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**Spiral trajectory planning approach for underground cavity measurements based  
on laser scanning**

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**Abstract**

Underground cavity three-dimensional measurements constitute an important and challenging task in underground mining. The laser scanning method is a relatively precise and efficient way to address this problem, but it is limited by the unevenness of the point cloud that reduces the scanning efficiency. In this paper, an approach that can increase the evenness of the point cloud in underground laser scanning is proposed. The approach is based on a spiral trajectory planning strategy. The scanning trajectory is generated from previous scan by solid geometry. Exceptions are discussed and

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