

# Novel Mining Methods

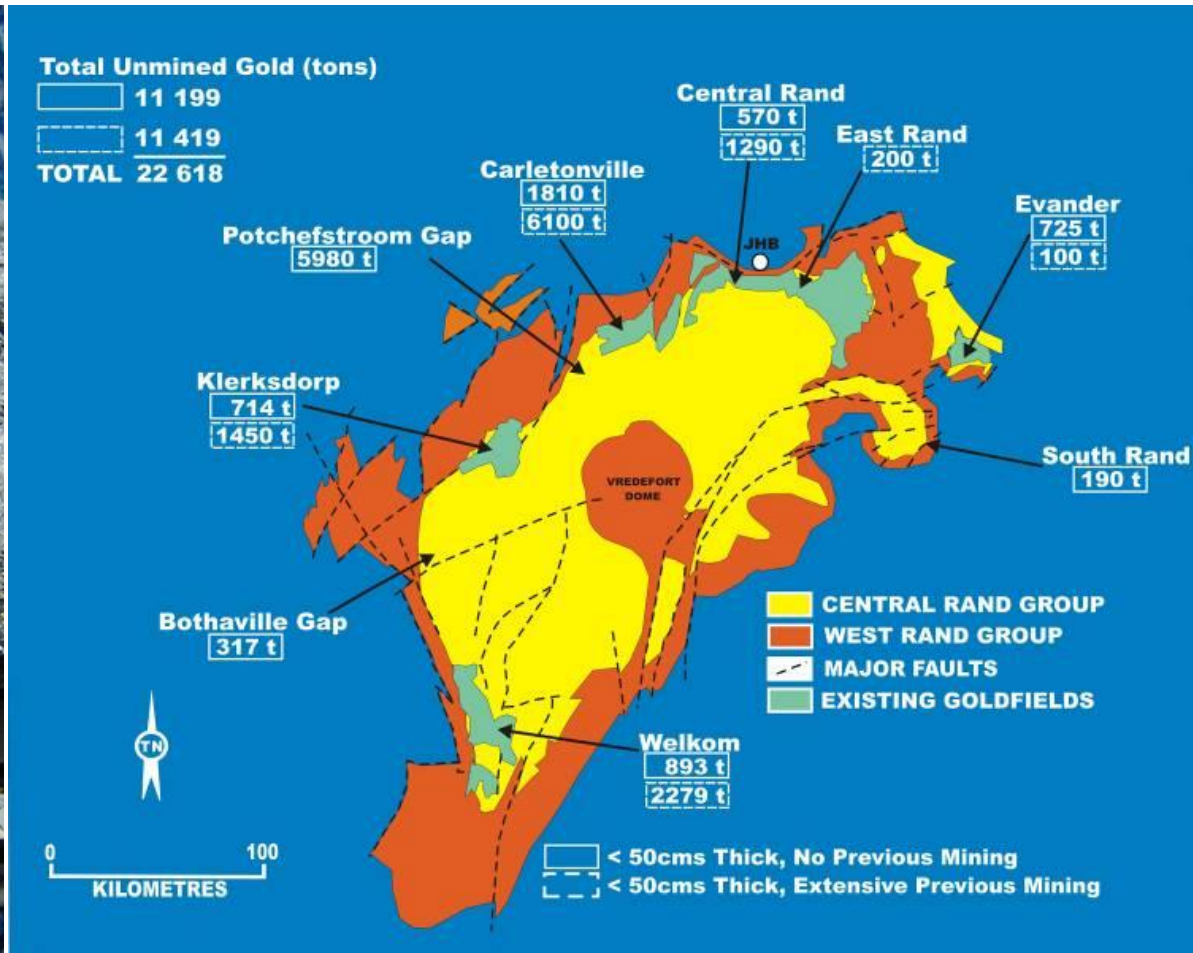
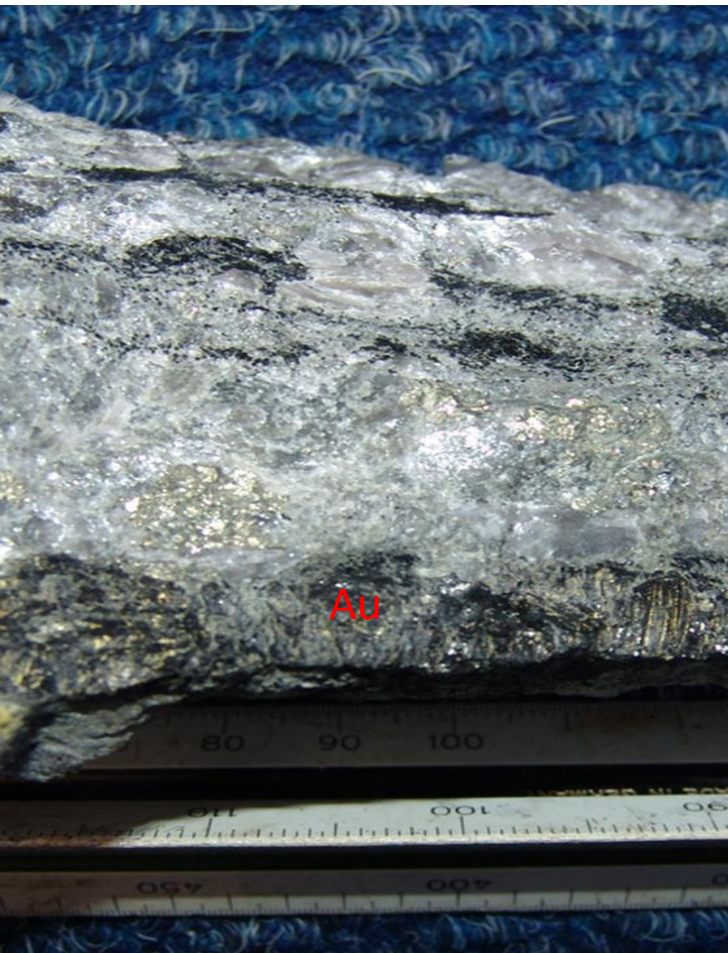
## 4<sup>th</sup> Biennial Conference



**Presented by: Dr. Bessie Monchusi**

**Date: 10 October 2012**

# Background



Conglomerate - Carbon Leader Reef

# Contents

- Fundamental Earth Science Research
- Applied Collaborative Research

# Question?



- How do we change our mining processes to mine the 50cm reefs efficiently, economically and safely?



# Vision: Autonomous Mining Systems



Assay/Mapping Robot



support



cleaning



Stope Recon



recovery



miner



- Rock breaking
- Rock removal
- Support
- Environmental safety
- Materials handling



# Contents

- Fundamental Earth Science Research



# GEOLOGY

Yeah, it rocks!!!

motifake.com



- Technology to image rock mass
  - Borehole radar
  - Electric Resistance Tomography
  - Radio Imaging Method



# Rock Engineering

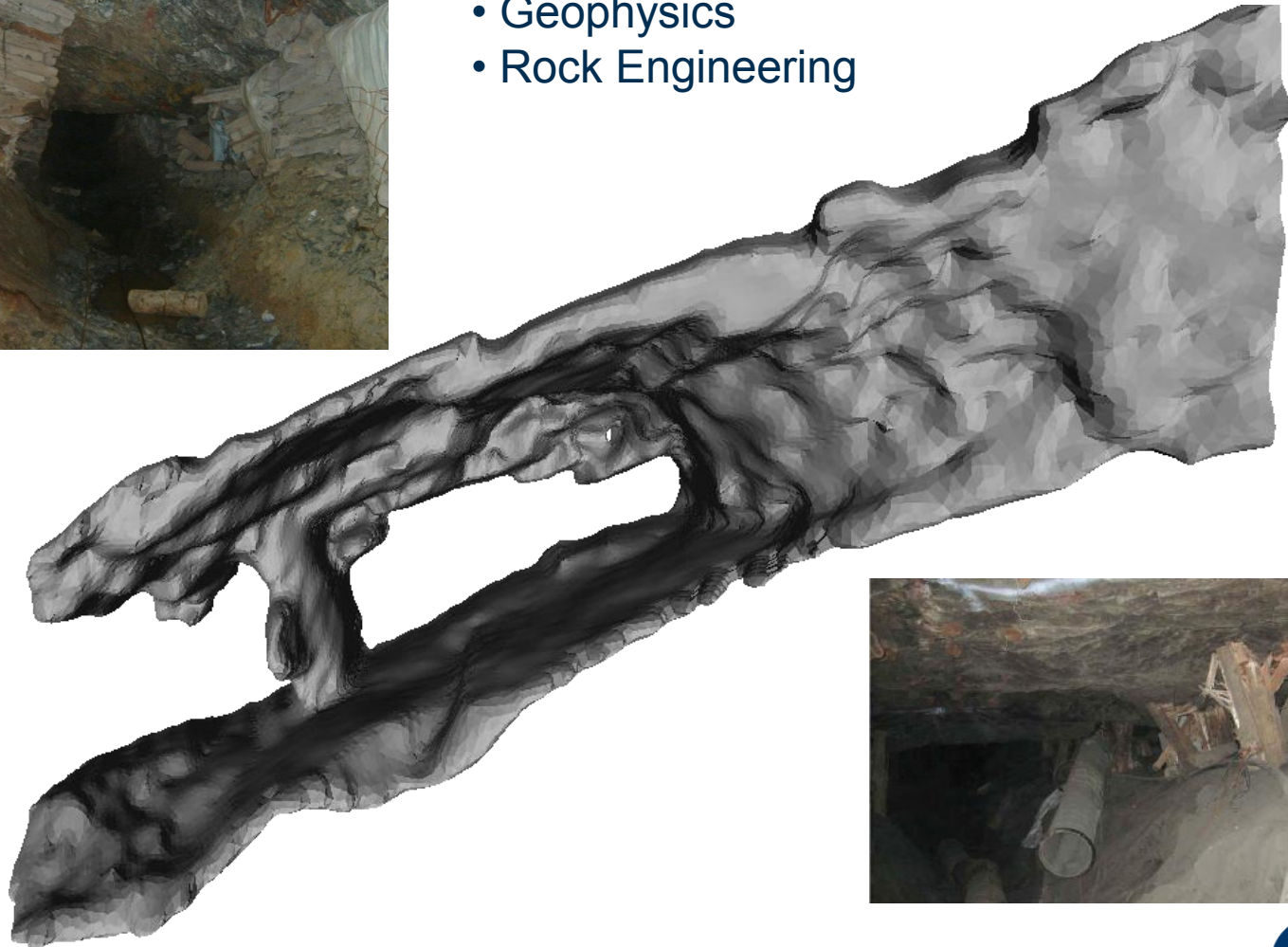
- How stable the rock is



# Reef Information



- Geology
- Geophysics
- Rock Engineering



# Contents

- Applied Collaborative Research

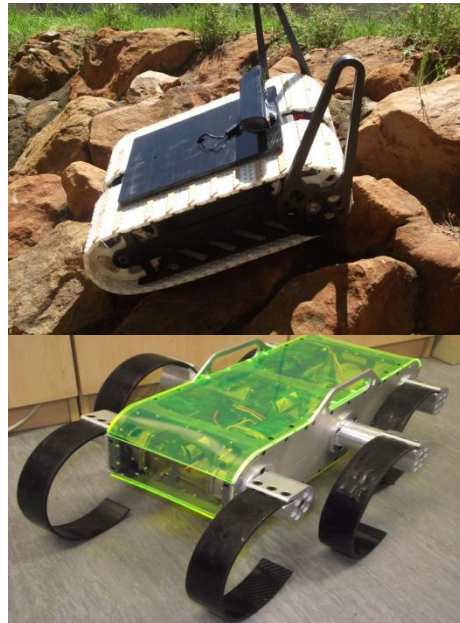


# Platform Development

AR Drone



CSIR mine safety platform

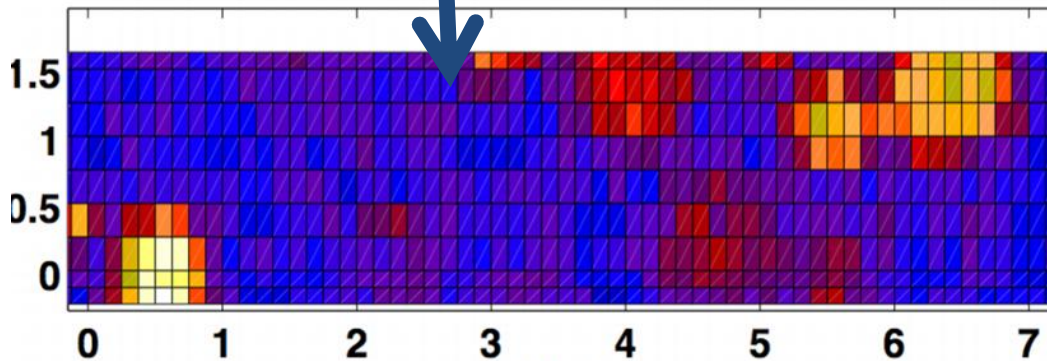
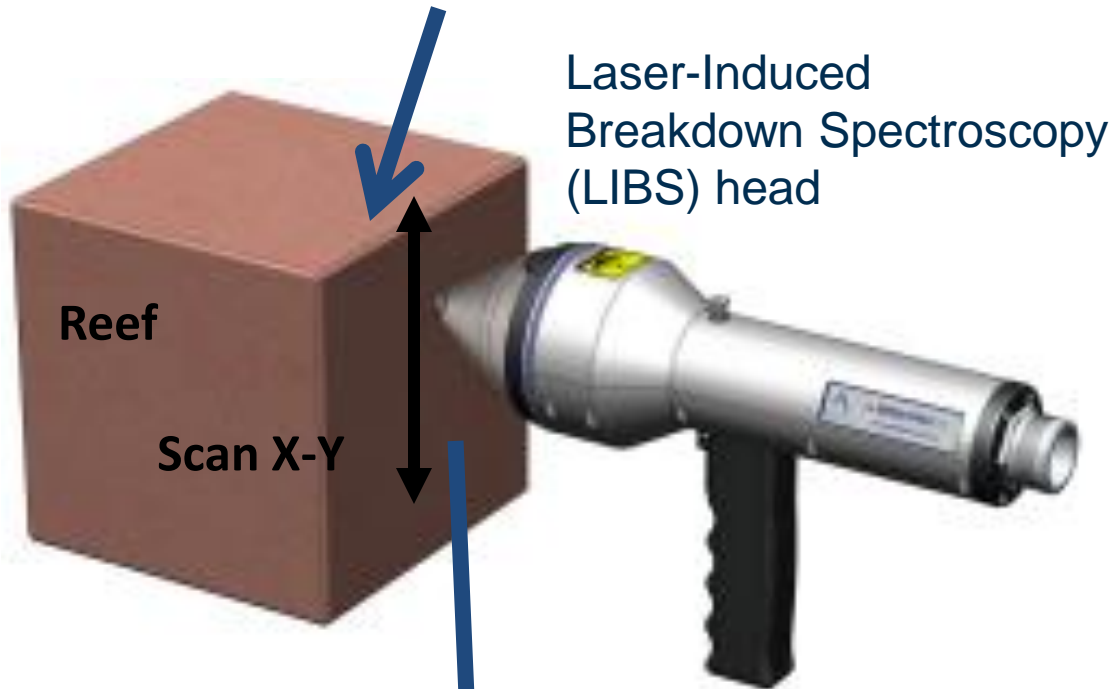


Differential time-of-flight beacon

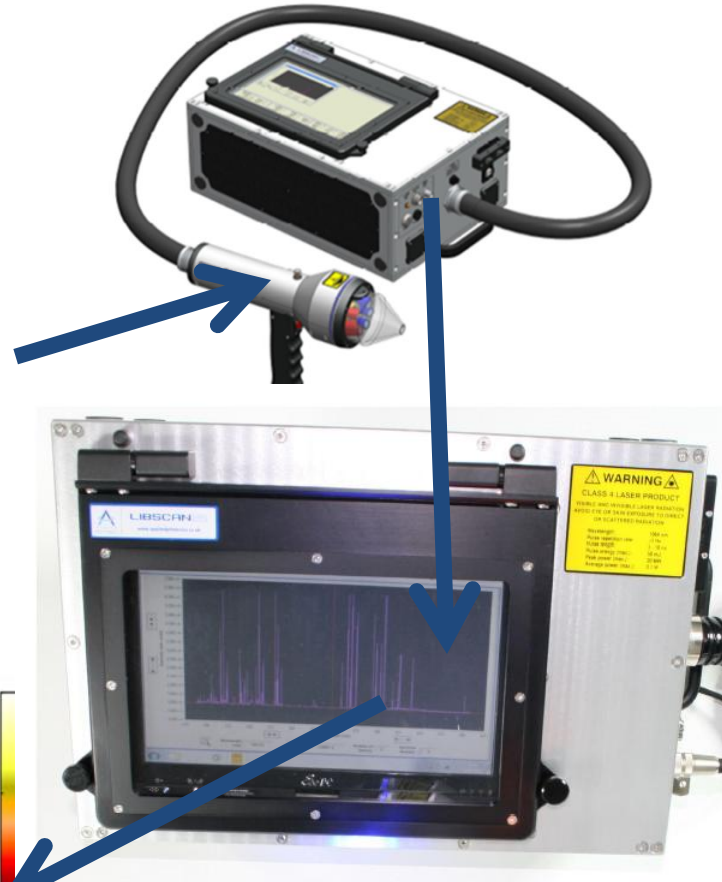




# Sampling

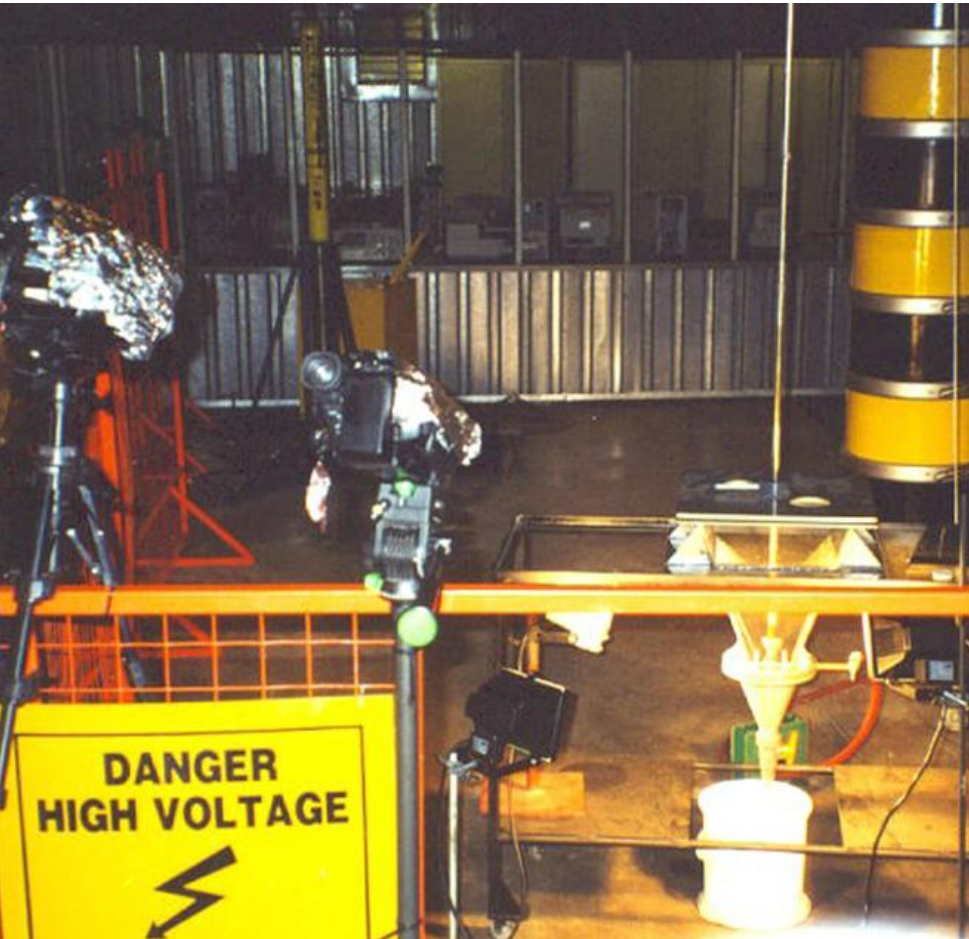


Laser/Spectrometer/Computer



# Rock Breaking

Direct Current (DC)

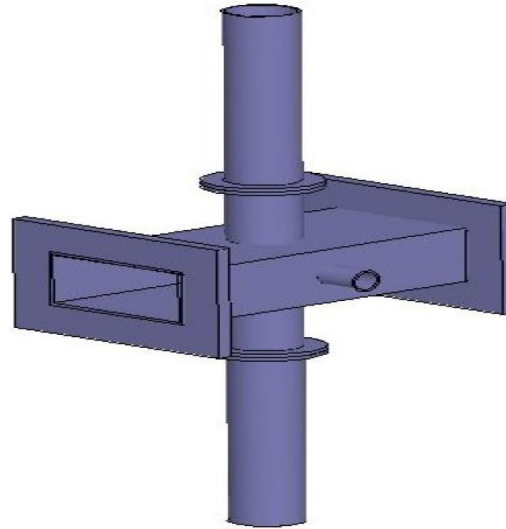


Alternating Current (AC)

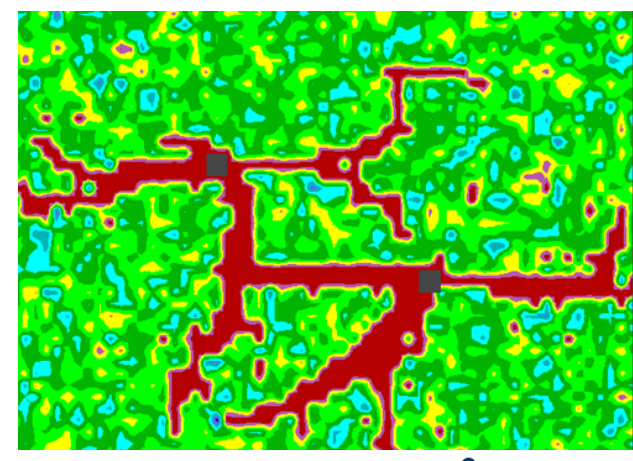
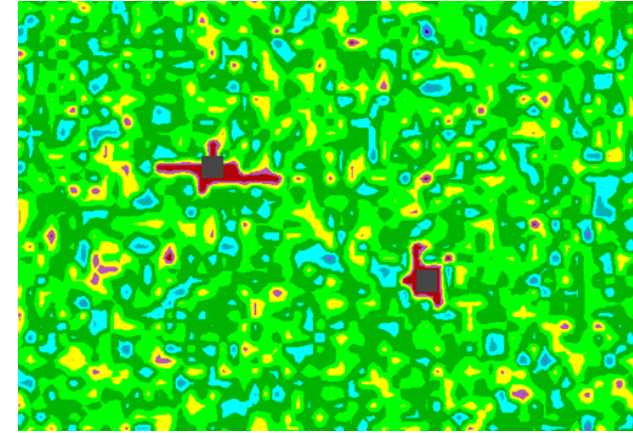




# Microwave Rock Breaking



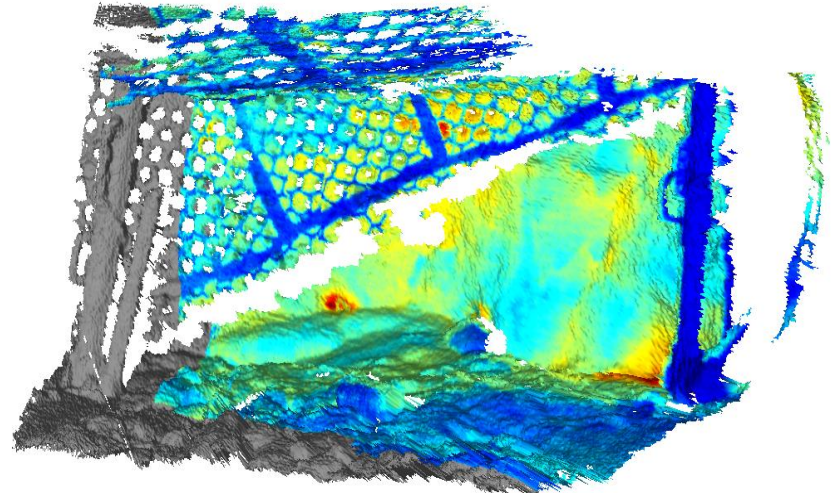
# Infrared Photography & Numerical Modelling





# Sensors for 3D Mapping

Xbox Kinect 3D



# Thermal Imaging for Proximity Detection



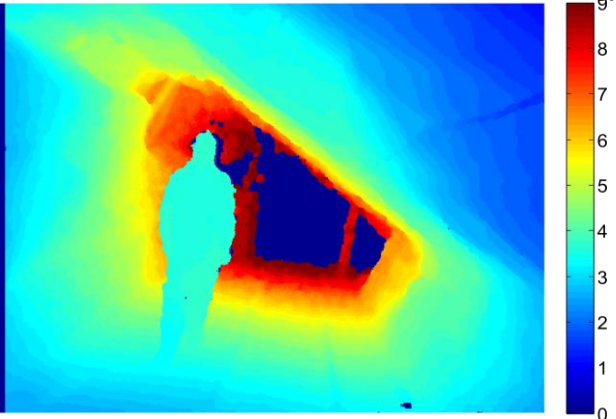
Extract  
"Region of  
Interest" ROI



Classify  
ROIs



Measure  
distance



Calculate time to  
collision



# Conclusion



Assay/Mapping Robot



support



cleaning



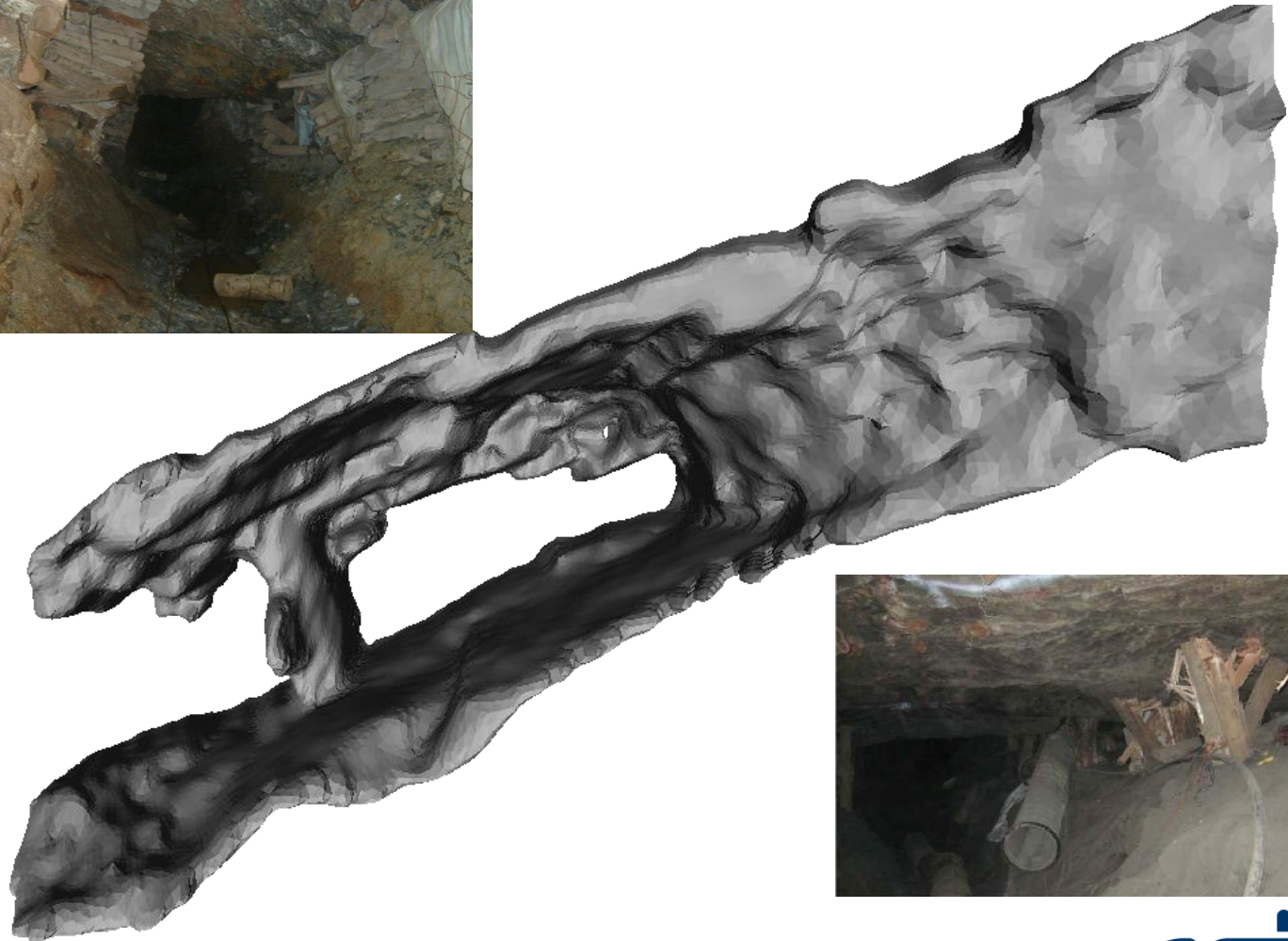
Stope Recon



recovery



miner





# Industrial Partnership



- Novel rock breaking techniques
- Robotics expertise
- Intrinsically safe design
- 3D point cloud mapping
- Machine integration
- Mining equipment supply





# ROCKS

Thats the way they are born.

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# Thank you

