

Haultrax Capability Statement

Mine Automation

2021



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HAULTRAX - BACKGROUND

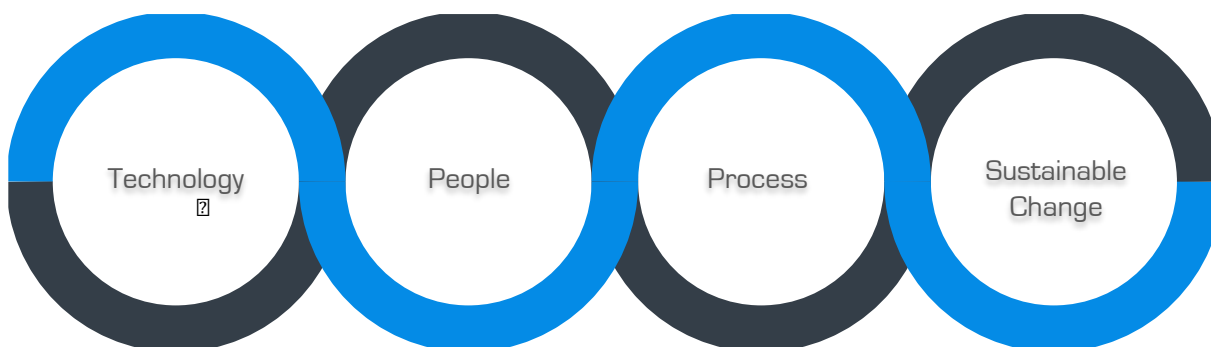
At Haultrax, we believe in challenging mining operational paradigms. Mining the way we ‘always have’ over the last decade has kept our industry in a state of productivity stagnation. Our aim is to achieve a more productive operating culture through working with your company’s people (skills and knowledge), processes and equipment.

Haultrax specialises in the area of mine automation and technology implementation for customers in the mining industry. Our personnel have extensive experience in surface mining technology and automation projects; having planned, procured, deployed, managed and operated autonomous haulage and drilling operations for large-scale mining companies since 2008.

For mine technology projects to be successful, changes are required to the processes around the technology. Without an integral alignment between people and supporting processes to the technology, the benefits of the technology are often not achieved. The appropriate identification, planning, and implementation of these changes and managing these towards completion is Haultrax’s expertise. This is how our team ensures the technology delivers its promised value.

The Haultrax offices are based in Brisbane and Perth. On the West Coast our team based in Perth locally supports the Pilbara, Southwest and Goldfields regions. On the East Coast our Brisbane team services the Bowen, Hunter Valley, Surat and Galilee Basin.

As a team, we pride ourselves on being mining, production and automation specialists, focusing on people and process changes to improve productivity, cost and safety.



Success occurs when the technology is integrated into the operational culture of our mining people. Without this pull and alignment of people and processes with the technology, sustainable change cannot be achieved.

COMPANY OBJECTIVES & FOCUS

Our company objective is:

To be the renowned and preferred value delivery company for mining customers

We will achieve this through providing our services to help customers with:

- Strategy, evaluation and selection of the right technology
- Operational readiness, implementation and change management
- Productivity improvement through deep data analysis targeting process variability

As a team we pride ourselves on being mining and technology specialist – focussed on safety, productivity and cost.

SERVICES PROVIDED

1. Mine Automation and Technology – Strategy & Implementation
 - Specialist in study, evaluation, business change, selection, implementation and support of autonomous technologies
2. Mining Safety & Productivity Initiatives
 - Mining safety technology selection and implementation
 - Operational efficiency projects targeted to achieve greater productivity
 - Delay minimisation on load and haul fleet, payload optimisation and cycle time efficiency
3. Organisational & Culture Change
 - People, organisational and culture change to successfully implement technology and/or process changes required
4. HX Digital – Mining Systems & Applications
 - A specialist toolkit of mechatronic and database skills that enable the creation of smart tools and applications

INVOLVEMENT & AFFILIATION WITH MINING AUTONOMY GROUPS/ORGANISATIONS

- Haultrax is involved with the Global Mining Guidelines (GMG) Group for Automation.
- Haultrax was also part of the group of industry specialists involved in developing the Code of Practice – Safe Autonomous Mining WA, working with industry autonomy users, OEMs and the Department of Mines WA.

HAULTRAX'S EXPERIENCE WITH AUTONOMY

Haultrax has assisted mining companies understand and use autonomous technology over the whole project lifespan: assessment (strategy, pre-/feasibility), operational readiness/execution, deployment and on-going improvement.

The graphic below shows the projects our team has been involved with that have led to successful deployments and the list after highlights the other study-based projects we have conducted.



KEY AHS PROJECTS – DEPTH OF INVOLVEMENT IS ONE OF HAULTRAX’S DIFFENTIATORS

- 2020: AHS Feasibility Study, Tier 1 Coal Producer (Queensland) – Komatsu & CAT
- 2019: AHS Feasibility Study, Tier 1 Coal Producer (Queensland) – Komatsu & CAT
- 2019: Automation Pre-feasibility Study (AHS, Drills, Dozers) – Tier 2 Coal Producer (Queensland)
- 2018: AHS Feasibility Study, Tier 1 Coal Producer (Queensland & New South Wales)
- 2017: AHS Regional Deployment Review for 150 AHTs, Tier 1 Oil Sands Producer (North America) – Komatsu system.
- 2017: AHS Operating Model for 50 AHT site, Tier 1 Iron Ore Producer (Western Australia) – Caterpillar system.
- 2016: AHS Feasibility study, Tier 1 Mining Services Provider (Australia) – all available solutions.
- 2015: AHS operating model, Tier 1 Iron Ore Producer (Western Australia) – Caterpillar system.
- 2015: AHS feasibility study and operational readiness, Tier 1 Coal Producer (Queensland) – Komatsu system.
- 2015: AHS production performance improvement, Tier 1 Iron Ore Producer (Western Australia) – Caterpillar system.
- 2014: AHS productivity & safety improvement lead, Tier 1 Iron Ore Producer (Western Australia) – Caterpillar system.
- 2014: AHS feasibility study lead & contractual support, Tier 1 Copper Producer (Chile) – Caterpillar & Komatsu systems.
- 2012-2013: AHS feasibility study & implementation strategy lead, Tier 1 Gold Producer (Western Australia), Caterpillar system.
- 2012: AHS pre-feasibility study lead, Tier 2 Iron Ore Producer – Caterpillar (MineStar), Komatsu (Modular) & Hitachi (Wenco) systems.
- 2012: AHS operational readiness & implementation lead, Rio Tinto Iron Ore (Western Australia) – Komatsu system, 26 trucks. Devising the operational, training and people strategies.

KEY AUTONOMOUS DRILL & OTHER PROJECTS:

- 2019: Automation pre-feasibility study including drills and dozers, Tier 2 coal producer Queensland and New South Wales.
- 2016: Autonomous drills rollout team development, Tier 1 Iron Ore Producer (Western Australia) – Atlas Copco system.
- 2015, 2014: Autonomous drills business rollout study lead, Tier 1 Iron Ore Producer (Western Australia) – Atlas Copco system.

- 2014, 2013: Autonomous drills study lead, trial execution operational & change advisor, Tier 1 Iron Ore Producer (Western Australia) – Atlas Copco system.
- 2014: Autonomous drills technology trial contractual support, Tier 1 Iron Ore Producer (Western Australia) – Atlas Copco system.

OUR METHODOLOGY – A DIFFERENTIATOR IS OUR METHODOLOGY & ENGAGEMENT

Our team has developed work packages to evaluate, prepare for and implement autonomous mining systems. Below is an example of the work packages for the feasibility and operational readiness.

FEASIBILITY		OPERATIONAL READINESS	EXECUTION	HANDOVER TO OPERATIONS
1	Business case	<ul style="list-style-type: none"> • Fleet definition and mine plan (AHS and Manned) • CapEx, OpEX, NPV and options 		
2	Site selection	<ul style="list-style-type: none"> • Area suitability and infrastructure availability • People capacity to change 		
3	Technology definition	<ul style="list-style-type: none"> • Software, hardware and vehicles required • Business integration 		
4	Infrastructure definition	<ul style="list-style-type: none"> • Wireless network and fixed IT • Control room and civil works 		
5	Technology delivery planning	<ul style="list-style-type: none"> • Phased implementation and mine plan • People and training models • Regulatory approval 		

Areas that are commonly overlooked >> Technology Delivery Planning | Business case | Go-ahead criteria

FEASIBILITY	OPERATIONAL READINESS	EXECUTION	HANDOVER TO OPERATIONS
1	Operating model	<ul style="list-style-type: none"> • Structure, accountabilities, capabilities and transition • Impact to people, process and technology 	
2	Functionality testing	<ul style="list-style-type: none"> • Framework for operational testing • Safety, Operability, Performance and Sustainability 	
3	Evaluation plan	<ul style="list-style-type: none"> • KPIs and periodic reporting • Address scale challenge 	
4	People and training strategy	<ul style="list-style-type: none"> • Recruitment and role definition • Training strategy and design to full AHS 	
5	Change management	<ul style="list-style-type: none"> • Business and operational change journey • IR management 	

Areas that are commonly overlooked >>

Some of the other resources we have gained through executing these projects are:

- Design principles for autonomous ramp-up and operating model
- Benchmarking data for autonomous performance (cycle time, annual hours, variability, delays)
- Profiles and autonomous haulage and drilling specific roles
- Function testing programme with autonomous haulage and drilling
- Haul modelling software

THANK YOU & FURTHER INFORMATION

Thank you and for further information or clarification please do not hesitate to contact myself.

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