Defining the Challenge

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Current Exploration Climate

Australia
- Healthy
- Gold has underpinned success to date
- Growing interest in other commodities

International
- Variable
- Overall not as high

Uptake linked to Company DNA
- Some quicker to adopt new technologies
How is HiSels trying to influence the exploration climate?

R&D to further advance the technology
- Internal
- With Curtin
- Minex

- Improving exploration effectiveness by providing high resolution measured data over tens of km³
- Improved investor confidence

-- Improved investor confidence

3D seismic

Geological architecture

Structure delineation

Improved targeting

Lithology mapping

Fast adopters...but still a need for early stage developments

“A high-resolution 3D seismic survey has now been completed over a 23 km² area surrounding the Neves-Corvo mine. Preliminary results have clearly imaged the major “Semblana deposit” verifying the effectiveness of this new tool in the search for blind massive sulphide deposits”


“3D seismic cube has been accurate beyond its expectations”…“The 3D seismic survey has been the real game-changer to brownfields exploration” Australian Mining Review 4 June 19, Andrew Fitzpatrick (Chief Geophysicist - IGO)

“Significantly the 3D seismic survey maps the location of both known fault/vein systems as well as a significant number of other faults likely to host epithermal veins. This is potentially a breakthrough technology to map complex fault and vein systems and together with other geologic parameters directly target parts of the fault likely to host gold mineralisation.

The current and planned drill programmes are the critical test in enabling Evolution to compress the timeframes for new discoveries around Pajingo and Cracow through the use of 3D seismic.”

Evolution Mining Quarterly Report, 30 Sep 2014

“The introduction of innovative seismic and other technologies will allow us to significantly improve the probability of making a discovery. At Pajingo and Cracow, drilling along the 2D seismic lines showed that zones of clay alteration spatially associated with mineralised faults and the larger epithermal system can be accurately interpreted from the seismic sections.”

Executive Chairman’s report, Evolution Mining Ltd Annual Report 2014

“We believe we can mine Nova-like mineralisation to at least two kilometres depth underground and there is no other technology more superior at the moment than HiSels 3D seismic surveying that allows us to target hard rock mineralisation at those sorts of depths. What makes it appealing is the level of geological detail that we can obtain at considerable depths.”

Australian Mining Feb 2019, Paul Polito (Exploration Project Manager - IGO)
Analogy from the oil industry

Step change in drilling success rates

<table>
<thead>
<tr>
<th>Success Rate Summary 1990-97</th>
<th>Percent</th>
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<tbody>
<tr>
<td>Overall success rate 2D:3D</td>
<td>13:47</td>
</tr>
<tr>
<td>Gas-well success rate 2D:3D</td>
<td>24:54</td>
</tr>
<tr>
<td>Oilwell success rate 2D:3D</td>
<td>3:37</td>
</tr>
<tr>
<td>Drilled wells covered by 3D Seismic 1990:1997</td>
<td>5:97</td>
</tr>
<tr>
<td>Annual drilled success rate 1990:1997</td>
<td>10:47</td>
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(Reference: Aylor, W.K. Jr 1999)

How Minex will make a difference

New wave of technologies

- Investment and expertise pool approach
- Provides a vehicle to support developments it might be unreasonable for individual companies to support
- Longer term – better with postgrad timeframes
- Partnerships to provide test sites and supporting geological information

- What we need
  - Get more from the data
  - Ways to circumvent land access challenges
Getting the more from the data

Massive data volumes (eg recent survey at Carosue Dam for Saracen Minerals)

- 4.48 Trillion samples in uncorrelated data
- 395 billion samples of correlated data
- 263,404,757 traces
- 5,306,301 traces per sqkm

Transform to:
- 3D wireframes of contacts and faults
- 3D volumes of elastic and other rock properties which are the key to mine planning and exploration

Addressing land access challenges

Distributed Acoustic Sensing (DAS)
- Fibre optic cable in a drillhole

Passive approaches
THANK YOU

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