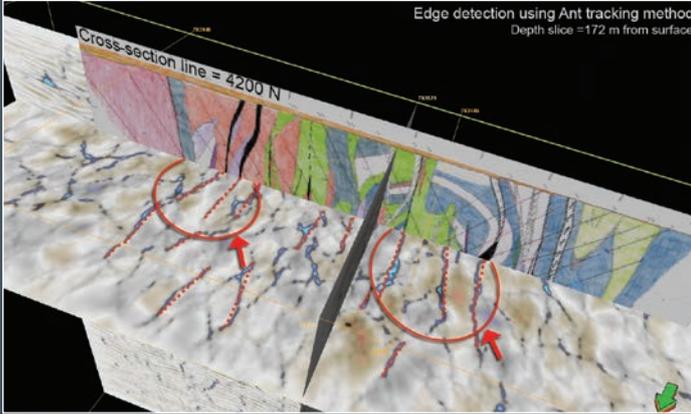




Project 3.1: 3D Seismic Exploration for Hard Rock Environments



PROGRAM 3: TARGETING

Program Leader	David Giles (University of Adelaide)
Project 3.1	3D Seismic Exploration for Hard Rock Environments
Project Leader	Andrej Bona (Curtin University)
Key Researchers	Sasha Ziramov (Curtin University), Roman Pevzner (Curtin University), Milovan Urosevic (Curtin University)
Participants	Curtin University, University of Adelaide
Timing	1 January 2014 – 31 December 2017
Cash Funding	\$860,000
In Kind Funding	\$4,031,000
Review Panel Chair	Mike Webb (Anglo American)

“Seismic imaging is like any other tool: we need to know when, how, and in conjunction with what other tools to apply it to get the most out of it.” Andrej Bona, Curtin University

OBJECTIVES

The objective of this project is to overcome the technical and cost barriers and to maximise the value of seismic data such that seismic methods are a viable tool for mineral exploration and the characterisation of complex mineral deposits.

BACKGROUND AND AIMS

This project relies on the high resolution and penetration power of the seismic reflection method that is as yet not fully tested nor utilised in hard rock mineral exploration. In the past the method has performed with a variable success mainly because of a straightforward transfer of seismic methodology from the oil sector to the mineral sector. Researchers in Project 3.1 are constantly improving hard rock seismic exploration practices by adapting existing methods and introducing new methods, algorithms and approaches.

These developments are intended to make seismic methods more efficient and inexpensive so as to be a viable tool for mineral exploration. One of the key objectives of this project is to further progress all aspects of three dimensional (3D) reflection seismic to delineate an excessively complex hard rock environment.

The key to success of this methodology is to combine it with borehole seismology and calibrate with logs and cores.

SERVICE SECTOR ENGAGEMENT AND COMMERCIALISATION

The targeted commercialisation/utilisation partners are the service companies who would take up the new seismic imaging techniques applicable to hard-rock environments.

LINKAGES TO OTHER DET CRC PROJECTS

Close collaboration with Project 2.4 investigating joint inversion of 3D seismic and electrical geophysics data. Links to Project 3.2 and Project 2.2 in obtaining downhole rock properties from Lab-at-Rig® and geophysical sensors incorporated in the Autonomous Shuttle and AutoSonde™.

YEAR 2 MILESTONES

- Detailed report on rock physics methodology applied to 3 deposit scale case studies evaluated against logs and/or core sample measurements.
- Check shot/zero offset VSP using downhole sensors tested utilising data from the Autonomous Shuttle.
- Detailed report and recommendations on volumetric geologic interpretation applied to field data in complex hard rock environments. What data are required, which approaches work?
- Report on combined geophysical-geochemical analysis for Barrick Nevada case study, including a comprehensive review of surface and borehole seismic data, dependent on provision of shot-records with geometric information from Barrick.

COMMONWEALTH AGREEMENT OUTPUT AND MILESTONES

- Optimised combined surface and borehole seismic techniques evaluated by case study.
- Next generation processing and imaging software developed.
- Combined surface and borehole techniques made available via service provider to sponsor companies.
- New surface and borehole techniques in regular use by the minerals exploration industry.