Discovery Undercover: What’s Next?

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CMIC Exploration Innovation Consortium
June 6, 2017
Introduction

• Context
  – Exploration challenges remain acute in Canada
  – EIC Roadmap still relevant
  – Successor project needed by mid-2018
  – Tight timeframe to get something in place

• Outline
  – Update on Discovery Under Cover project
  – Highlight challenges
  – Other relevant national and international initiatives
  – Concluding remarks
CMIC Exploration Innovation Consortium

• Created 2010 under CMIC
  – Industry-driven

• Vision
  – Improve discovery rates
  – Through step-changing applied R&D and innovation

• Objectives
  – Define exploration challenges
  – Develop roadmap
  – Catalyst for relevant projects

• ~35 Partners
  – Exploration companies
  – Service providers
  – Institutions

• Approach
  – Extensive consultation
  – Part-time consultant (Tosdal)
  – Full time CMIC person (Galley)
  – Dedicated Industry champions
## 10-year Innovation / R&D Program

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<td>1. Characteristics of fertile terranes and districts</td>
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<td>• Detecting edges and vectoring to ore</td>
<td>• How to identify most fertile areas?</td>
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<td><strong>2. Techniques to unravel deep 3D geology</strong></td>
<td>2. Techniques to map sub-surface geology</td>
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<td>• Deep penetrating detection and mapping techniques</td>
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Why Discovery Under Cover?

• **Technical challenge**
  – 78% of Canada concealed by lakes and surficial deposits
  – Can detect “anomalies” but techniques not predictable

• **Focus**
  – Processes of migration to surface
  – Sampling & analytical techniques

• **Benefits**
  – Fewer barren holes (<$$>$)
  – Reduced environment footprint!
Project Status

• Process to date
  – Enlisted Canada’s top 3 experts
  – Industry consultation
    Workshops (Q1)
  – Historical work reviewed

• Where we are (+/- on track)
  – Gap analysis completed
  – 6 key problems identified
  – 3 focus areas agreed upon

• Next steps
  – Develop relevant program for each focus area
  – Engage with other groups disciplines for novel ideas

• Year-end target (stretch!)
  – Identify funding vehicle(s) & management structure
  – Circulate high-level proposal to potential sponsors
Program: Three Focus Areas

• **Processes of migration**
  – How elements move
  – Under which conditions

• **Tools & Technology**
  – Define techniques of choice
  – Develop new tools

• **Protocols**
  – Design efficient surveys
  – Improved success

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Metal migration is complex

From Kyser (2017)
Project Approach

• **New disciplines for new ideas**
  – Nuclear storage, molecular biology
  – Soil, agricultural, and material sciences, etc.

• **New technologies & application**
  – Genomics/fingerprint bacteria
  – Lab simulation experiments
  – Analytics for data integration

• **...with geoscience partners**

From Winterburn (2017)
Anticipated Challenges

• **Access to expertise**
  – Limited national expertise in Exploration geochemistry
  – International collaboration required

• **Funding vehicle**
  – NSERC rules limiting (outside funding, open access)
  – Creative avenues to be explored

• **Project duration**
  – 5 years required for impact
  – 3 years preferred by Industry Partners
Coordination with National Initiatives

• **Metal Earth**
  – Strategic consortium led by Laurentian
  – Canada First Research Excellence Fund
  – $104M / 7 years ($49M from CFREF)

• **Focus**
  – Fertility of terranes and districts
  – Craton, transects, thematic, analytics

• **Links with EIC**
  – Addresses key roadmap component
  – New Director = active member of EIC

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**Remote & Covered Areas**

1. **Characteristics of fertile terranes & districts**
   - How to identify most fertile areas?

2. Techniques to map sub-surface geology
   - Drilling, data integration
   - Data density for detection

3. Secondary metal dispersion
   - Understand mechanisms
   - Develop techniques
Monitoring International Initiatives

**Deep Mature Camps**

Real-time down-hole data collection
- Real-time decision

**Remote & Covered Areas**

Techniques to map sub-surface geology
- Drilling, data integration

**Reflex Lab-at-Rig**

- Real-time data from drill muds & chips
- Mineralogy, geochemistry & processing for geology and orebody proxies

**DET CRC Coiled Tubing Drilling**

- Cheaper, faster, safer, small footprint
- Can be used for “prospecting” drilling

![Photo courtesy of Reflex](https://via.placeholder.com/150)

XRF & XRD Processing

![Photo courtesy of DET CRC](https://via.placeholder.com/150)

50m/h, 500m depth, $50/m
<10 tonnes & small footprint
Other projects considered (2012-15)

• Exploration-focused
  – Permafrost drilling
  – Lightweight heli-portable drill
  – Muon technology
  – Exploration Simulator

• CMIC working groups links
  – Real-time portable analyzer
  – In-situ rock mass characterization
  – NOW: Environment management working group

Exploration Extraction Processing Tailings Remediation
Concluding Statements

• Focus on next EIC project
  – Need to be ready in time

• Discovery Under Cover
  – Next significant challenge for discovery in Canada
  – Progressing; significant engagement from stakeholders
  – Combination of Applied R&D and Innovation
  – Synergies with Environment
  – …but funding and timeline will be challenging