



Australia's National
Science Agency



Resourcing the future

We're delivering breakthrough innovation to create a more productive, sustainable and globally competitive minerals and mining industry for the benefit of Australia and the world.

Australian resources, our future

CSIRO Mineral Resources is one of the largest minerals and mining research and development groups in the world with a proud track record of industry innovation across commodities.

We partner with industry, government and the research sector to deliver breakthrough innovation across the mining value chain.

Addressing the industry's greatest challenges, our research aims to benefit Australia and the globe by growing our resource base, increasing mining productivity and driving social and environmental performance.

We apply our expert knowledge and specialised research to deliver innovation that solves the challenging, complex problems faced by minerals companies, mining equipment, technology and services (METS) companies, government, and other industry stakeholders.

Our innovation unlocks the value of Australia's natural resource base and delivers a more productive, lower cost, socially and environmentally responsible global minerals industry.

Our expertise spans:

- exploration geoscience
- resource engineering
- process science and engineering
- resource characterisation
- on-line analysis
- data analytics and decision support
- social and environmental science
- safety
- automation.

Delivering value to industry and the nation

Our focus is on delivering innovation and real-world outcomes for the resources industry and Australia by addressing seven industry priorities.

1. Exploration through cover

Our research aims to increase rates of discovery in Australia and uncover the nation's next generation of deposits. Our technology will lead to increased investment and greater success rates as new regions of Australia's covered bedrock are effectively explored.

2. Orebody knowledge

By delivering onsite resource characterisation, we're helping companies optimise extraction. Companies can get an in-depth understanding of mineral resources in near real time, and use new sensor and data processing technologies to reliably predict and improve downstream processes and resource life.

3. Unlocking Australian ores

Advanced processing techniques and technologies will ensure Australian ores are globally competitive. Taking advantage of new process technologies can make otherwise uneconomic lower grade ores viable to mine and export.

4. Low impact mining

We're developing intelligent ore extraction technologies so that global mine operators can exploit inherent ore variability, increase productivity and reduce their input costs.

5. Selective ore management

New sensing and sorting technologies will increase mine productivity and safety. Mine operators can adopt high-throughput, no-contact sensor technologies and systems for high-tonnage ore sorting, and process management and optimisation.

6. Process optimisation

Global minerals processing operations can lower health and safety risks, reduce costs and increase productivity thanks to our new energy- and water-efficient technologies and processes.

7. Environment and community

Our research is delivering positive social and environmental outcomes for the minerals and mining industry. Our aim is that communities and miners have a shared approach to maximise resource value and ensure positive long-term social and environmental outcomes to underpin a vibrant national economy.

Partnering globally for impact

LASC automation system for safer longwall operations

Longwall mining accounts for around 90 per cent of Australia's underground coal production. Traditionally a mechanical shearer cuts along the coal seam, exposing miners to several risks on a daily basis. In partnership with the coal industry, we developed the LASC automation system to remove workers from direct hazards, while improving productivity by up to 10 per cent. It's been adopted by four mines in the US, about 30 in China and at least 20 of Australia's underground longwall coal operations. LASC has been licensed to most of the major international suppliers of coal mining equipment to use in their products.

Cheaper and faster exploration with an 'onsite lab'

In partnership with Imdex and Olympus Scientific Solutions Americas, under the Deep Exploration Technologies Cooperative Research Centre (an Australian government-funded collaboration), we've developed a technology that allows exploration companies to make multi-million dollar decisions in minutes rather than months. Lab-at-Rig provides real-time information about mineralogy and chemistry of drillhole samples to dramatically reduce exploration costs and enable efficient exploration program planning.

Demonstrating bulk ore sensing to enable sorting

Our advanced bulk ore sorting sensor is directly mounted onto a conveyor to sort up to 4000 tonnes of ore per hour, per stream, selecting high value ore from waste. These sensors can be used to upgrade ore and significantly boost mine production rates by up to 30 per cent. Several industry trials are currently underway at mine sites around the world. Early results from one mine site show that the sensor is able to accurately measure ore grade in two seconds. The solution is available through NextOre.



Our cyanide-free gold recovery process is available to industry through Clean Mining.

Environmentally-friendly solution for gold recovery from refractory ore

With sights set on becoming the first gold producer to go green, Eco Minerals Research partnered with us to develop a non-toxic, cyanide-free gold recovery process. Together with Eco Minerals Research, we built a demonstration plant to pilot the technology. On the back of successful trials, new Australian company Clean Mining was launched to take the cyanide-free gold process to market.



Inside our ore sorter sensor system, which has the ability to rapidly grade ores on a conveyor, offering significant productivity gains.

Working with us

We engage with a wide range of organisations in different ways – everything from solving today's challenges to strategic programs to unlock future value for the resources industry.

We invest funds into developing science that will solve major global challenges. For example, one of our latest investments is in breakthrough science for deep earth imaging, which will enable mapping of the earth's subsurface for deep and hidden resources.

We partner to innovate, improve and grow.

The many ways we can work together:

- collaborative or contract R&D
- IP and technology licensing
- researcher placements
- world-leading facilities and technology hire
- consulting and strategic research arrangements
- equity transactions
- grant programs for start-ups and small- and medium- sized enterprises
- linkage to mineral resources networks.

We bring together research and breakthrough science, state-of-the-art equipment and facilities to improve understanding of mineable resources and to unlock future growth opportunities.



As Australia's national science agency and innovation catalyst, CSIRO is solving the greatest challenges through innovative science and technology.

CSIRO. Unlocking a better future for everyone.

Contact us
1300 363 400 | +61 3 9545 2176
csiroenquiries@csiro.au
csiro.au

**For further information
Mineral Resources**

Jonathan Law
Director, Mineral Resources
+61 3 9545 8316
jonathan.law@csiro.au

Rob Hough
Deputy Director, Mineral Resources
+61 8 6436 8610
rob.hough@csiro.au