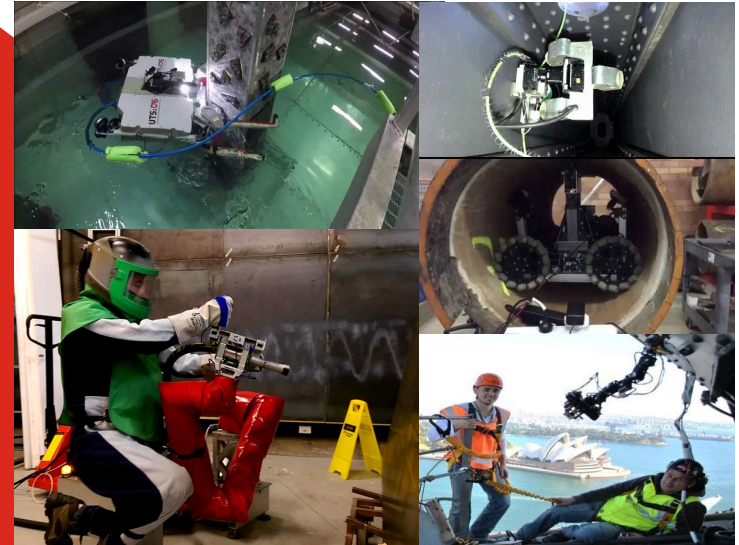


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CENTRE FOR AUTONOMOUS SYSTEMS

REVOLUTIONISING MINERAL SEPARATION USING ADDITIVE MANUFACTURING

Nuwan Munasinghe



**Mineral
Technologies**
A Downer Company



Rapido

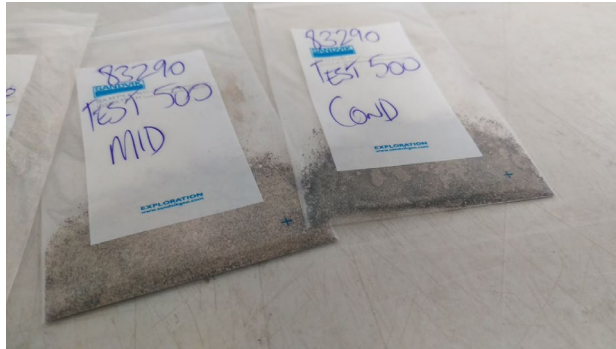


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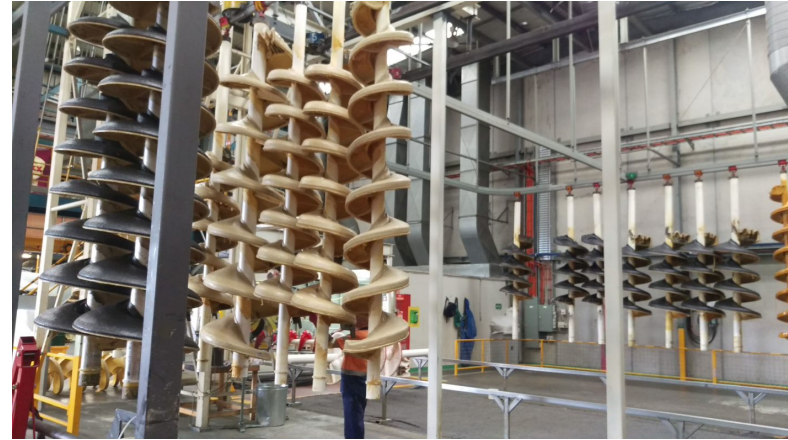
Gravity Separation Spirals

- Used in mining industry to separate minerals from slurry




Challenges in Traditional Manufacturing

1. Time consuming
2. Labour intensive
3. Hazardous
4. Difficult to customise




R&D Project Objectives

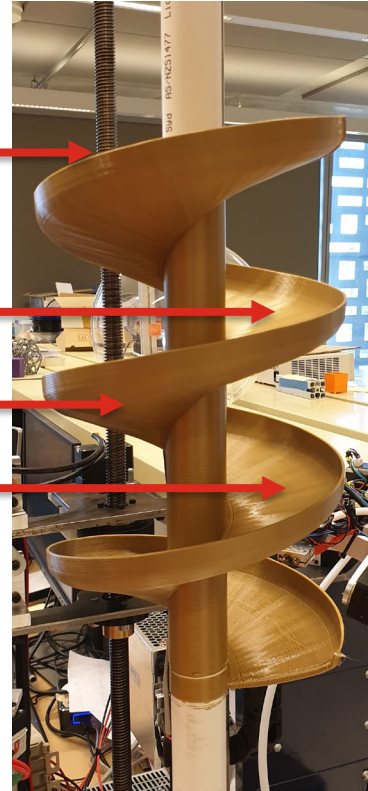
- Develop a 3D printer to print spirals
- Integrate IoT capabilities

Flow rate 

Temperature 

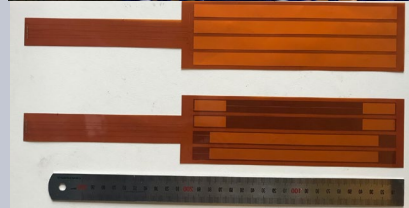
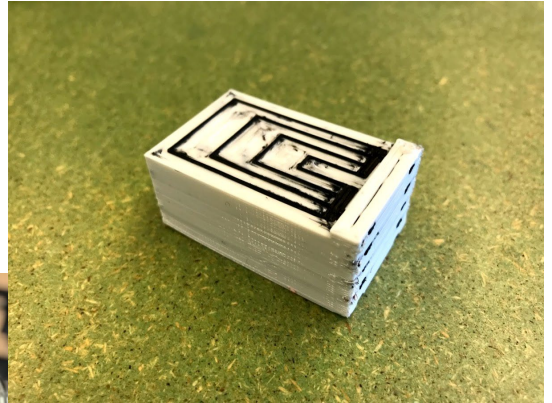
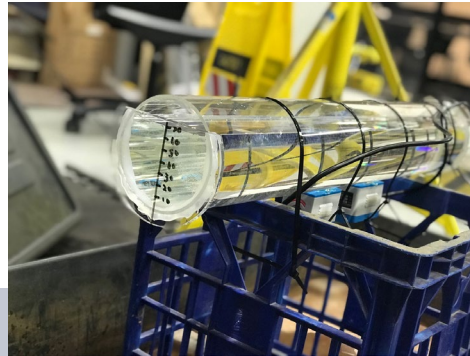
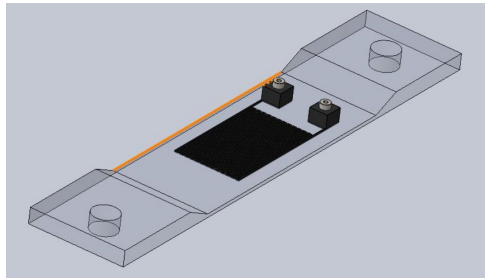
Wear 

Strain 



IoT Enabled Smart Spirals

- 3D print or embed sensors to measure spiral operation conditions:
 - Wear
 - Flow rate
 - Strain
 - Temperature



Benefits to the Industry Partner

- Ship a printer rather than spirals
 - > Reduce transportation cost
 - > Reduce damage during transportation
- Easily customisable for different minerals
- Troubleshoot issues remotely
- Fault prediction
- Provide feedback to optimise output



Applications in Other Industries

- Printing helical pattern
- Printing large-scale real-world equipment
 - Current printer: 0.015m³ (Build 200mm diameter 500mm height)
 - Planned printer: 0.77m³ (700mm diameter 2000mm height)
 - 13th largest 3D printer in the world (Source: <https://www.aniwaa.com/largest-3d-printers/>)
- Embedding sensors inline with the printing

Thank You!