



## TECH STUDY

## GPS MACHINE CONTROL - CONNECTED SITE

### OVERVIEW

We were asked by our client to provide a solution which will confluence machine control systems, data connection, telematics and real time survey data. New Trimble software and machine control solutions used on our fleet is allowing us to give our client best possible solution on the market to connect all these fields.

- Using machine control systems offers contractors the opportunity to cut operating costs and construction time while increasing efficiency and profit margins.
- The use of these systems can make a direct reduction in surveying costs from the outset, while reducing the need for revision throughout the construction phase.
- Improving task time frames while delivering the same level of accuracy means that the equipment is in use for a shorter time, minimising costs for the contractor.
- With the package also making a huge reduction in the need for physical reworking, this further lowers the cost of earthmoving work.
- There are further savings as more efficient use of plant and avoiding reworking means that wear and tear on the machinery is also lowered, providing an additional savings on maintenance.

### ACTIONS

In construction, data from the field and back-office are often disconnected. That's especially true when it comes to non-structural horizontal construction work, such as road construction. This disconnection often causes missed scheduling and reduced productivity.

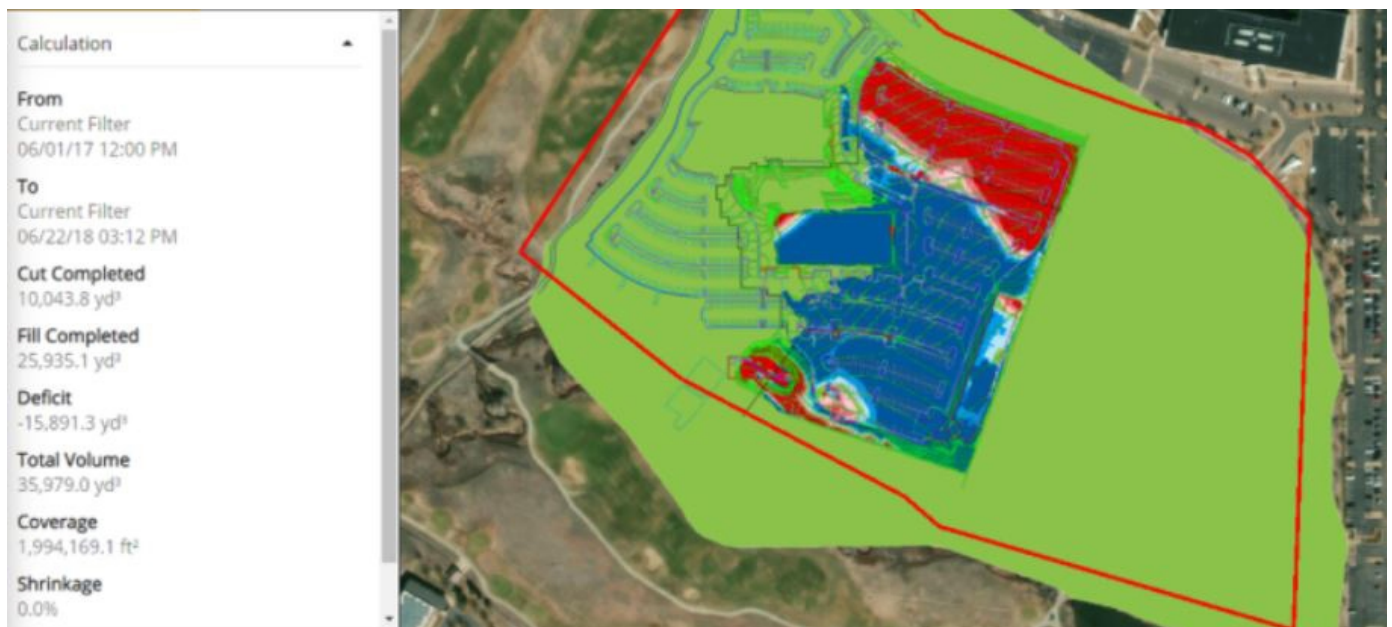
Supervisors are often unaware or uncertain of how much earth was moved, how much work is remaining and how long it's going to take to complete the task. A new cloud-based operating system delivers 3D productivity and real-time progress data for site supervisors to help them maximize jobsite efficiency.

Many construction projects are becoming increasingly complex and companies are struggling to obtain actionable and timely data back from the field. This disconnection leads to reduced productivity and unmanaged costs.

### BENEFITS

#### 1. Office to site connection

"Office-to-field" software solution can be used to manage all assets on the site. Users (engineers, foreman, works managers) can dispatch work to machines in the field and see actual progress in real-time within the software. In our opinion understanding what level of visibility is possible between the office to the field and what it would take to achieve that visibility is an important foundation for the management of any construction project.



Real time cut and fill map shows progress and remaining earth-works



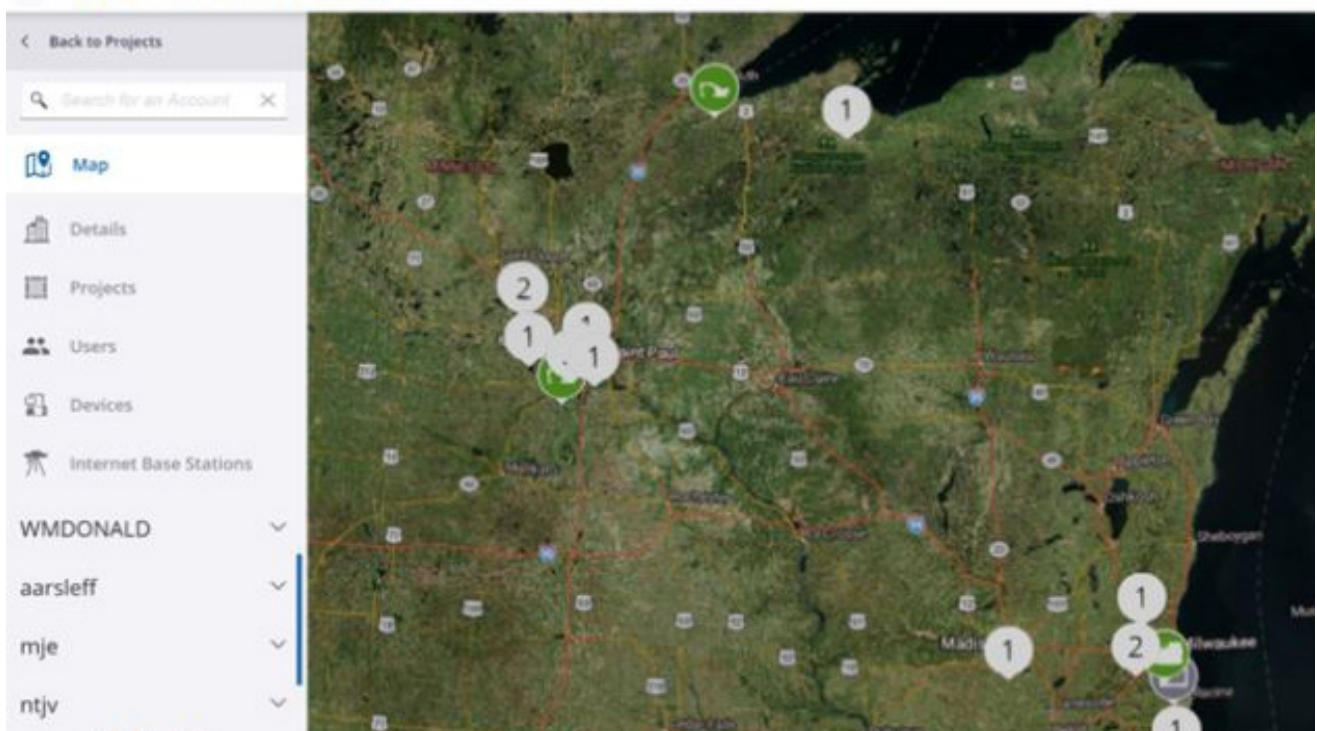
### BENEFITS

Understanding jobsite's progress and the quality of that progress is one of the most important day-to-day metrics weighing on any site manager's mind. Your productivity solution should be able to retrieve the latest productivity files from your machines and safely store them in the cloud. Trimble WorksOS solves this and offers the ability for users to click on a particular cell on the map and see the most recent information about elevation, pass number, operating mode and more.

### 2. Telematics - Job site activity monitoring

One challenge we hear from customers is the frustration and time wasted when they have to jump between multiple systems during the course of a working day to understand where their machines are and what design version that machine is working from. The release of Trimble's 3D productivity solution changed all of this, now when you view your map, you can see machine location along with the last reported date and design version in real-time.

- Keep track of the location of your devices and machines with detailed activity information.
- Intuitive dashboard shows an at-a-glance view of your digital assets and design information wherever you are.
- Monitor operations to keep the job on track and keep costs down

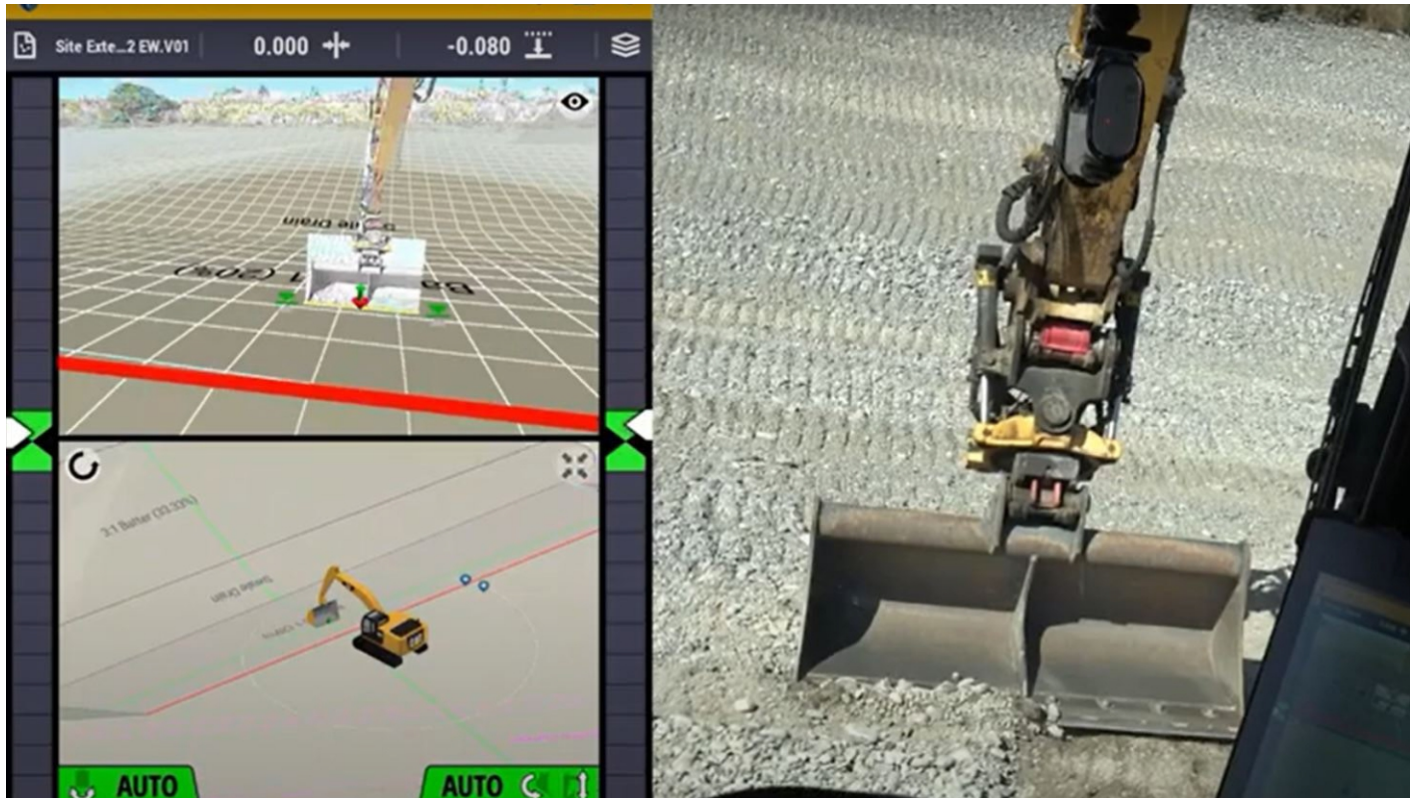


Telematics can be used to show real time location of every connected machine.

### BENEFITS

#### 3. Augmented reality on-cab camera

Augmented reality (AR) platforms combine a digital space with the physical worksite. When used with an on-cab camera, operators can see virtual design elements—such as avoidance zones—superimposed over the real site. This allows machine operators to visualize the design in relation to the site. If they are in the cab of the excavator and they look around or rotate the machine, they can see what they have to build and how it relates to the ground as it stands today.



#### 4. Compaction

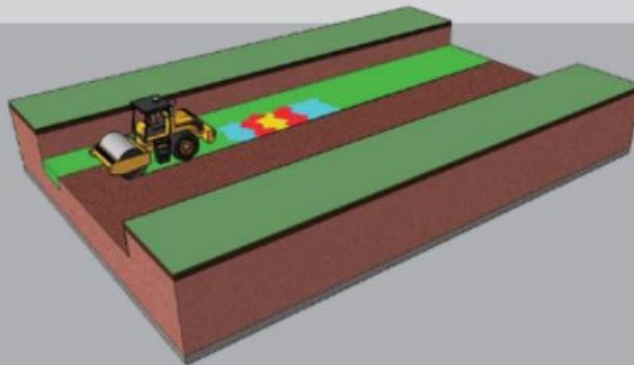
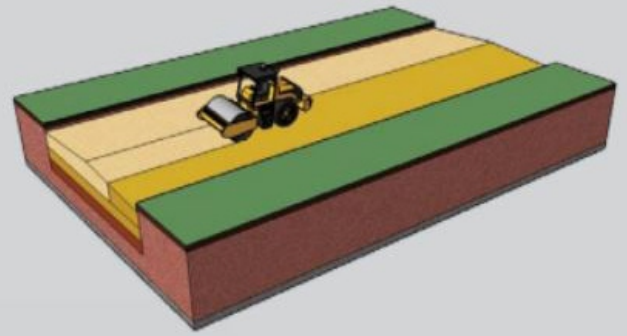
For compaction activities, Trimble software we use benefits productivity in the shape of Compaction Control Package. This means the operators of compactors machinery working alongside each other will be able to avoid duplicating passes, significantly reducing the risk of over- or under-compaction. It can be used in soil as well as asphalt compaction applications, boosting its versatility. The records from our connected compactors were used as a quality records to prove the right amount of passes on each road layer as well as embankment layers has been carried out successfully.



### BENEFITS

#### Consistent Compaction

The powerful on-machine software allows the operator to easily achieve target compaction and more uniform results. Sub-material layers are accurately compacted allowing for faster, better balanced compaction.



#### Detect problem Areas Early

With the addition of the CM310 Compaction Sensor, the system detects sub-surface inconsistencies, soft spots and hidden obstructions. Problem areas can be excavated, re-graded and compacted prior to further work.

### CONCLUSION

The connected site software which we have been testing and using provides our customers with real-time data straight from the field. Overall project efficiency can be maximized and managed remotely, allowing better communication with logistics teams to better plan haulage and material deliveries in line with “on time” requirements.

The connected site removes another element of people plant interface, regular GPS machine control removed the requirement for an engineer/ banksman to regularly check levels to stay on target. Connected site now removes the need to physically load a 3d model in to the machinery. With the advancement of drone surveying technology that we are seeing our customers using, an earthworks operation can be carried out with minimal “boots on the ground”

Utilising the live information and productivity data, engineers can more accurately predict job costings and timings and report better to the commercial team providing cost vs initial budget.

Trimble office is a platform that we will be recommending to our customers and helping them with connecting to our Trimble enabled machinery to provide them with a truly connected site.