

# COMMAND FOR HAULING

## MOVE MINING EFFICIENCY FORWARD WITH AUTONOMOUS HAULAGE.

Cat® MineStar Command for hauling has forever changed how mining companies move material—allowing them to haul more efficiently with near-continuous operation and move more with fewer people on site. Proven on diverse operations around the globe, Cat MineStar Command for hauling is opening new possibilities for mines of all sizes, complexities and locations.

Command leverages other MineStar capabilities to provide the fully integrated operation of remote control, semi-autonomous and fully autonomous mining systems. Autonomous trucks operate safely around other equipment, light vehicles and personnel. Command trucks respond to calls to the shovel, move into position, haul to dump points and even report for maintenance—all without an operator on board.

### BENEFITS

- » Enhances safety by removing operators from hazardous or remote sites.
- » Reduces costs for employee infrastructure and travel to remote sites.
- » Improves efficiency, enables consistency in operations and provides near-continuous operation through the reduction of operational delays—eliminating daily operator breaks (lunch and breaks), allowing hot seating, reducing queuing times, allowing machines to run in inclement weather, etc.
- » Improves fuel efficiency and component life.
- » Prevents machine damage and downtime due to misuse and overloading.
- » Allows the instant alteration or redesign of mine maps to meet changing operational needs.
- » Enables advanced assignment and tracking from a central location.
- » Alerts maintenance personnel to machine faults, enabling repairs before failure and reducing downtime.
- » Allows mines to attract new employees with a safe, comfortable work environment close to home.
- » Extends careers by upgrading skills and reducing exposure to hazards.

### DIFFERENTIATORS

- » **Interoperability.** While putting Cat technology on Cat equipment is the ideal scenario, Command for hauling is not limited to Cat machines. Caterpillar will partner with customers to develop Command technology on other OEM brands.
- » **Integration.** MineStar offerings make up a fully integrated system.
- » **Smarter Trucks.** Trucks with Command for hauling have electronics on board, giving them the ability to think for themselves for a more robust autonomous system.
- » **Advanced Perception System.** This system allows trucks to run at full speed and can also be used to survey load and dump areas, providing a Rate of Production advantage. Competitive systems may provide similar utilization improvements, but it's the work done or "Rate of Productivity" that is a key differentiator.
- » **Defensive Driving.** The system anticipates manned behavior to slow down or stop due to intersecting paths.
- » **Multiple Truck Dumping.** Command allows multiple trucks to enter and dump simultaneously.
- » **Crusher Dumping.** Command allows autonomous trucks to tip automatically.

**140+**

CAT CMD TRUCKS  
CURRENTLY ON  
CUSTOMER SITES

..... & GROWING TO .....

**200+**

CAT CMD TRUCKS BY  
THE END OF 2018



**5+**

YEARS IN  
OPERATION

**860+**

MILLION TONNES  
SAFELY HAULED

**30+**

MILLION KILOMETERS  
SAFELY TRAVELED

**0**

LOST-TIME  
INJURIES

**SUCCESS STORIES**

- » Caterpillar’s flagship autonomous operation, the Fortescue Metals Group (FMG) Solomon iron ore mine in the Pilbara region of Western Australia, has announced productivity improvements of 30 percent and has recently expanded its autonomous haulage to retrofit the system on its fleet at its Chichester Hub.
- » BHP Billiton has reported both cost reductions and safety gains. At its Jumblebar operation in the Pilbara, the company reports that the productivity benefits of the autonomous haulage fleet have helped the mine reduce costs by 20 percent. BHP has also reported a reduction in the frequency of safety incidents by 50 percent. Jumblebar is BHP’s first operation to move completely to autonomous trucks. The company has reported that the move to automation is part of its strategy to improve safety, build capacity and remain globally competitive.

