



# Improving safety and productivity in coal mines

Around 90 per cent of Australia's underground coal production comes from longwall mining. CSIRO worked with the industry and equipment manufacturers to develop sensor technology to keep miners safer, and improve productivity.

## The challenge

Coal accounts for around 24 per cent of employment and 27 per cent of total revenue for the Australian mining sector. It is an important industry for Australia's gross domestic product, but can be a hazardous workplace. The mining industry continues to improve conditions for mine workers, striving for zero harm. However innovation in processes and technologies are still needed.

Around 90 per cent of Australia's underground coal production comes from longwall mining. Traditionally, a mechanical shearer cuts along the coal seam beneath a roof supported by hydraulic jacks, exposing miners to multiple risks. Increasing safety and productivity in longwall mining has been a long-term industry goal. Despite significant progress many challenges remain, including developing sensors and automation technologies to replace miners operating in hazardous conditions.

## The response

CSIRO, in partnership with the coal industry, developed an underground automation system that both isolates people from mining hazards and improves productivity. Specialised remote guidance technology continuously steers longwall equipment, automatically plotting its position in three dimensions, whereas previous systems required operations to stop production to manually correct positioning.

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Around 60 per cent of Australia's operating longwall coal mines have adopted CSIRO's longwall automation technology.

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The system removes personnel from direct hazards and increases safety. Real-time progress can be monitored from anywhere in the world, leading to further efficiency gains.

## The engagement

We collaborated with industry and the Australian Coal Association Research Program to develop and trial the technology. The system is now licensed to Joy Global, Caterpillar, Eickhoff, Kopex, and Nepean Longwall. These companies supply the majority of longwall equipment in Australian mines.

## The impact

The technology has increased productivity by 5–10 per cent. A recent economic assessment estimated the total net benefits arising from the research at \$785.6 million<sup>1</sup>.

CSIRO's technology has also contributed to improving the working conditions and safety of coal mine employees.

The improved accuracy of longwall mining operations reduces the amount of waste rock mined along with the coal, leading to less environmental disruption from rock spoil stockpiles and lower rehabilitation costs.

<sup>1</sup> ACIL Allen Consulting, 2014. *CSIRO's Impact and Value – An Independent Assessment*.

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We do this by using science to solve real issues. Our research makes a difference to industry, people and the planet.  
**WE ASK, WE SEEK, WE SOLVE**

## FOR FURTHER INFORMATION

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