Opening up the covered search space in Australia: new data, new technology, new ideas.

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In terms of mineral endowment, Australia ranks No. 1 in gold, nickel, iron ore, lithium, lead, zinc and uranium, and ranks in the top five for many other important minerals, including the critical commodities. Most of the long-life profitable mines have been found in the 25% of the Australian continent that has prospective rocks and Tier 1 deposits exposed at, or close to, the surface.

The remaining 75% of the continent represents a largely under-explored search space comprising vast flat-lying plains of sands, soils and gravels covering prospective rocks. Exploration beneath this cover is, however, arguably one of the most significant technical challenges facing mineral explorers in Australia (and globally). Explorers in Australia have the benefit of a suite of new pre-competitive knowledge that is being derived across these under-explored regions, which should enhance exploration effectiveness and lead to discovery of new Tier 1 deposits.

The many decades of investment in pre-competitive data by governments form the backbone of any exploration program in Australia. These data include geological, geophysical, geochemical and geochronological information at increasingly higher resolution. Building on this legacy is a new suite of novel data that are being acquired across vast areas of the continent. These include the world's largest airborne electromagnetic survey (AusAEM); arrays of passive seismic (AusARRAY) and coincident long-period magnetotelluric (AusLAMP) deployments; ~1000-km long deep seismic reflection lines; multi-element rock, soil, and water geochemistry; orogen/craton-scale atlases of isotopic systems; and national stratigraphic drilling.

A variety of collaborative ventures are developing new technologies. The highly successful Deep Exploration Technologies Cooperative Research Centre (DET CRC) developed a new coiled-tube drilling system and associated sensing technologies that will drill cheaper, smarter, safer, and cleaner than conventional systems. The follow-up MinEx Cooperative Research Centre will continue these technology developments and will deploy them to the covered parts of Australia as the National Drilling Initiative (NDI).

New ideas are being generated by maximizing the data potential via the development of new open-source codes and algorithms that take advantage of the large datasets and increasing computational power. New decision-support platforms under development are essential for investors, explorers and researchers alike.

These new data, technologies and ideas taken together are opening up Australia's covered search space. Australia's lead in these fields has the potential to transform global exploration efforts worldwide in regions that have potential resources under cover.