Cat® Terrain

for Loading

Terrain for Loading Features

More value for your mine.

- *Provides productivity improvements through:*
  - *Accurate bucket positioning*
  - *Automatic material identification*
  - *Profile and plan views of ore bodies*
- *Improves communication between office and machine staff.*
- *Enables safe operating practices with machine to machine status updates, avoidance surfaces and safety checklists.*
- *Reduces wear on haulage components and increases tire life by keeping benches to design slope, thereby lowering operational costs.*
- *Lessens survey work to be performed, lowering labor expenses.*

Cat® MineStar™ System is the industry's broadest suite of integrated mine operations and mobile equipment management technologies configurable to suit your operation's needs.

Terrain, a capability set of Cat MineStar System, enables high-precision management of drilling, dragline, grading and loading operations through the use of guidance technology. It increases machine productivity and provides you real-time feedback for improved efficiency.

Terrain for loading provides accurate information on each pass helping operators to move the right amount of material with every bucket load. Safety, productivity and efficiency are positively impacted and the mine design plan accurately executed.

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Terrain for Loading

Versatile in many mining applications.

Terrain uses Global Navigation Satellite System (GNSS) technology, machine mounted components, a radio network and office software to enable productivity, safety and efficiency improvements in mines around the world. Terrain is an ideal tool for mine planning, engineering, surveying, production monitoring, bench maintenance and ore grade control and material identification.

This technology system is purpose-built to help miners improve productivity and profitability on a variety of equipment, including shovels, hydraulic excavators and wheel loaders.

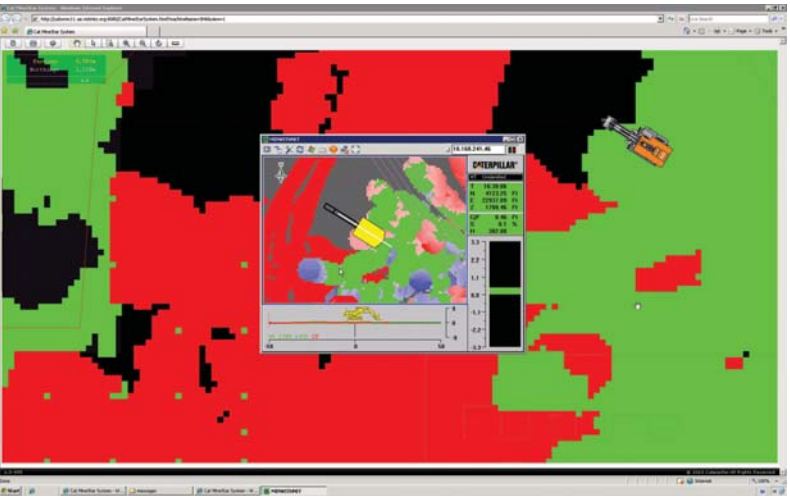
Terrain offers a full suite of productivity enhancing tools that add great value to mining operations. Less rework, the ability to manage material volume, accurate grades that lessen the wear on equipment, increased safety and better communication between operators and engineers all add-up to bottom-line cost savings for your operations by:

- ensuring the material is moved to the right place the first time through accurate bucket positioning, avoiding rework.
- enabling smooth benches that lessen wear and tear on tires and other critical machine components.
- providing real-time communication between the machine and office so there is never idle time waiting for the next task assignment or design plan.
- reducing survey work and personnel working on unsafe toe or crest surfaces.
- keeping machines safely out of restricted areas through the use of avoidance zones.

Terrain now features a mobile application for use in light vehicles. Mine supervisors can log in from a laptop or tablet to view progress updates from nearby machines, know the precise location of all Terrain-equipped machines, assign tasks and validate design plans without having to drive back to the mine office, improving the efficiency of your operations. Updates made on the mobile application are sent back to the office software and then communicated to the applicable machine on-board system in near real-time.

Features and Benefits

Mine more safely, efficiently and accurately.



Terrain empowers the operator to move the right material the first time, ultimately improving productivity and profitability. Using this system, machines and the mine office are linked – ensuring the design as created by the mine engineers is being accurately executed in the pit. Terrain is a versatile solution with multiple features and capabilities available to suit nearly any mining application.

Increased Accuracy

- Color-coded maps provide real-time feedback on progress towards ore design, resulting in more accurate material movement

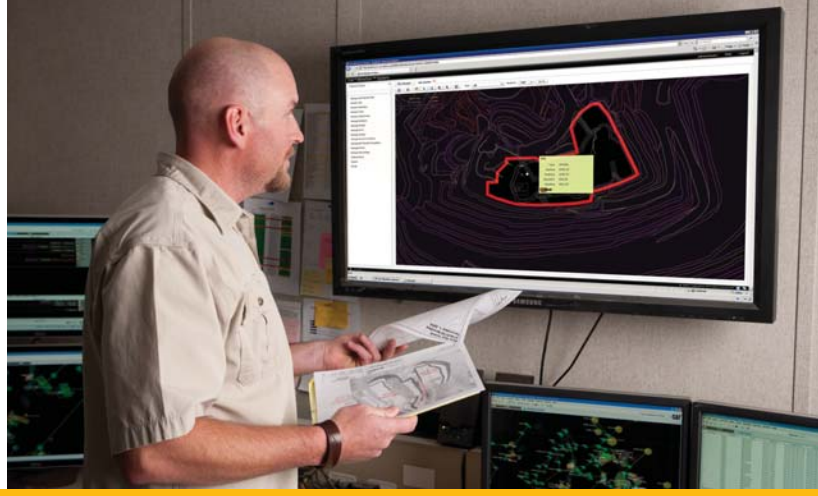
Increased Efficiency

- Mobile application allows supervisors to assign/manage tasks, verify/view designs and know locations of machines without driving back to the mine office
- Archived productivity data enables reports to be generated and analyzed for continuous improvement of operator productivity
- Task assignment allows the operator to know what needs to be done next and manage completion of the job tasks, saving time and eliminating miscommunication
- Real-time productivity and volume calculation feedback allows operators to improve inefficient actions
- Modernized web-based user interface makes file management easier and reduces the number of steps required to send design files
- Machine measure-up data collected during commissioning can be transmitted to the office, saving time and effort
- Pre-operational checklists help operators identify service and maintenance issues to enable repair before failure

Increased Safety

- Operator licensing tracks which operators have been trained and only allows qualified operators to log-in
- Viewing the position of other machines on the in-cab display improves operator awareness of surroundings
- 3D avoidance zones ensure the operator stays out of restricted areas
- Reduces or eliminates survey work that causes personnel to be working on unreliable surfaces near moving equipment

For more information about how Cat products promote safety at your mine site, visit SAFETY.CAT.COM.



Office Software

Manage your mines from anywhere in the world.

Utilizing an easy to deploy, web-based architecture, Terrain allows mines to more efficiently manage their operations by sharing information such as machine location, operational status, and progress to the work plan. User login and roles ensure staff can only access the data and functions necessary to do their job without jeopardizing sensitive operational data.

The office software, when coupled with the appropriate on-board hardware and software, gives mines the ability to define and manage drilling, dragline, grading, loading and excavation plans, enhance safety through avoidance zones/operational borders and pre-operation checklists, and track the location of and job status of machines. Four additional capabilities can be optionally licensed to maximize productivity and reinforce the site's operational practices. Packages include:

Productivity

Productivity allows the mine to track and analyze machine utilization and productivity by machine type and operator. Reporting tools generate information on machine utilization, timelines, operator productivity and other parameters to help identify and correct operational inefficiencies. It also enables the assignment of job tasks to grading and loading tools. This feature is particularly useful to assign mobile auxiliary equipment (ex. rubber tire) to its next job assignment. Operators can even request creation and assignment of a task to another operator (such as clean-up a spill). The information about each task is tracked and stored for reporting purposes.

Position & Material

The Position & Material capability package allows machines to share position and job status information both on-board and in the office. This knowledge helps reinforce safe operating practices when working in close proximity. This capability package also enables machine-to-machine cut and fill status sharing within grading and loading applications in real-time including sharing cut/fill information from draglines to dozers.

Data Share

Allows Terrain to share data made available via the licensed capability packages with other applications such as competitive fleet management systems, data reporting systems, and position monitoring systems via an industry standard interface.

Multi-Site

Allows for management of multiple Terrain-equipped sites from a single control center. By licensing the optional Multi-Site package at each mine, customers can monitor and manage work activities for multiple mines based on their universally defined user access permissions.

On-Board Components

Built-to-last in harsh mining environments.

Touch Screen Display

The touch screen graphical display provides real-time production information to the operator through an easy-to-use interface. Designed for reliable performance in extreme operating conditions, the unit is built to withstand shock and vibration and is sealed against dust and moisture.

GNSS Receiver

The MS992 is the next generation GNSS receiver from Caterpillar. The rugged housing and internal shock isolation system of the MS992 enable it to withstand the harsh conditions encountered on mine sites. The receiver computes positions and heading with centimeter-level accuracy to ensure precise machine location. The MS992 supports the newest GPS and GLONASS signals, faster system initialization times, better tracking and accuracy characteristics, and leverages increased satellite availability for mines with deep pits or locations in the far northern and southern hemispheres.

Communications Radio

A ruggedized Ethernet port on the touch screen display is available for easy connection to third party radios.

Support

Global and local.

Customer Support

For more than 25 years, Caterpillar has been providing electronic and electrical components and systems for the mining industry – real-world technology solutions that enhance the value of Cat products, making customers more productive and profitable. Your Cat dealer is ready to assist you with matching machine guidance systems to the application and obtaining responsible, knowledgeable support.

From sales and implementation to support and service, count on your Cat dealer to provide all your technology product needs. Repair options for select loading tool components are available from factory-trained technicians at the Cat Machine Control & Guidance Repair Center.

GNSS Receiver

Horizontal accuracy	10 mm	0.39 in
Vertical accuracy	20 mm	0.79 in
Operating range	Up to 10 km (6.2 miles)	
Network connector	16-pin	
Electrical input	9 to 32 V DC	
Operating temperature	–40° C to 70° C –40° F to 158° F	
Storage temperature	–50° C to 85° C –67° F to 185° F	
Height	147 mm	5.8 in
Width	232 mm	9.1 in
Depth	251 mm	9.9 in
Weight	3.8 kg	8.3 lb

Touch Screen Display

Display screen	264 mm (10.4 in) LCD display, 800 × 600 transflective color SVGA	
Electrical input	9 to 32 V DC	
Memory drive	2 GB RAM, 8 GB internal compact flash	
Operating temperature	–20° C to 70° C –4° F to 185° F	
Storage temperature	–50° C to 85° C –58° F to 185° F	
Humidity	100%	
Height	236.8 mm	9.3 in
Width	282.6 mm	11.1 in
Depth	122.9 mm	4.8 in
Weight	5.4 kg	12.0 lb

For more complete information on Cat products, dealer services, and industry solutions, visit us on the web at **www.cat.com**

AEHQ6177-03 (03-2013)
Replaces AEHQ6177-02

Materials and specifications are subject to change without notice. Featured machines in photos may include additional equipment. See your Cat dealer for available options.