Integration of Automation and Robotics
BC Mining Workforce Perspective
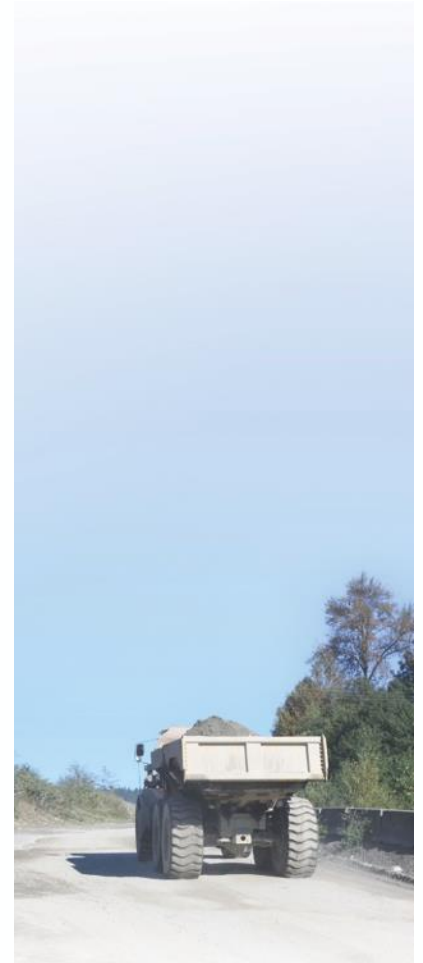
JULY 25, 2017

PRESENTED BY: JILL TSOLINAS, EXECUTIVE DIRECTOR

CENTRE OF TRAINING EXCELLENCE IN MINING
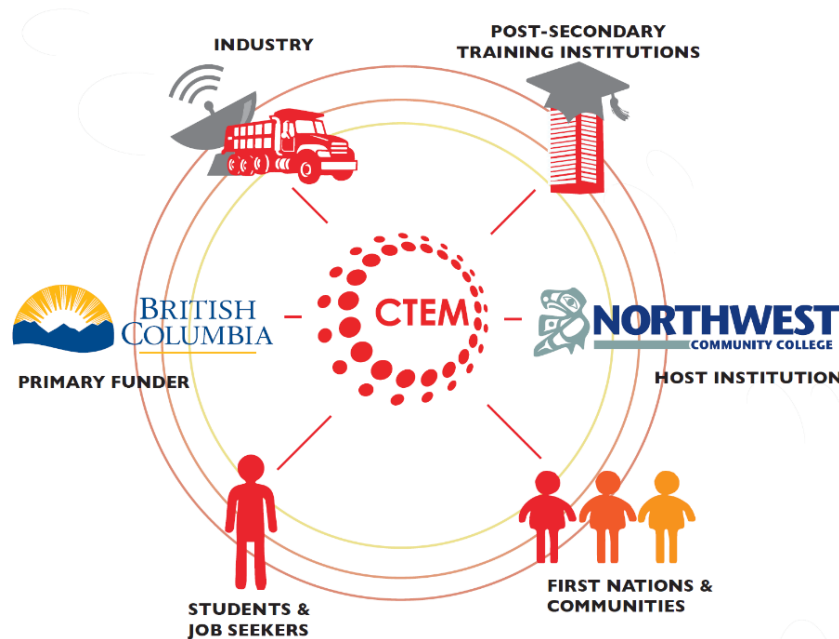
Today's Presentation

- CTEM Overview

- What it automation and robotics looks like
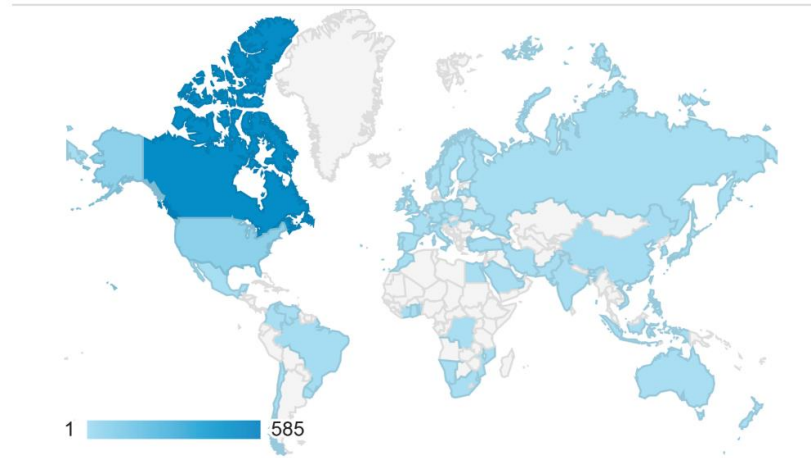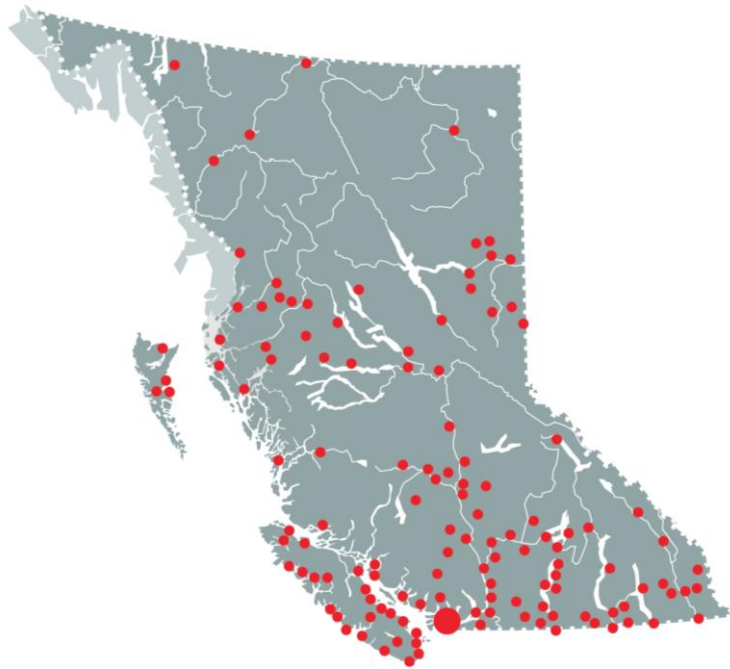
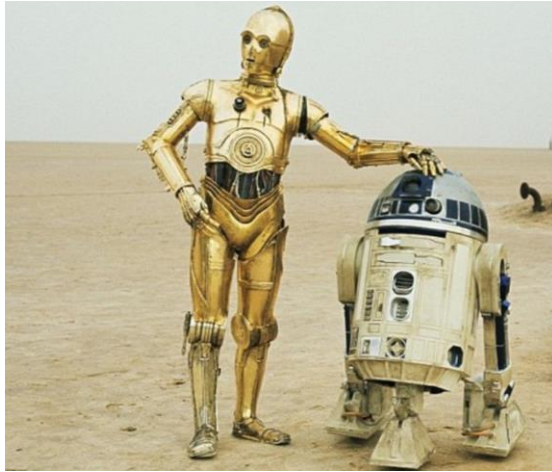- How to train

- Questions and Discussion

CTEM

VISION A province-wide virtual hub that facilitates collaborative, innovative training opportunities for the British Columbia mining industry, job seekers and communities.

CTEM's Influence – Provincial and Global

Robotics and Automation

Source: Lucas Arts, Popular Science, dws-4.me

Robotics and Automation
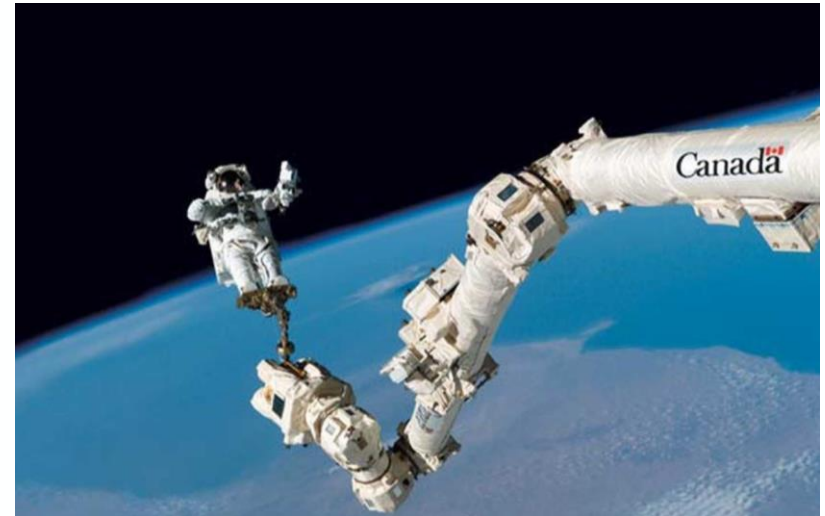
Incorporation of Robotics and Automation

- Safety Enhancements

- Productivity Increases

- Equipment Efficiency

- Maximize Labour

- Effective Decision Making

New Technology

New mill with modern technology

New Technology

New ore sorting technology is being developed that reduces the waste produced

New Technology

Filtering water from mine waste makes it safer and easier to store

New Technology

Equipment enhancements: detecting loose/missing teeth and remote vehicles

Source: Sandvick, Caterpillar, SMS

New Technology

A true "closed loop" system, our revolutionary centrifuge design removes over 95% of the drill cuttings from our return fluids. Using the same 1000 gallons of fluid with minimal makeup water, the system can reduce fresh water consumption by up to 90% per day, with cuttings reduced to the consistency of toothpaste for trouble-free storage or transport.

GO MOBILE

With the FieldView™ web app and weekly updates sent via email, we've put every aspect of the drilling operation at your fingertips.
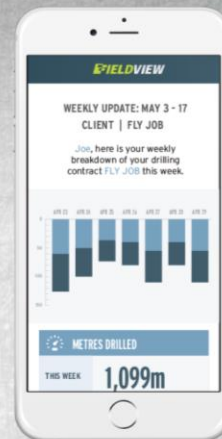
Decision Making

Mining requires balancing technical and social innovation to build a sustainable world

Preparing for the Future:

**Mining Labour Market Outlook
for British Columbia**

Key Recognition

Funding provided through the Canada-British Columbia
Labour Market Development Agreement.

Significance of Skills Shortage

Mining employers need a continuous flow of individuals through the "talent pipeline" to ensure they have a sufficient pool of qualified workers to meet future hiring requirements and support competitiveness and growth in the mining industry in British Columbia.

Source 'Preparing for the Future: Mining Labour Market Outlook for British Columbia 2016 - 2026
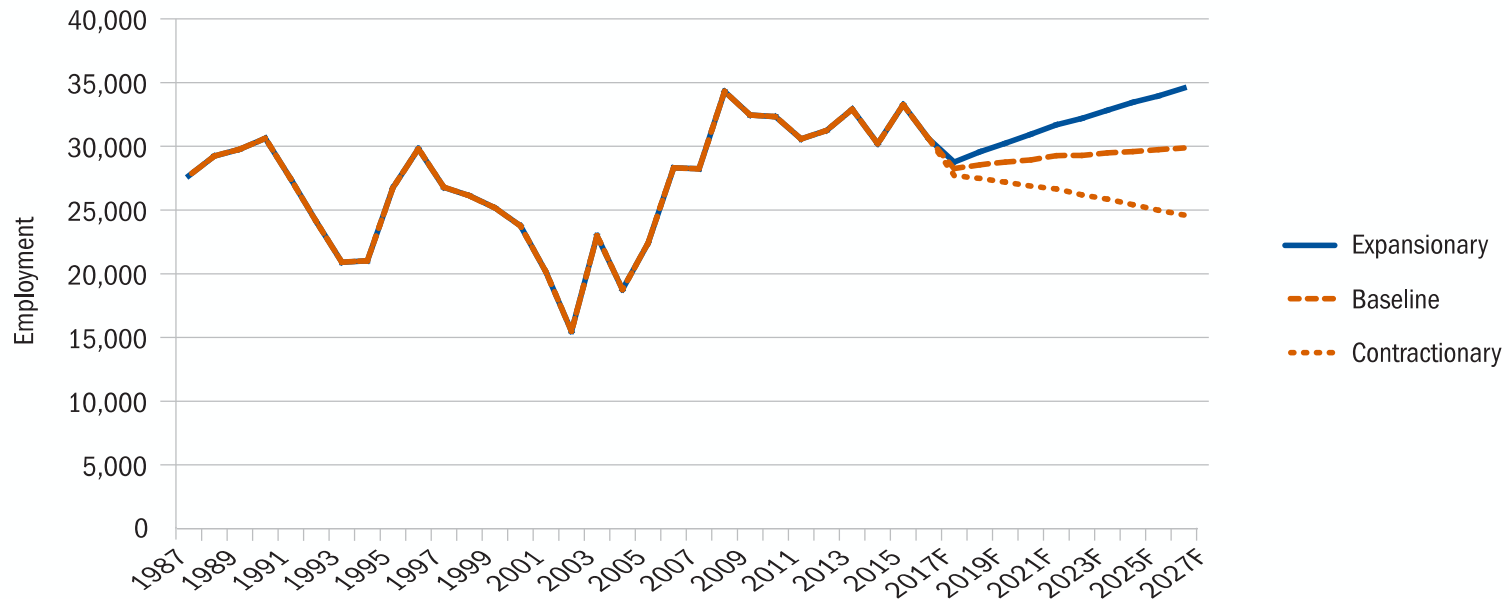
1

A look at the numbers

If the mining industry expands, there will be a need to hire up to 20,000 workers over the next 10 years

Forecast of mining employment in BC by scenario (1987–2026)

Source: Mining Industry Human Resources Council, (2016)

Hiring requirements persist in all economic scenarios

BC cumulative hiring requirements forecast by scenario (2017–2026)

	Net Change in Employment	Replacement Requirements		Cumulative Hiring Requirements
		Retirement	Non-Retirement	
Contractionary	-5,985	6,670	6,295	6,975
Baseline	-730	7,415	7,015	13,705
Expansionary	3,980	8,105	7,690	19,770

Source: Mining Industry Human Resources Council, (2016)

Embracing the Change

"With the move to more sophisticated technology, this doesn't necessarily mean requiring fewer employees — it is not about eliminating a person but increasing the efficiency of equipment or vehicles."

Source: Industry Stakeholder, May 2016 Consultations

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Embracing Change

Embracing the Change

- Remove Hesitations -
- Remove Insecurities -
- Enhance Competence +
- Increase Employability +

3

Innovative Training

Increase in Technological Skills

"In the past we could handle a process of training over time; we now need technological skills and capabilities to be able to monitor equipment, so hiring with lower education is decreasing and the need for skills is going up."

Source: Industry Stakeholder, May 2016 Consultations

Simulators

- Industry and student benefit +
- High-level application +
- Skills development +
- Cost -

On-location Training

- Student benefit +
- Skills development +
- Costly -

Upskilling & Reskilling

- On site
- Short Duration
- Credentials
- Roadmap

Collaboration is Critical

- Rethink – Retool Training
- Accessibility
- Credentials
- Roadmap

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THANK YOU

Questions?