## **INNOVATION**

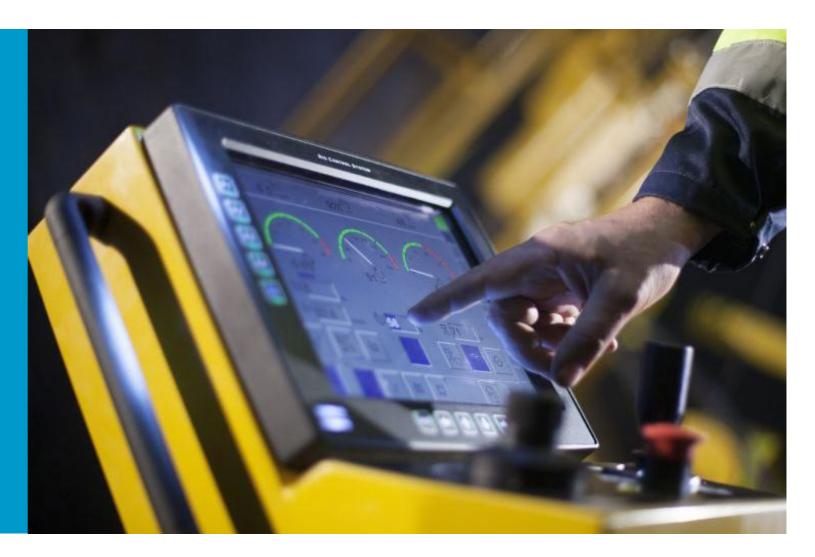
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Johan Halling Business Area President Mining and Rock Excavation Technique



#### AGENDA

- Innovation drivers
  How do we work with innovation
- 3. Innovations
- 4. Summary





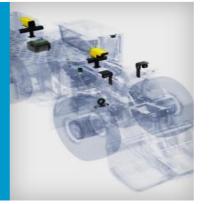
## **INNOVATION DRIVERS**

#### **Trends**





Increased demand for automation / fleet management and safety



Focus on energy efficiency and carbon footprint







A growing demand for competent labor

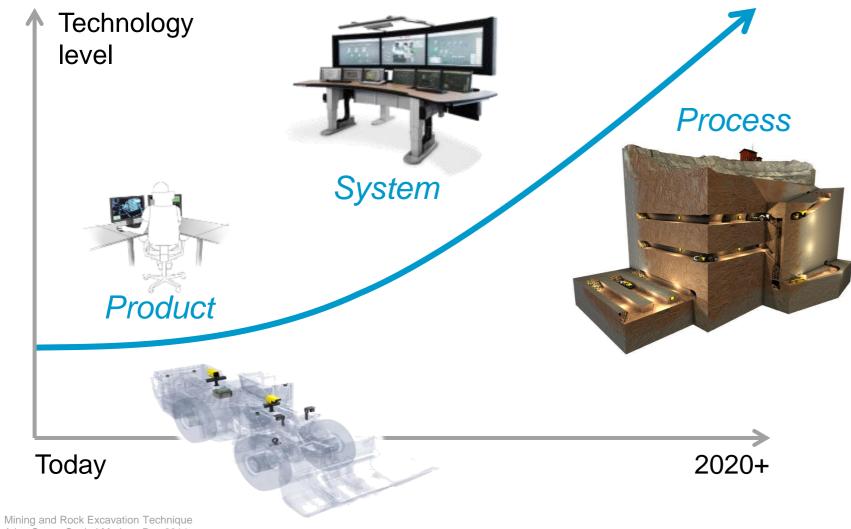


Quicker communication and availability of information





### HOW WE WORK WITH INNOVATION



Short term and long term simultaneously

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#### **PRODUCT INNOVATION**





#### **PRODUCT INNOVATION**

#### **Differentiated value proposition**











#### **SERVICE INNOVATION**





#### **CONSUMABLES INNOVATION**





#### **MECHANICAL ROCK EXCAVATION**





#### **MINING AUTOMATION**

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Operations with minimal or no human interaction

Remote automation

Operator interacts remotely – ability to operate multiple machines

Automation

Operator onboard, but is assisted by technology

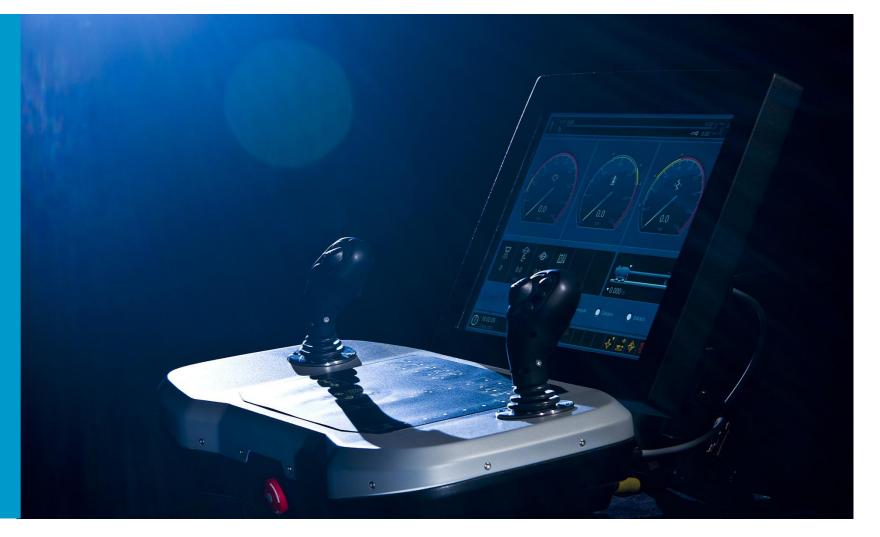
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## **AUTOMATION**

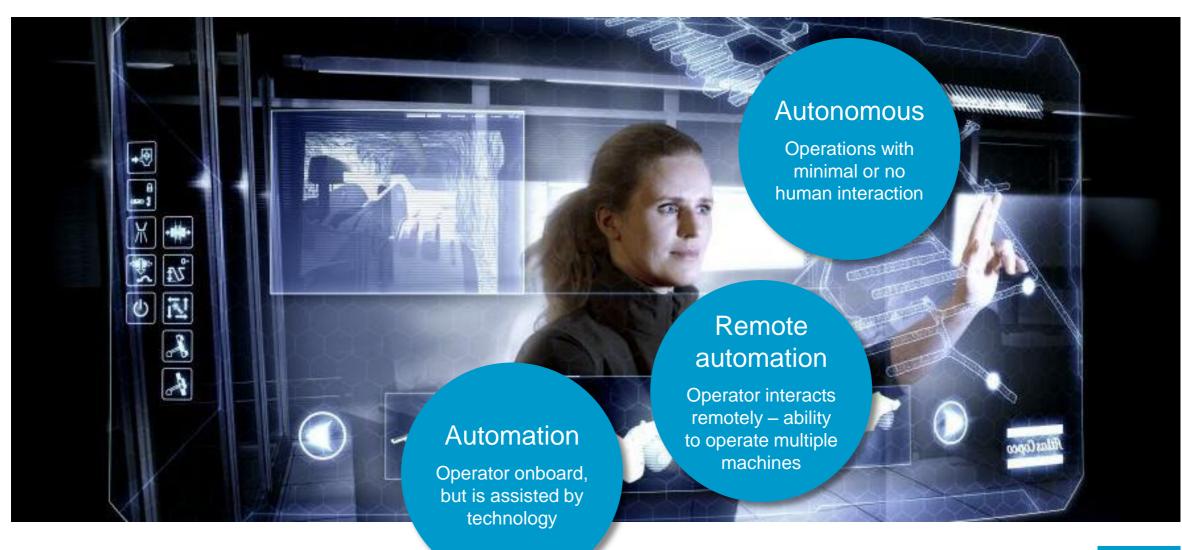
Rig Control System installed on equipment increases productivity and enables automation

Large installed fleet





#### **MINING AUTOMATION**



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#### **MULTI-MACHINE OPERATIONS**

One operator can monitor and operate up to six production drill rigs

One shift per day – rigs on auto through the night

Operators sit in office





#### **LOADER AUTOMATION**



14 ton loader operating in a 10 ton loader sized drift

Control room 80 km from the mine

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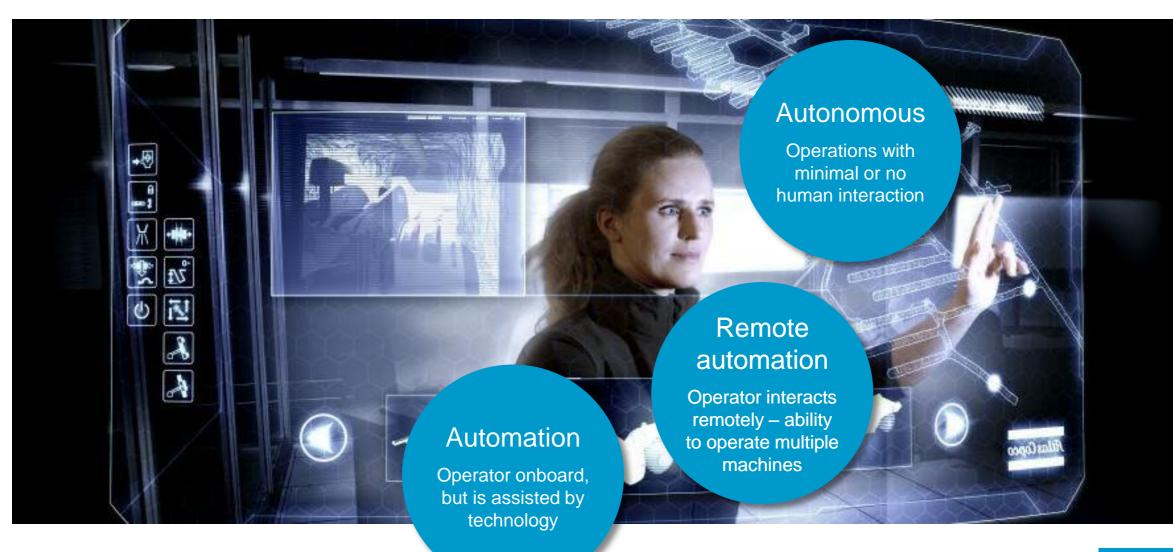
#### **BENCH REMOTE**

One operator runs two drill rigs with remote control





#### **MINING AUTOMATION**



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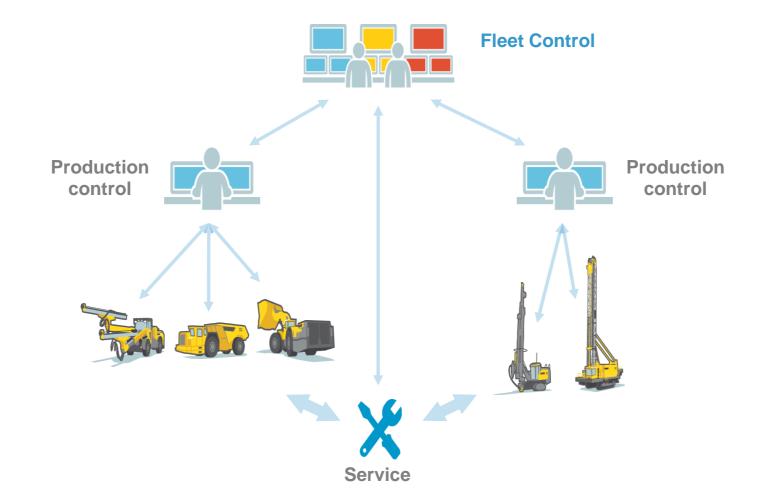
#### **FULLY AUTONOMOUS**





#### **MINING AUTOMATION – THE FUTURE**

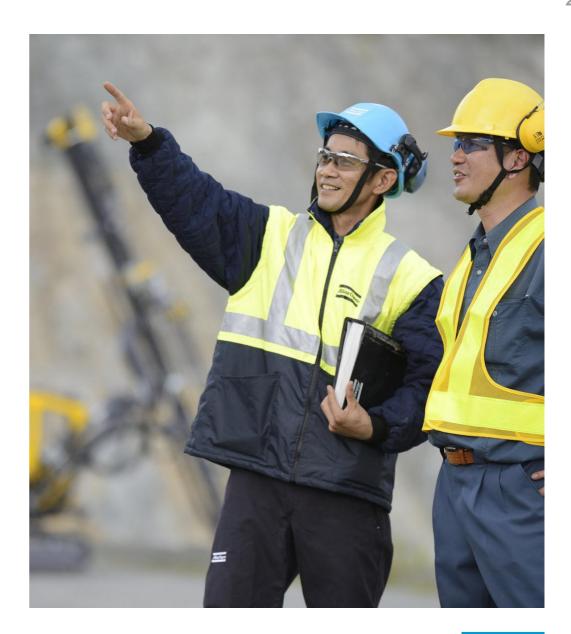
Large installed fleet with process control and consultancy products





#### **SUMMARY**

- More productive and efficient equipment, services and consumables
- Mechanization and automation
- Efficiency and time to market
- Growth opportunities





# COMMITTED TO

# SUSTAINABLE PRODUCTIVITY.





