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## **Underground Mining Robot: a CSIR Project**

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### **Abstract**

The Council for Scientific and Industrial Research (CSIR) in South Africa is currently developing a robot for the inspection of the ceiling (hanging-wall) in an underground gold mine. The robot autonomously navigates the 30 meter long by 3 meter wide, by 1 meter high stope area, while scanning the hanging-wall to generate a thermal 3-D map. Data is then analyzed to identify cooler regions that are not consistent with the hanging-wall topography. These are then shown to the miners in a 3-D visualization environment such that remedial action can be taken, and all miners are aware of the potentially dangerous areas in the working area. The project is a collaborative effort between three units within the CSIR. The Centre for Mining Innovation (CMI) is the project lead unit and is developing the sensors needed for underground data acquisition related to the safety application. The body of the robot is being developed by the Mechatronics and Micro-Manufacturing (MMM) group. The software component is being developed by the Mobile Intelligent Autonomous Systems (MIAS) Group. The project is currently completing the technical prototype for the system that will be demonstrated in a specially constructed test facility.