geospatial data acquisition through surveying and mapping techniques that are safer, less time consuming and cost-effective is required. RPAS is now increasingly being used in the mining industry for geospatial data collection tasks in both underground and surface environments. The absence of RPAS-aided solutions in some areas of the mining industry can be attributed to the fear of deviating from the tried and tested techniques and the initial costs of acquiring RPAS equipment. There is limited documented information readily available on the effective use and the strengths and weaknesses of RPAS technology that can be used as a guide for users or potential users. This research develops a guideline framework for equipment selection based on the strengths, weaknesses, opportunities and threats of adopting RPAS in mining operations in comparison to existing geospatial data acquisition techniques. Furthermore, analysis of legislation governing the use of RPAS in South Africa, such as operator certification, is given in the research. The overall deduction from this research is that RPAS surveying is more cost-efficient, less time consuming, comparatively accurate and safer than conventional survey methods. However, the main recommendation is that RPAS should not always be considered as a substitute for conventional surveying and mapping methods, but as another valuable geospatial tool to augment existing methods.