Walk-in Slide: AU 2014 Social Media Feed

1. Click on the link below, this will open your web browser

http://aucache.autodesk.com/social/visualization.html

2. Use “Extended Display” to project the website on screen if you plan to work on your computer. Use “Duplicate” to display same image on screen and computer.

CO6671 - Managing Heavy Highway in Real-Time

Ben Huber/Mark Billingsley BSc Hons RICS

Topcon Positioning Systems

Key learning objectives

At the end of this class, we will have covered

- How to maximizing productivity with technology on a massive highway project by implementing hardware and software solutions
- Understand how to execute a seamless transfer of design data from the office, to the cloud, and then straight to the machine
- Realize how data can be distributed across a variety of machines; allowing you real-time monitoring of performance
- The transfer of data from project site back into Civil 3D from a contractor/ machine to complete the BIM infrastructure cycle

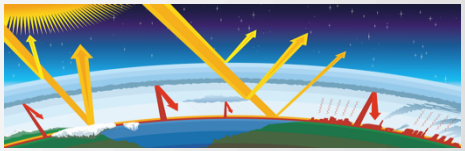
Industry Challenges

Urbanization

Global Economy

Failing Infrastructure

Climate Change



Industry Solution

BIM is an intelligent model–based process

Building Information Modeling (BIM) provides insight for creating and managing projects faster, more economically, and with less environmental impact.

Infrastructure Solution?

BIM for Infrastructure is about creating and using a 3D, intelligent model for planning, designing, building and managing infrastructure.

Clarity

Better understand and communicate project risk, intent, and options before project is built

Continuity

Maintain consistent data, context and processes across lifecycle

Agility

Respond quickly to project changes – smarter and faster processes

Plan and Tender

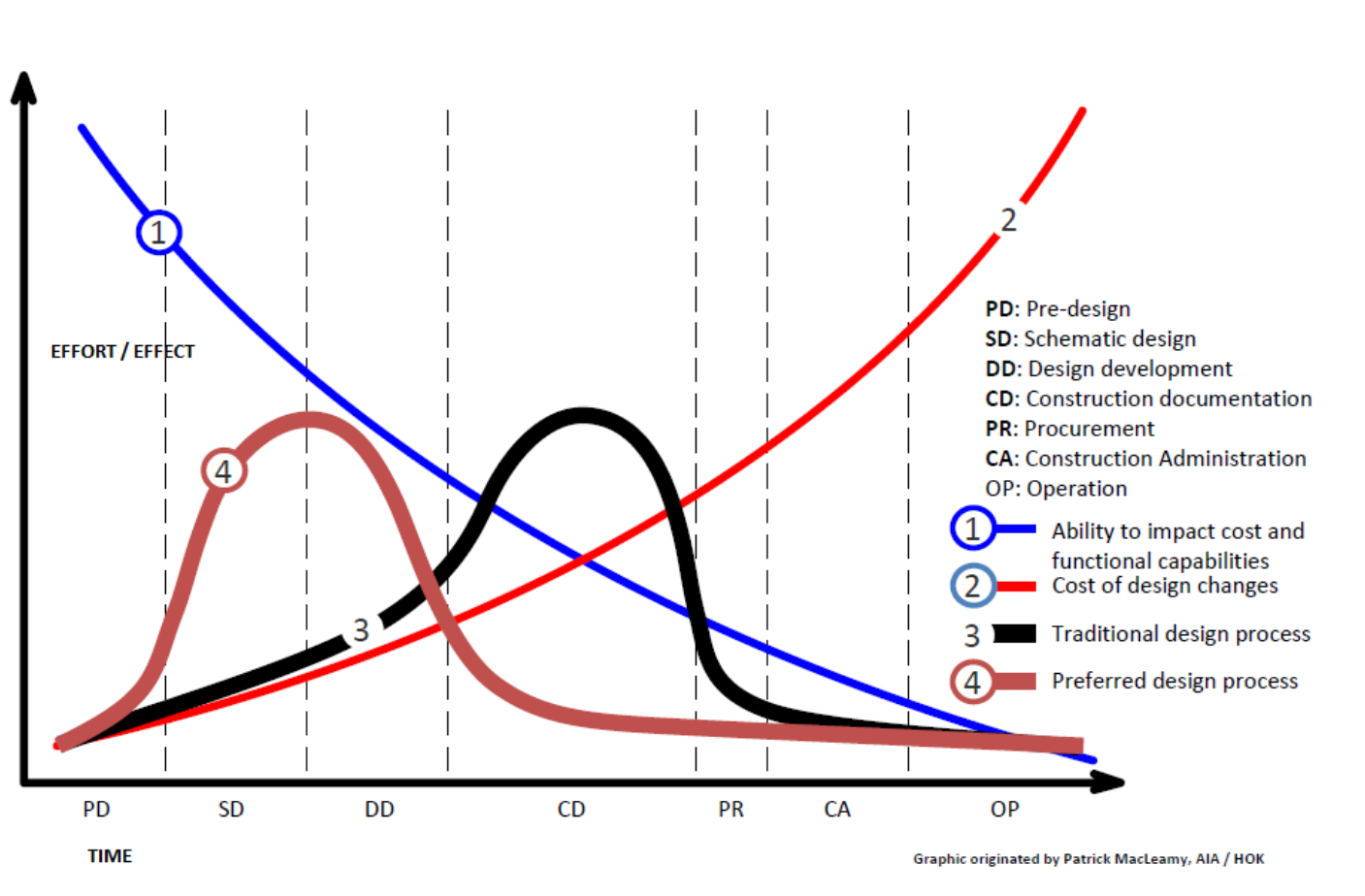
Design the project to win the project……

Create in hours not months

Autodesk InfraWorks 360

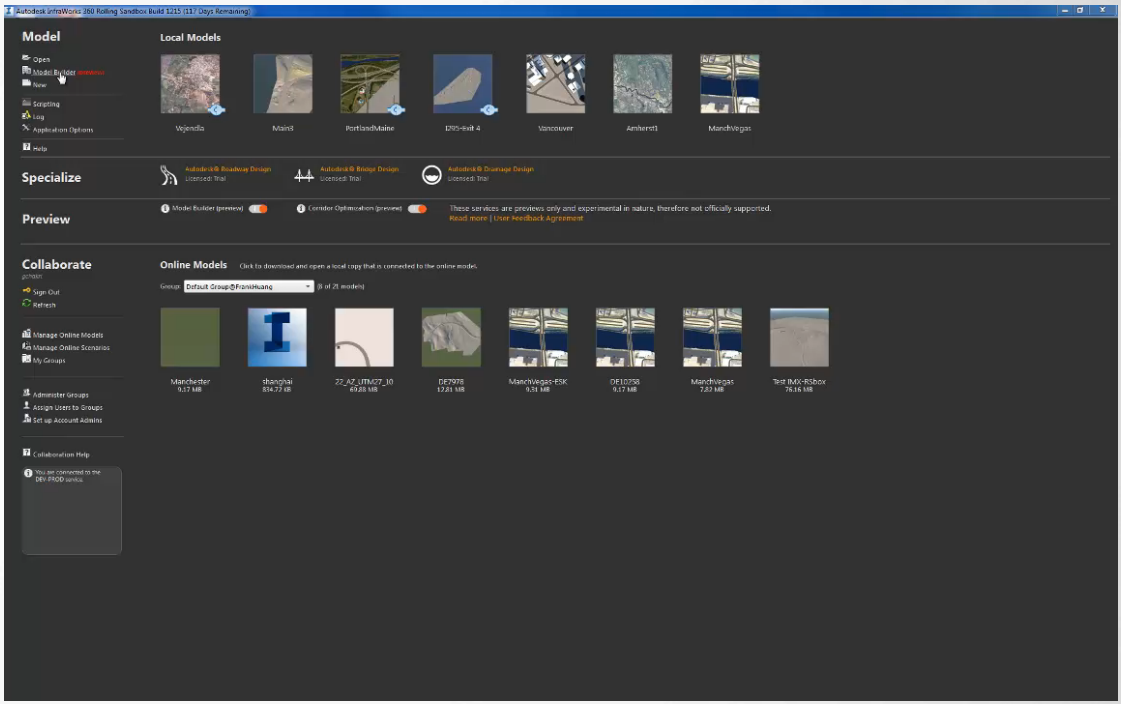
- Engineer large-scale preliminary designs in the context of the built environment
- Expand project and stakeholder collaboration
- Extend your design capabilities

BIM Process Improvements



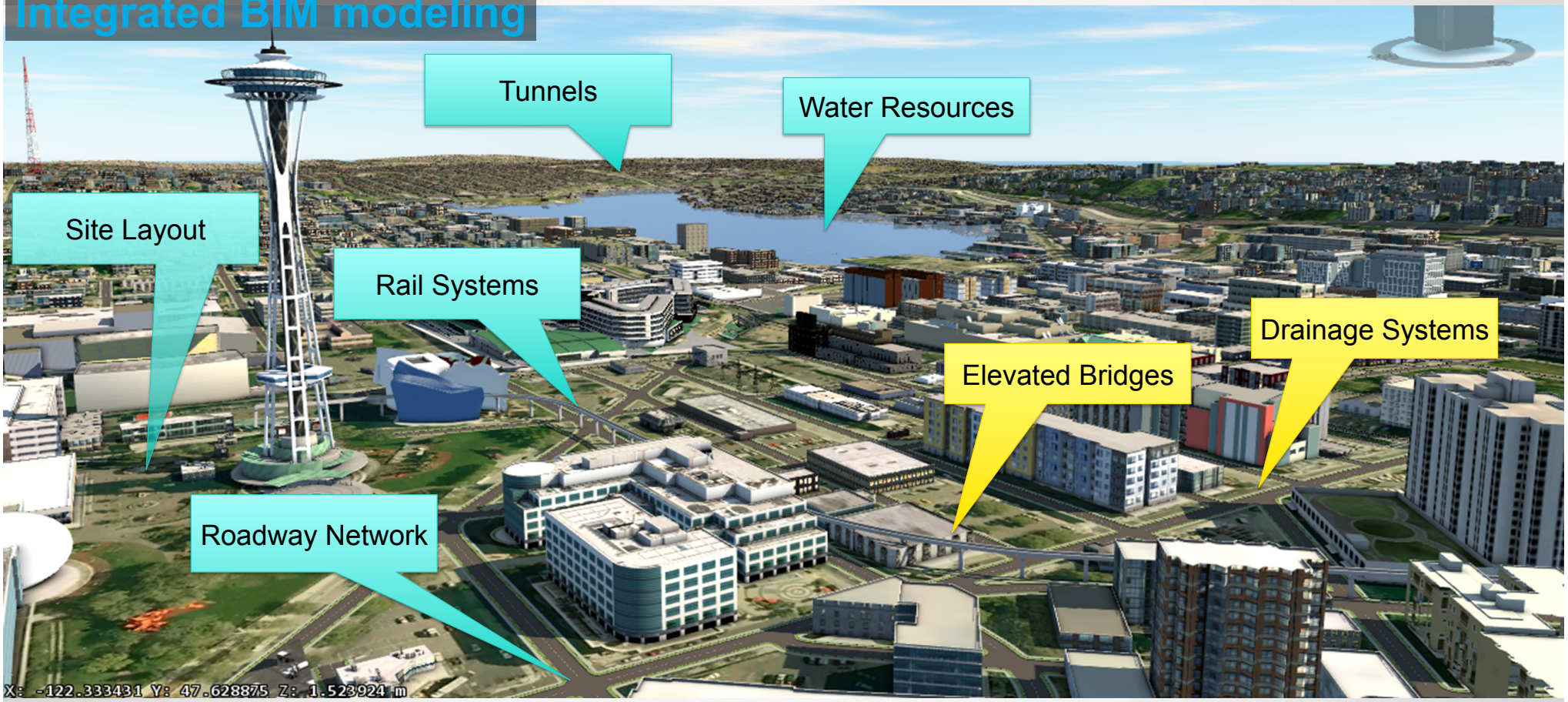
Model Builder | Global content with rich data sources

- **Vector Data: OpenStreetMap**
  - Vector data with buildings, roads, railways and water features worldwide
- **Raster Data: BingMap**
- **Terrain Data: SRTM**
  - (Shuttle Radar Topography Mission)
  - Global data; 90 meter resolution
- **US Department of Agriculture**
  - For US only; 10 meter resolution



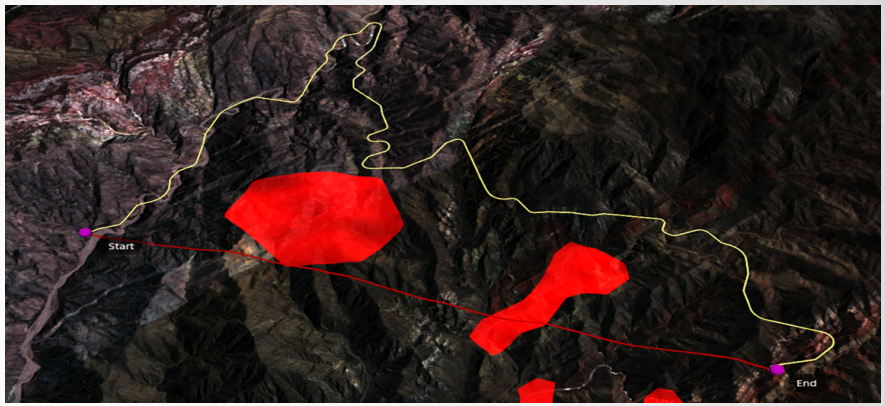
Moving the BIM Curve: Preliminary Engineering

Integrated BIM modeling

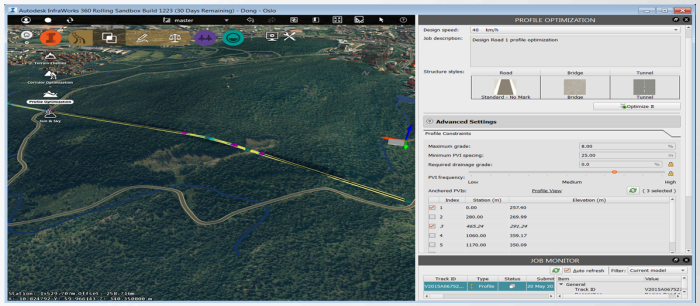


Roadway Design for InfraWorks 360

Road Design | Corridor Optimization



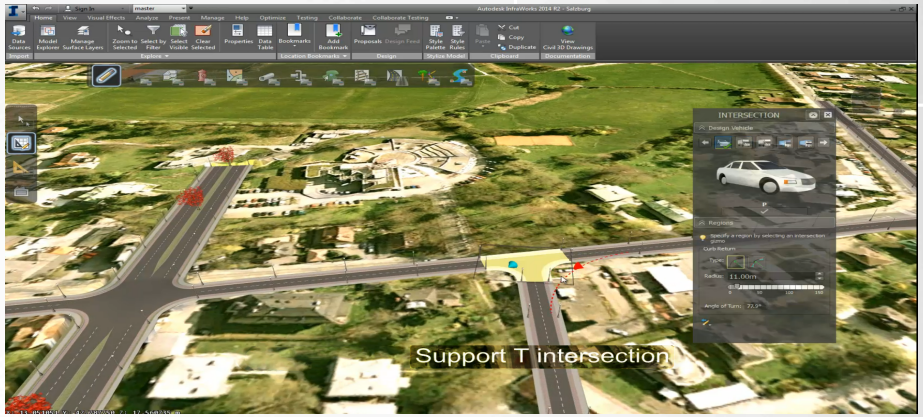
- **Supports design roads with multiple zones**
  - Fully support multiple-zone design road optimization in profile optimization service
- **Considers cross sections in profile optimization**
  - Max grading option can be customized.
- **Avoidance zone draw tool for corridor optimization**
  - Added avoidance zone draw tool for corridor optimization preview service
  - Improved the usability for avoidance zone draw tool
  - Avoidance zone selected in UI will be highlighted in canvas.

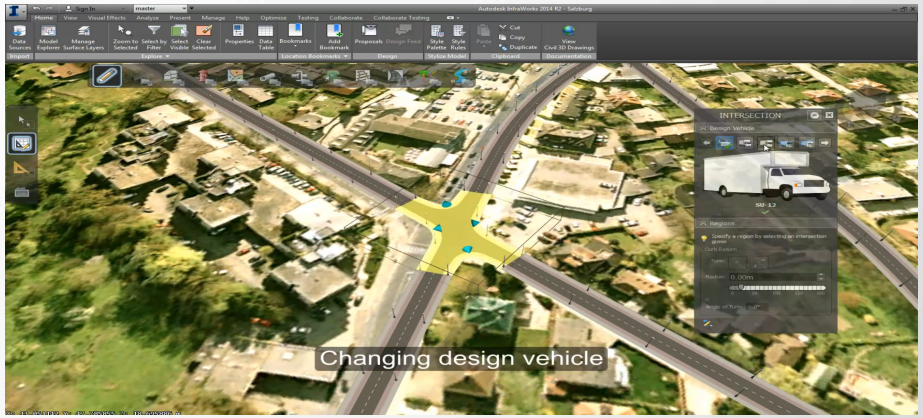


Optimize project performance

1 | Engineer in context

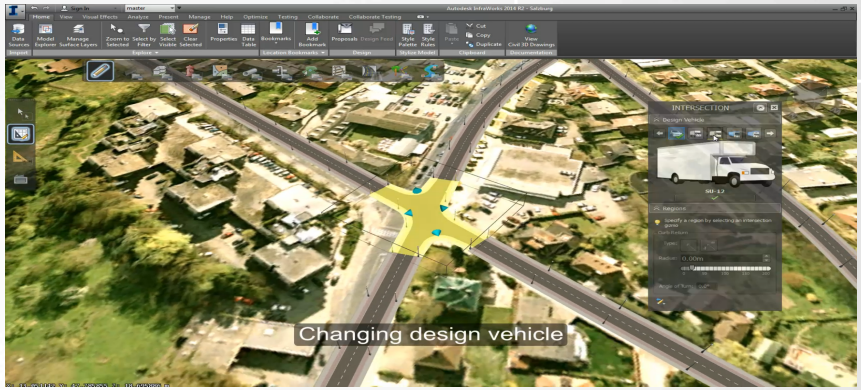
- Edit road geometry interactively and intuitively
- Automate creation of roadway intersections
- Dynamically lay out roads and update intersections

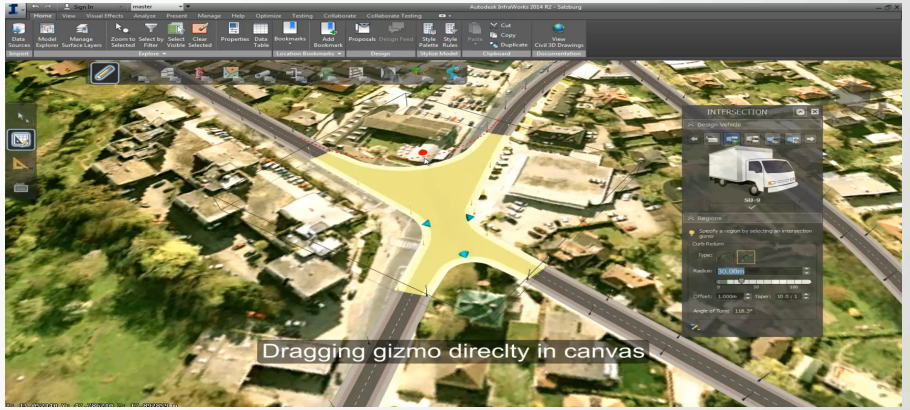




2 | Powerful intersection features

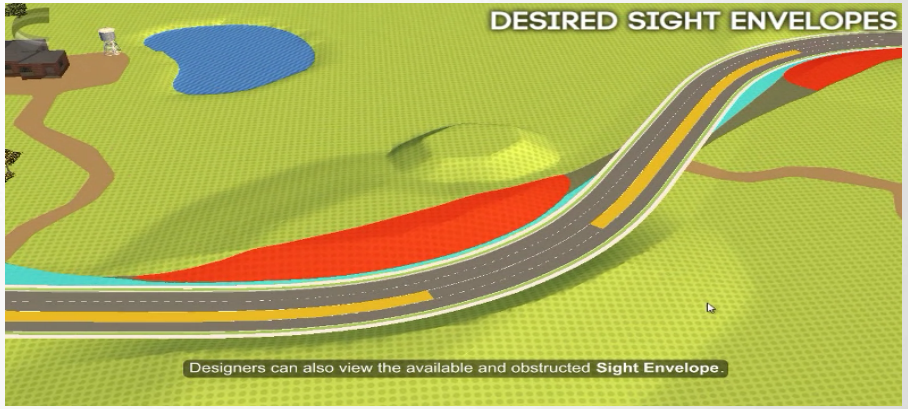
- Create intersection geometry using standard design vehicles
- Automate the creation of intersection design proposals
- Use flexible curb return editing tools





3 | Integrated sight distance analysis

- Analyze stopping sight distance based on design standards
- Demonstrate desired and actual sight envelopes
- Help identify causes for driver sight obstructions, sight distance failure zones, and potential accident zones with terrain markers




Demonstration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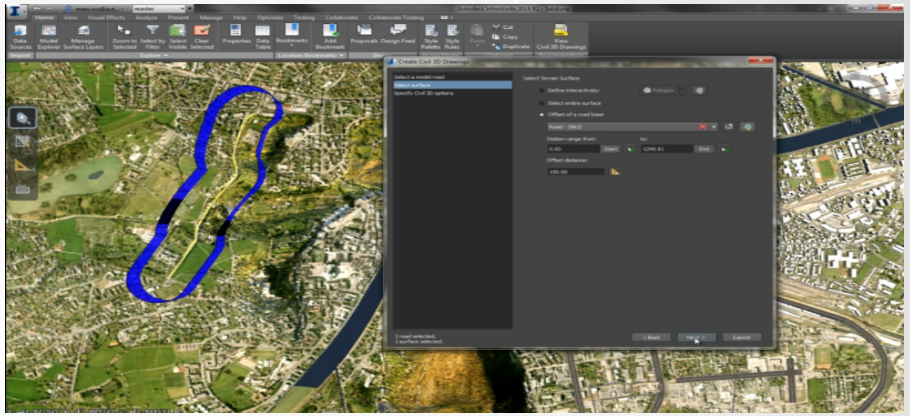
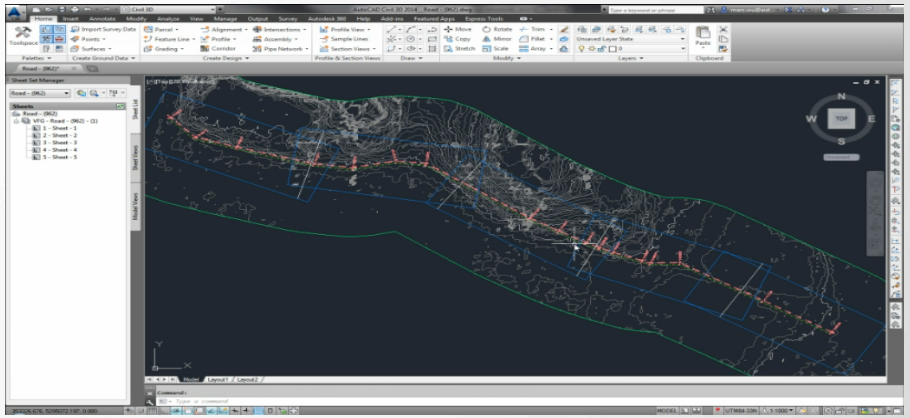
4 | Detailed design and documentation

- Take geometry and road surfaces to Autodesk® AutoCAD® Civil 3D® 2014 software for detailed design work
- Create documentation with a cloud-based sheet set service

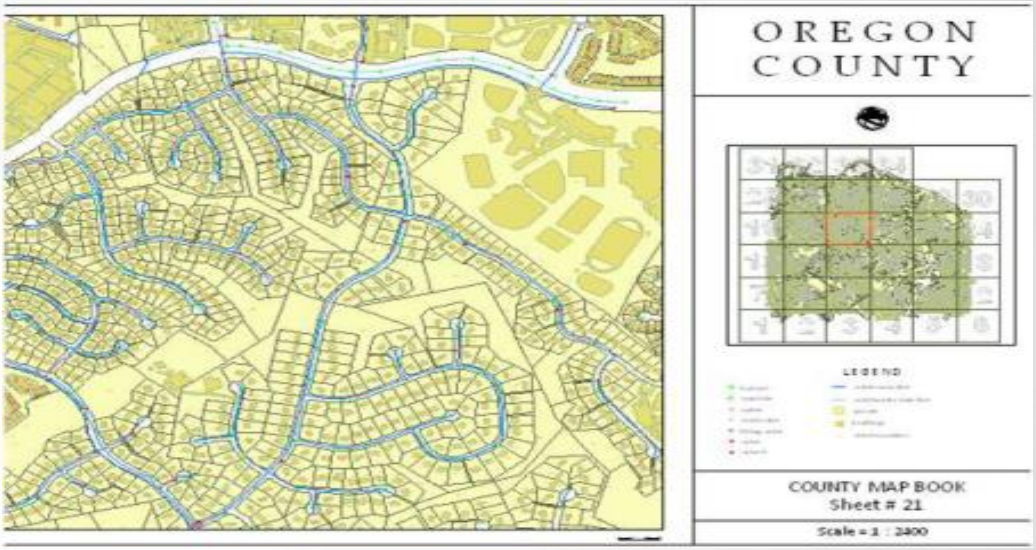




AUTODESK Civil 3D

Challenge

- Excessive amounts of data exist but are difficult to assimilate
- Specialized expertise is often necessary to use the information that is available



Solution

- Integrate design data and geospatial data more easily
- Integrate data from different coordinate systems to maximize usage of readily available data

Challenge

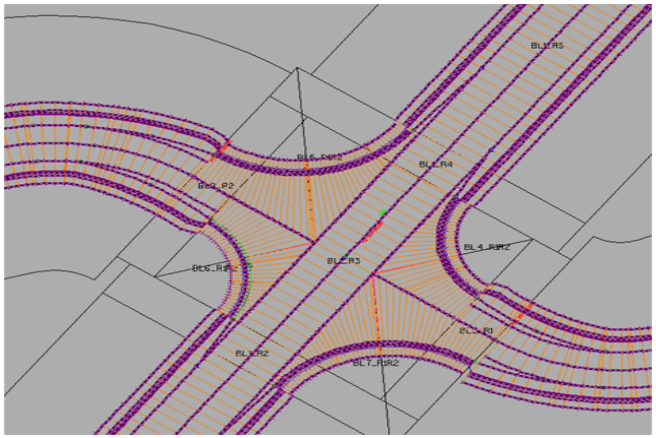
- Roadway design is characterized by constant change.
- Even the most minor design change can have a significant impact on the project schedule.

Solution

- Design changes ripple through an entire project into the documentation
- Design elements have predictable relationships with other elements in the design.

Challenge

- Creating detailed 3D intersection models is avoided because it is too time-consuming.



Solution

- Built-in wizard helps streamline time-consuming tasks, such as laying out intersection geometry and creating corridor regions
- Intersection geometry becomes part of the model, so when changes are made, the 3D model of the intersection updates
- Geometry in the intersection model is interrelated

Challenge

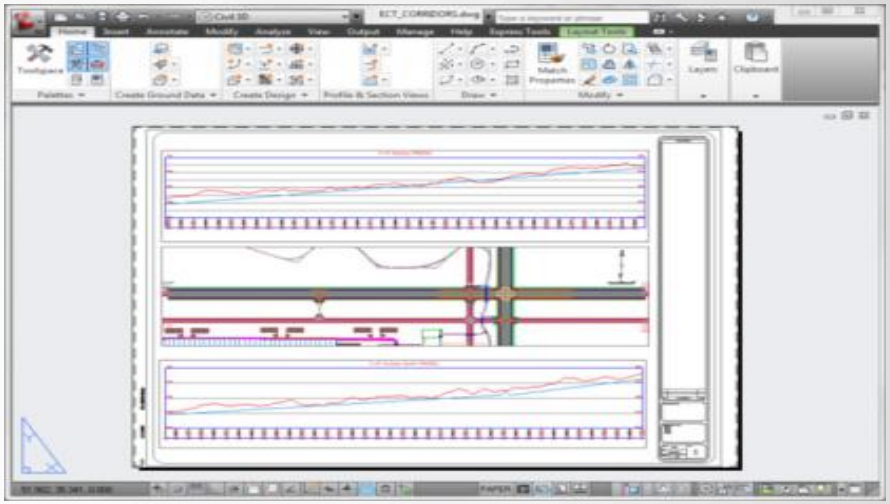
- Accurate construction task sequencing is critical to uncover potential design problems before construction begins.

Solution

- Verify design component locations to help identify and resolve potential construction issues
- Integrate construction schedules (time) with design models (3D) to create a 4D simulation
- Simulate what-if scenarios and site logistics to help uncover design problems

Challenge

- Creating and delivering construction documentation is one of the most time-consuming, error-prone tasks in any infrastructure project.



Solution

- Dynamically connect construction drawings and reporting to the design so design changes are automatically reflected
- Built-in wizard helps streamline the time-consuming task of developing sheets and sheet sets
- Make more of your AutoCAD® expertise

Challenge

- Quantity take-off is a manual, error-prone procedure.

Solution

- Pay item lists can be imported
- Pay items can be assigned to objects in the drawing
- Pay items can be assigned to features in a corridor

Challenge

- Project teams are scattered and need to communicate design changes in a timely and effective manner.

Solution

- Real-time project collaboration
- Changes made are reflected throughout the model and are more quickly accessible to all team members
- Multiple teams and team members are better coordinated with one source of information

Challenge

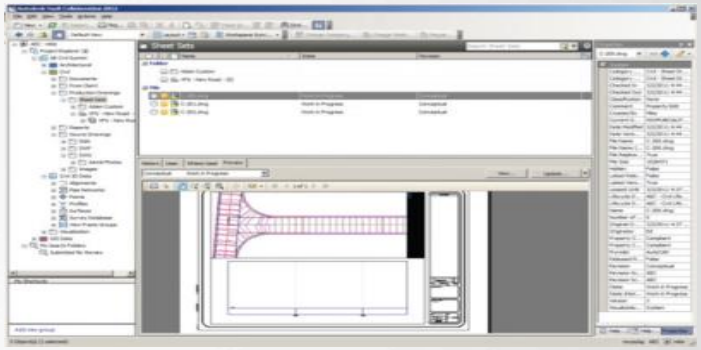
- It is difficult to transfer traditional 2D cross-sectional models of roadways to the automated machine guidance systems used in construction.

Solution

- 3D model can be directly exported
  - Updates to the model can be made to the design model in the field, which can be passed directly to contractors

Challenge

- It is difficult to manage project information at every stage of the project in order to use it for decisions made in operations and maintenance.
- As-built plan data is not stored digitally and tends to be scattered and difficult to use.



Solution

- Store as-built plan data with important attributes
- Geospatial databases can be created and updated using information extracted from as-built project data
- Access information via mobile devices


Demonstration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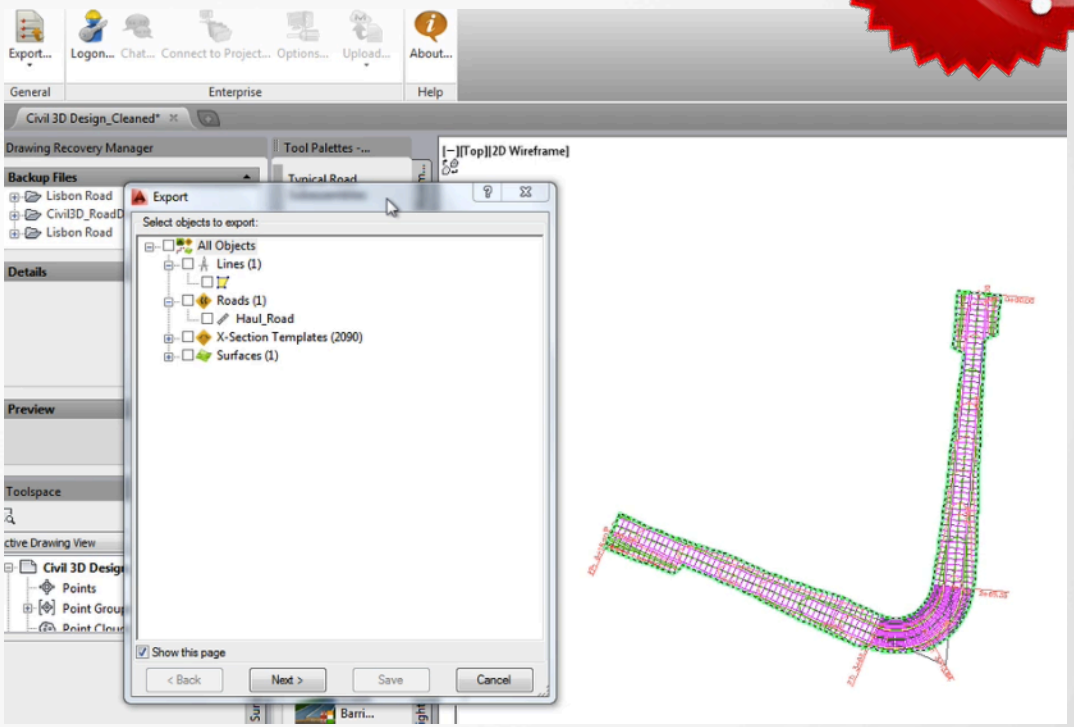
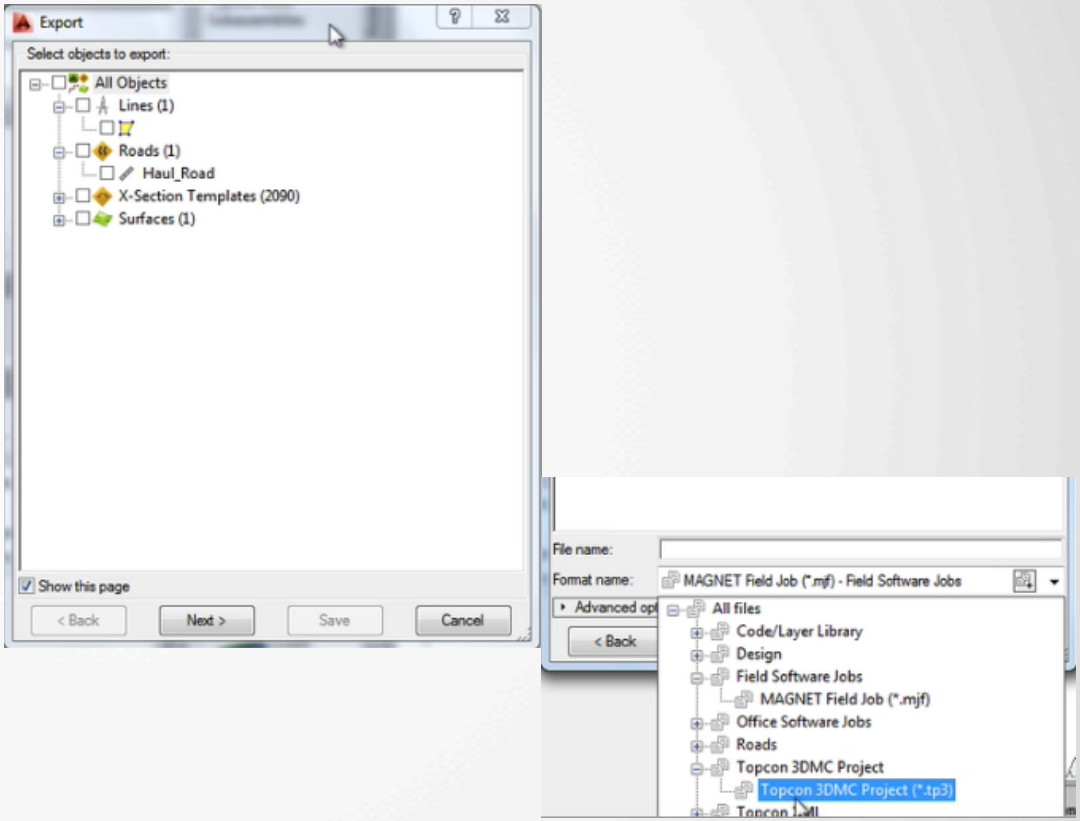
Topcon Exchange for AutoCAD

- The ability to create a file from a design in Civil 3D that can be “cloud surfed” and instantaneously made available to multiple contractors and machines on a job site

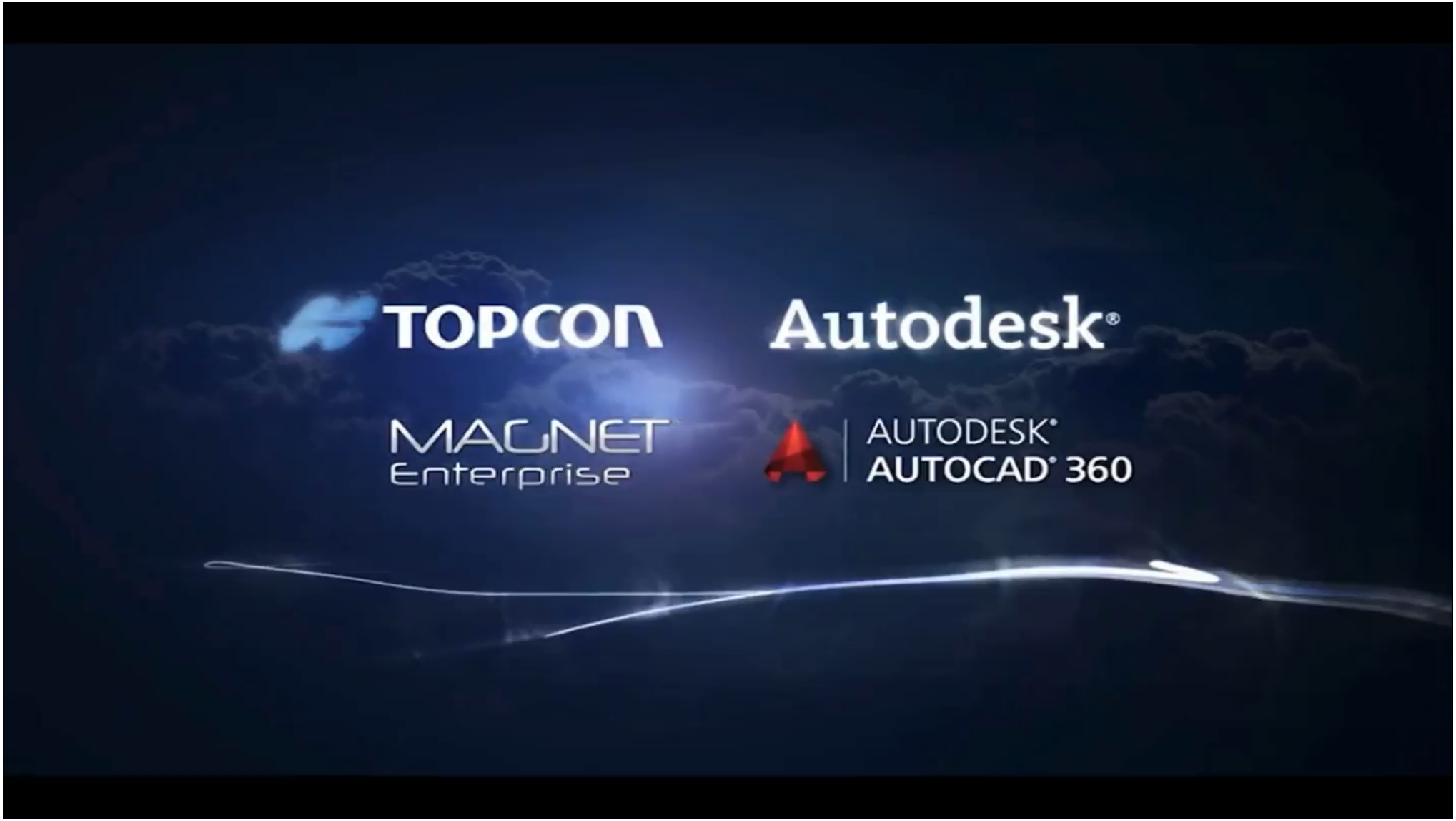


Topcon Exchange for AutoCAD

- Once selected the Export routine shows the options available based on the contents of the design.
  - Alignments (Roads)
  - Surfaces
  - Templates (Assembly)
  - Lines
- Then Export file format .TP3 across all platforms




Demonstration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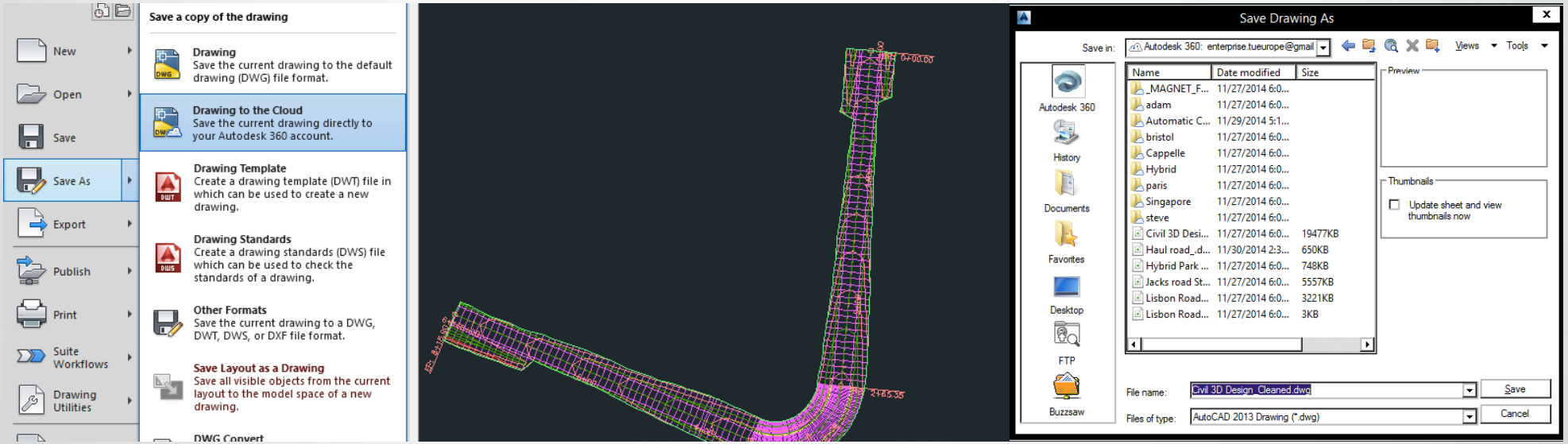
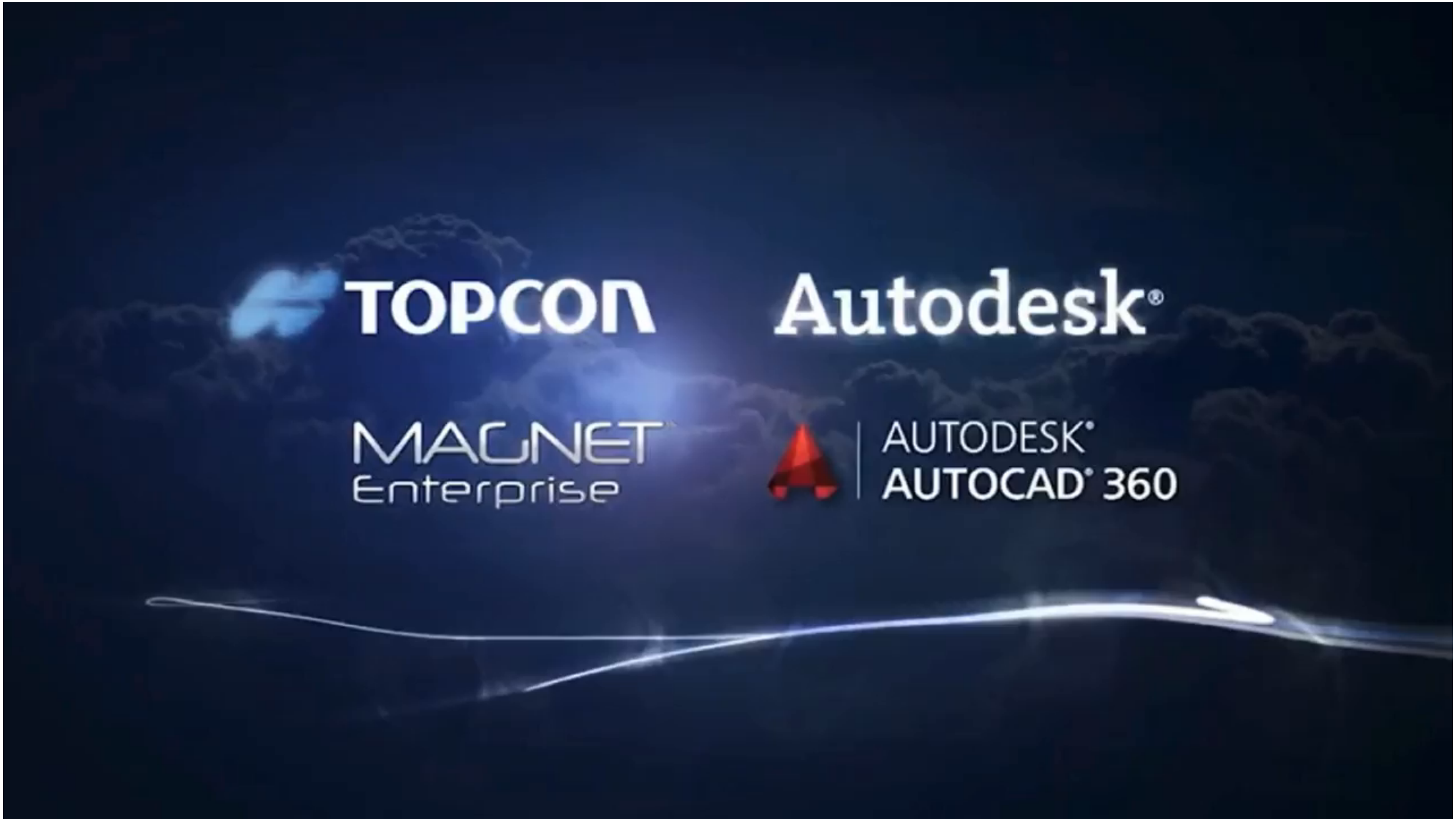
Exporting to AutoCAD 360 from Civil 3D

- Once the design has been completed it can be synced straight to an AutoCAD 360 account for sharing amongst colleagues
- The File(s) can subsequently be viewed and accessed globally for speedy data acquisition




Demonstration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AUTOCAD® 360

The Cloud…

Changing the Dynamic of Office to Site Communication

Common Project Workflow

- Project Collaboration
- It is well known that the more **communication** is improved, the more successful the project will be

Common Project Workflow

- How can the cloud help what I do in the construction or geospatial industry?

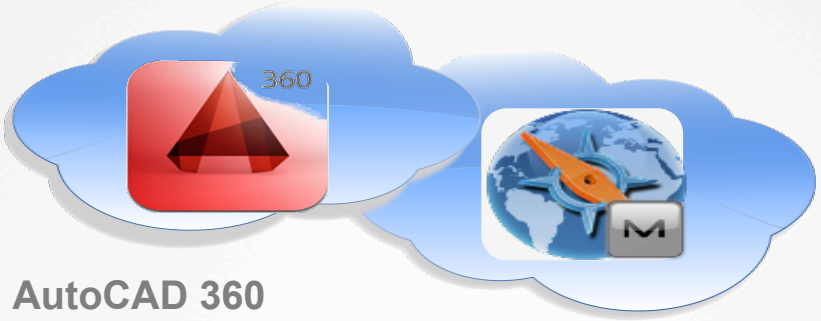
Get your head IN the Cloud!

- Smartphones and Tablets (Phablets!) are quickly replacing clipboards and printed files.
- Instant field-to-office communication is becoming ever more important in a world of increasingly demanding deadlines.

Cloud… equals Security and Access

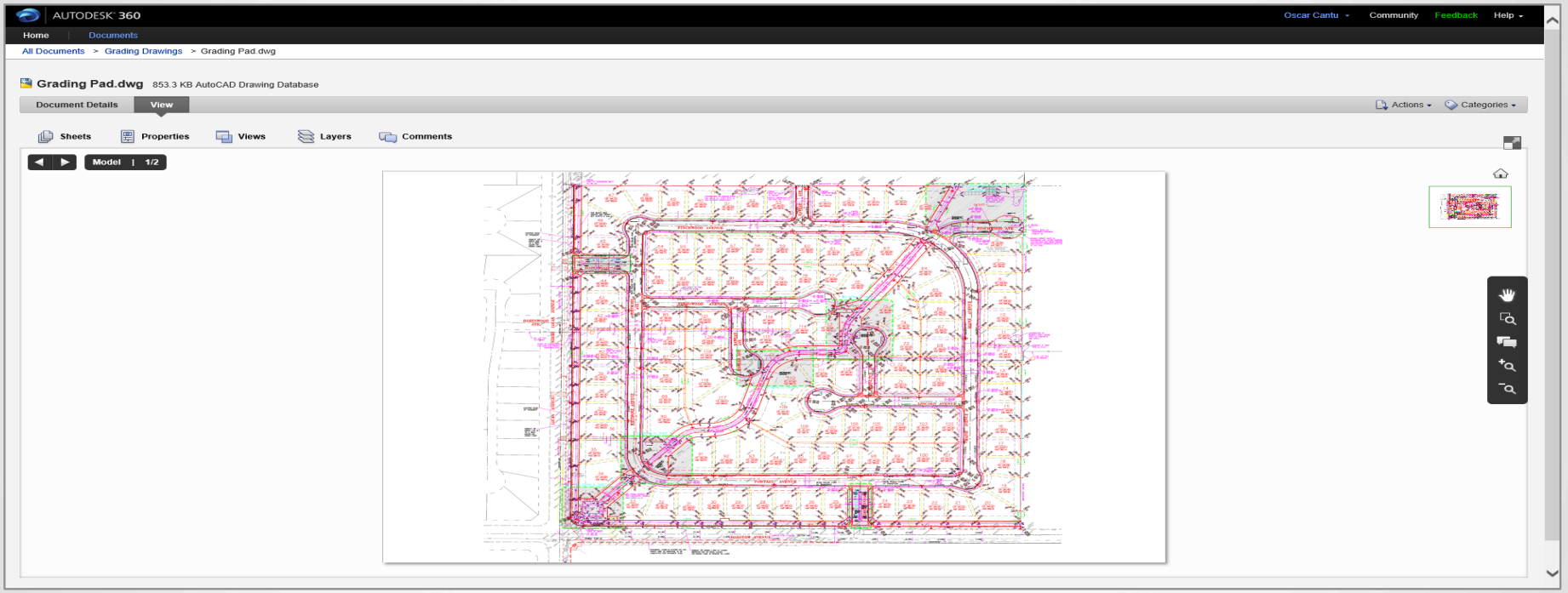
- Your data is stored within a cluster of computers that make up a single **cloud provider**.
- Your data is actually **redundantly** located.
- If one cloud server explodes, the others around it take up the slack and the system **continues** unimpeded.
- This will evolve into **no down time** permanently.

Cloud Surfing, the Next Big Thing



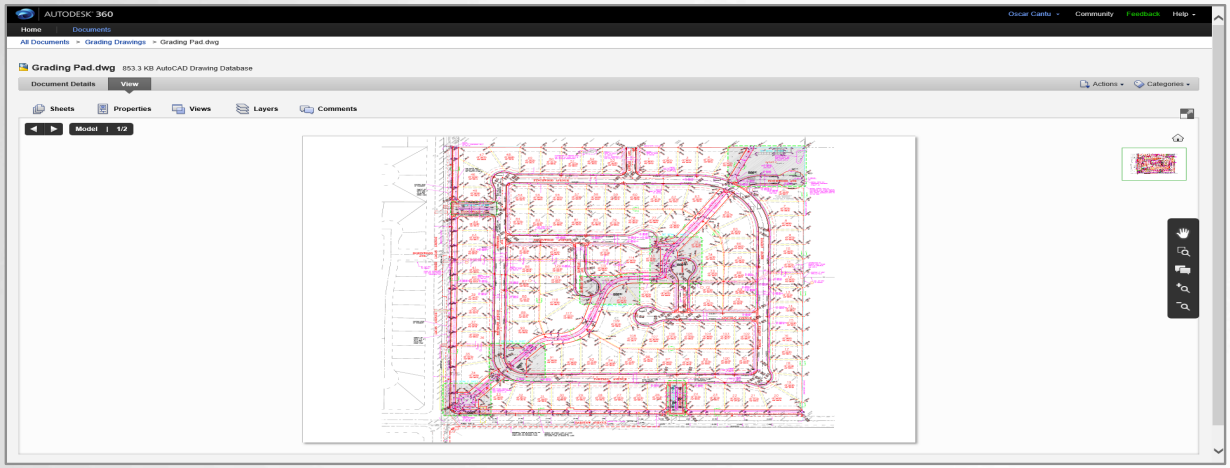
- AutoCAD 360 is an app that extends CAD functionality to **web and mobile devices**.
- AutoCAD 360 service enables you to view, create, edit, and share **drawings** using any web browser or mobile devices.
- The quick example shown is the option of **cloud-surfing** from MAGNET Enterprise to AutoCAD 360 service.

AutoCAD 360 Service

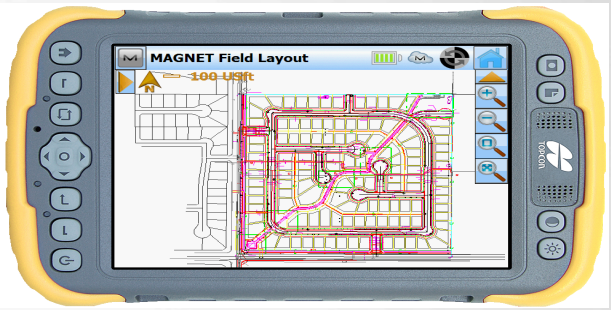


- Visualize the drawing file, make edits, add / remove.
- Stored within AutoCAD 360 (5GB of cloud storage) environment.

Cloud Surfing, Quick Example



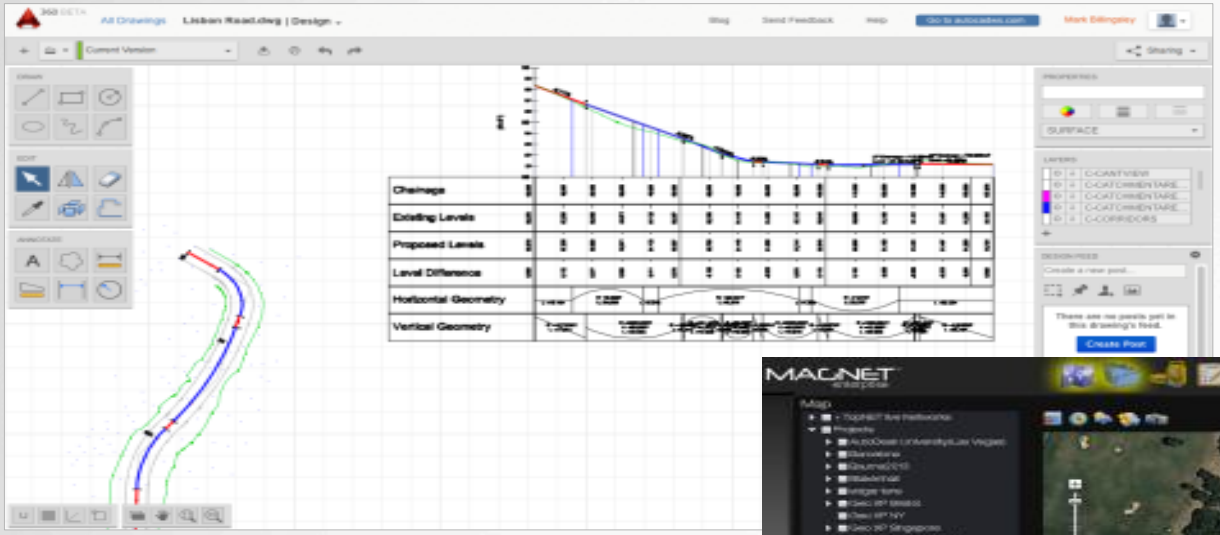
AutoCAD 360 (source) Storage and Sharing

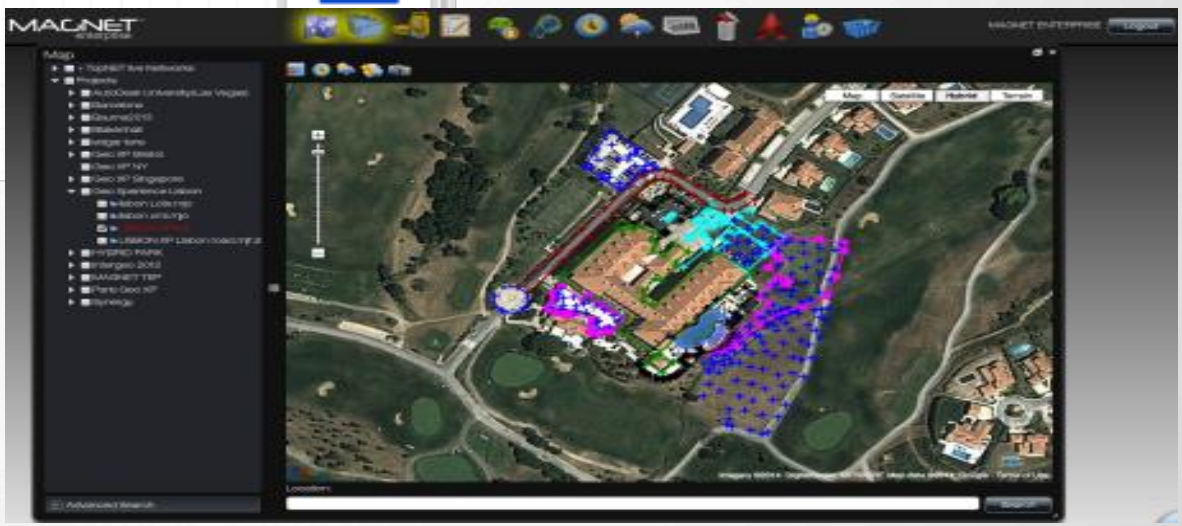


Design Received

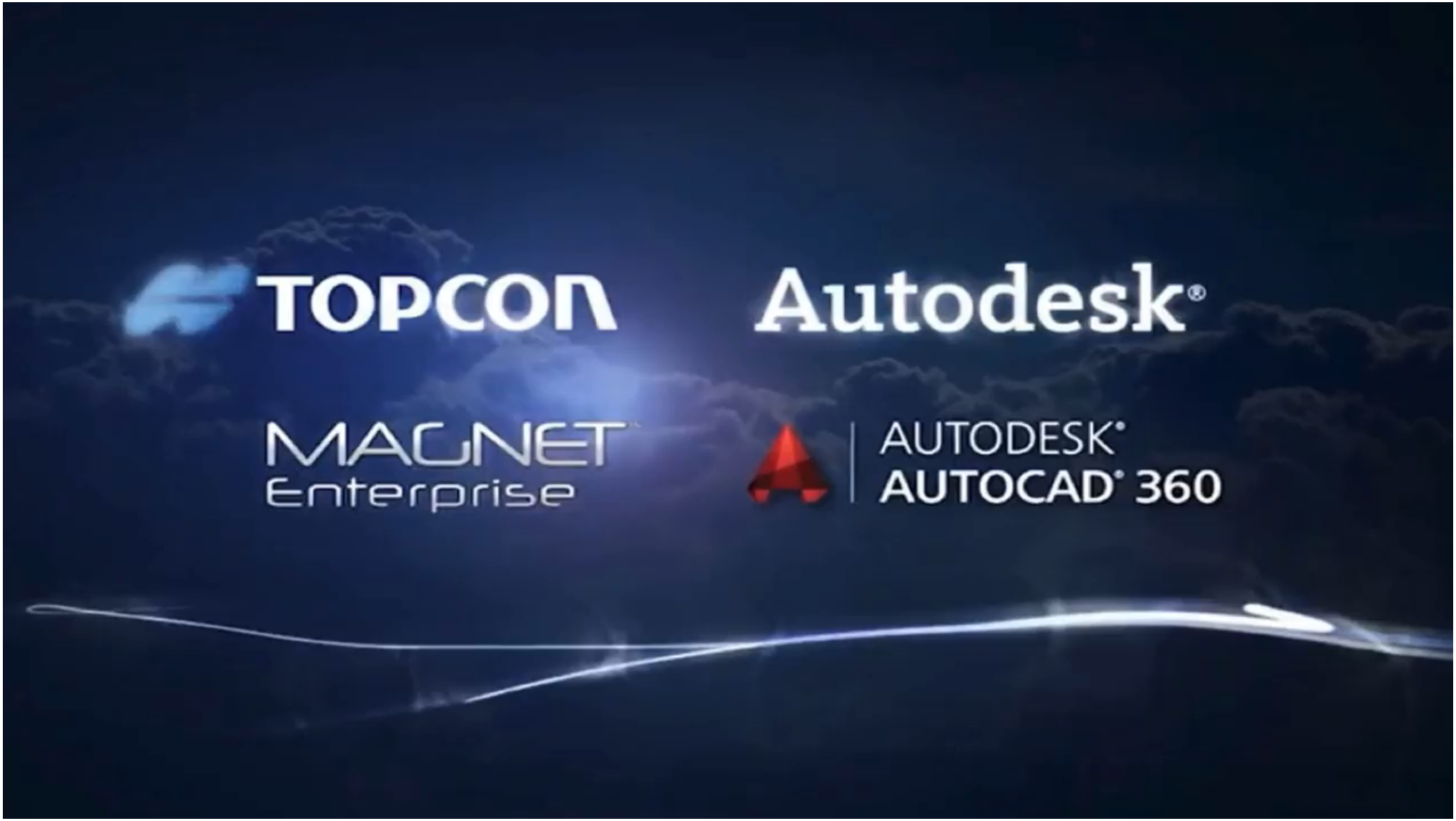
- In this example, the workflow **started** with a design change represented in a common DWG file.
- The DWG was **uploaded** to AutoCAD 360 for storage, viewing, quick edits, and permissive sharing.
- It was then **cloud surfed** into MAGNET Enterprise account.

The Cloud – Changing the Dynamic of Office to Site






Demonstration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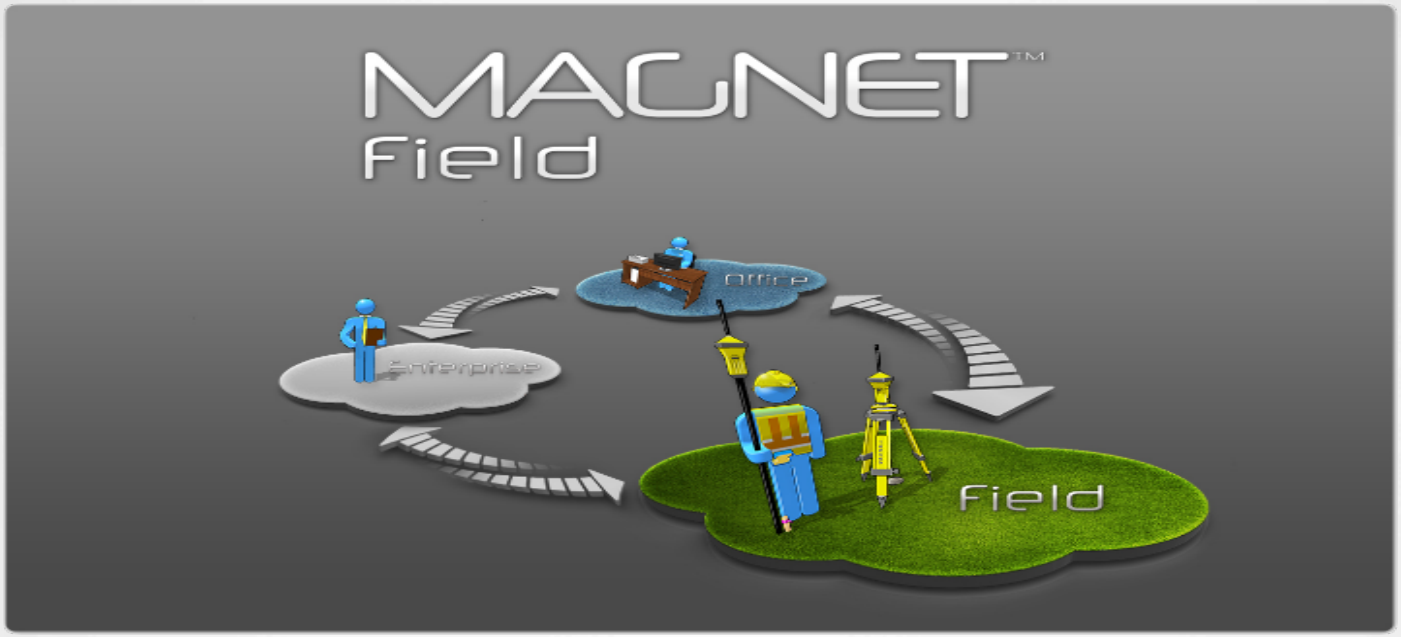
MAGNET Field



- Powerful and intuitive field application software that enables users to collect survey mapping data and perform construction and road layout using total stations, levels, and GPS equipment.

Secure Connection to Company Account

Connect

Enterprise

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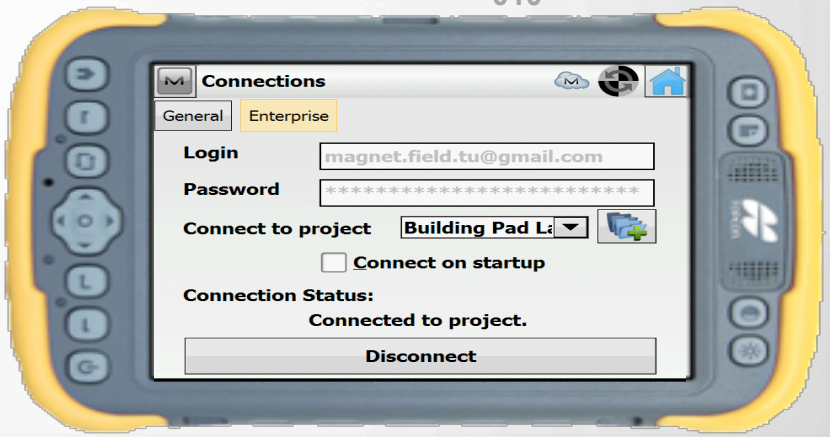
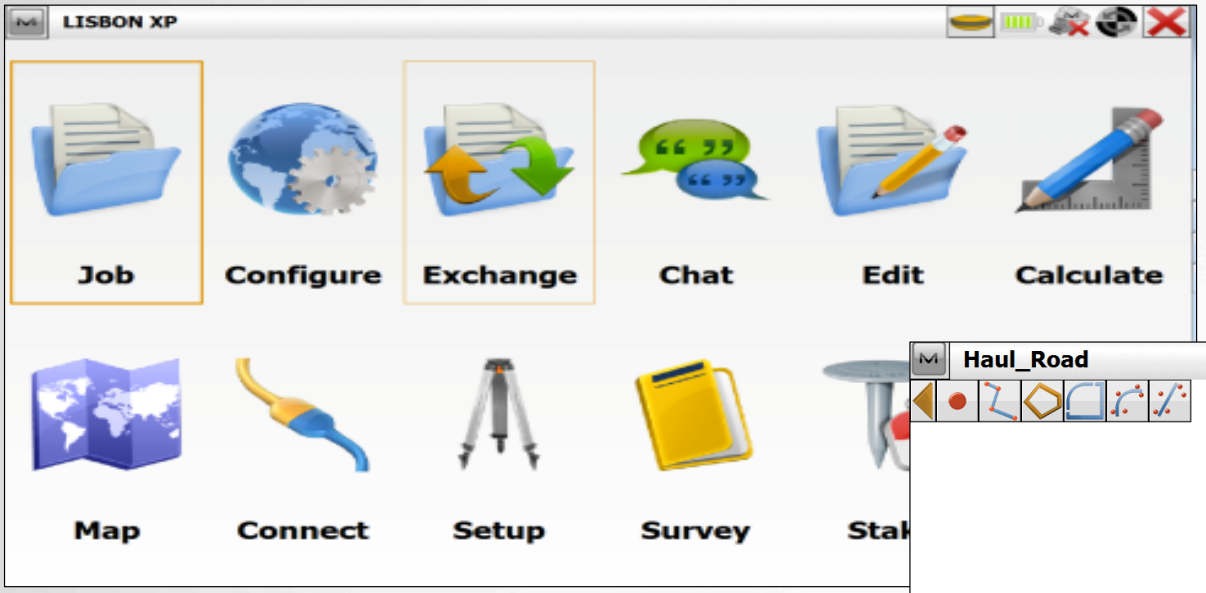
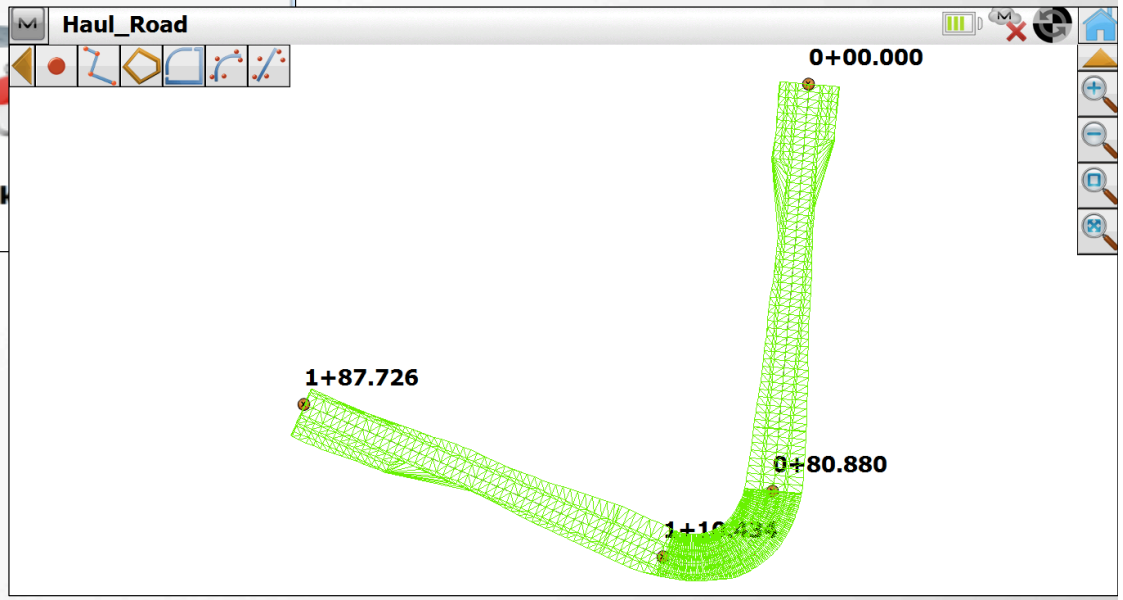


Connected to Company Account

- Ability to directly log in to Company Account, connect to a Project, and download / upload related files.
- No need for field crews to visit the office and send/receive supporting information.

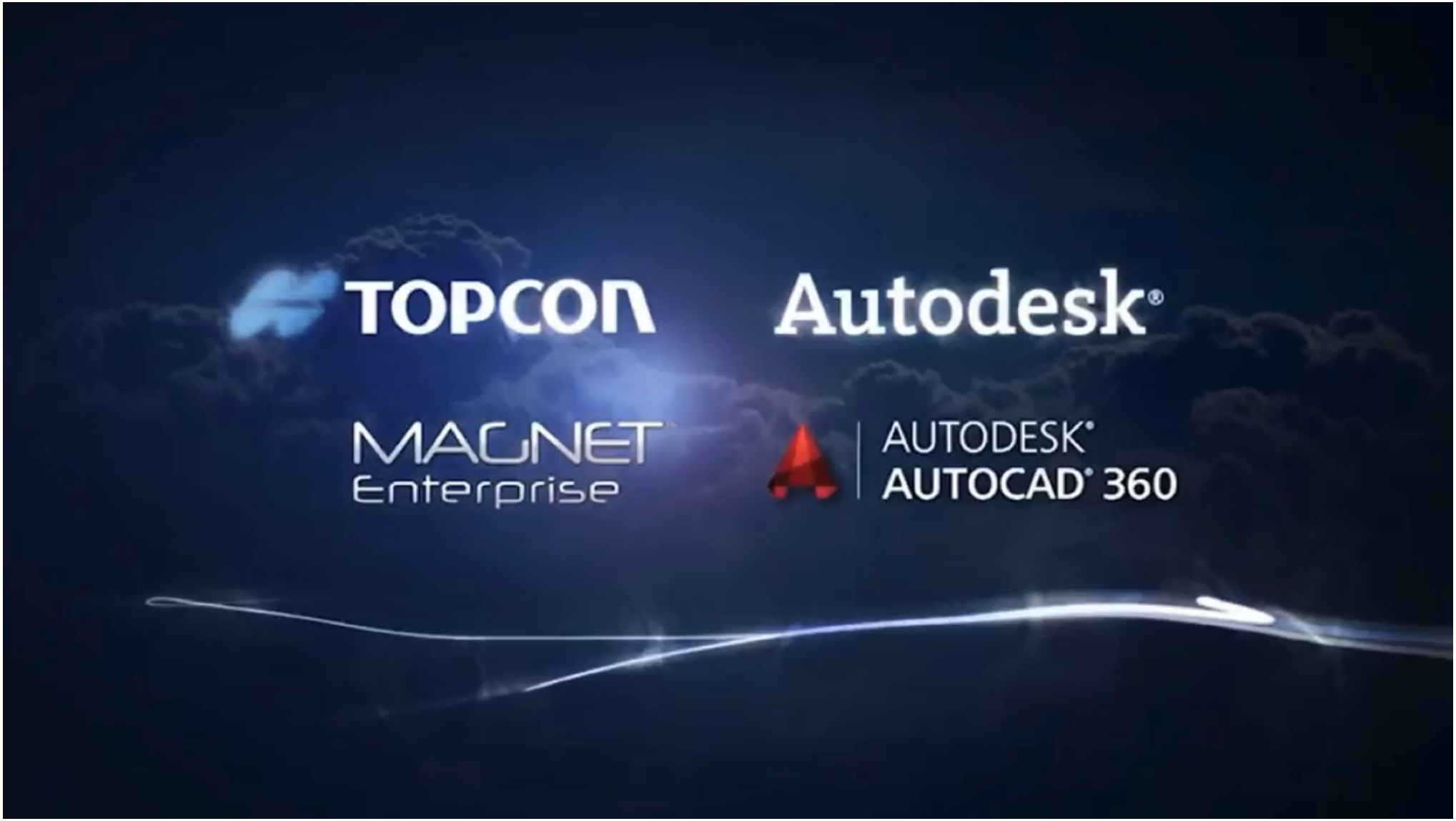
MAGNET Field – Seamless workflow from and to the cloud





One File .TP3 straight from AUTODESK across all platforms


Demonstration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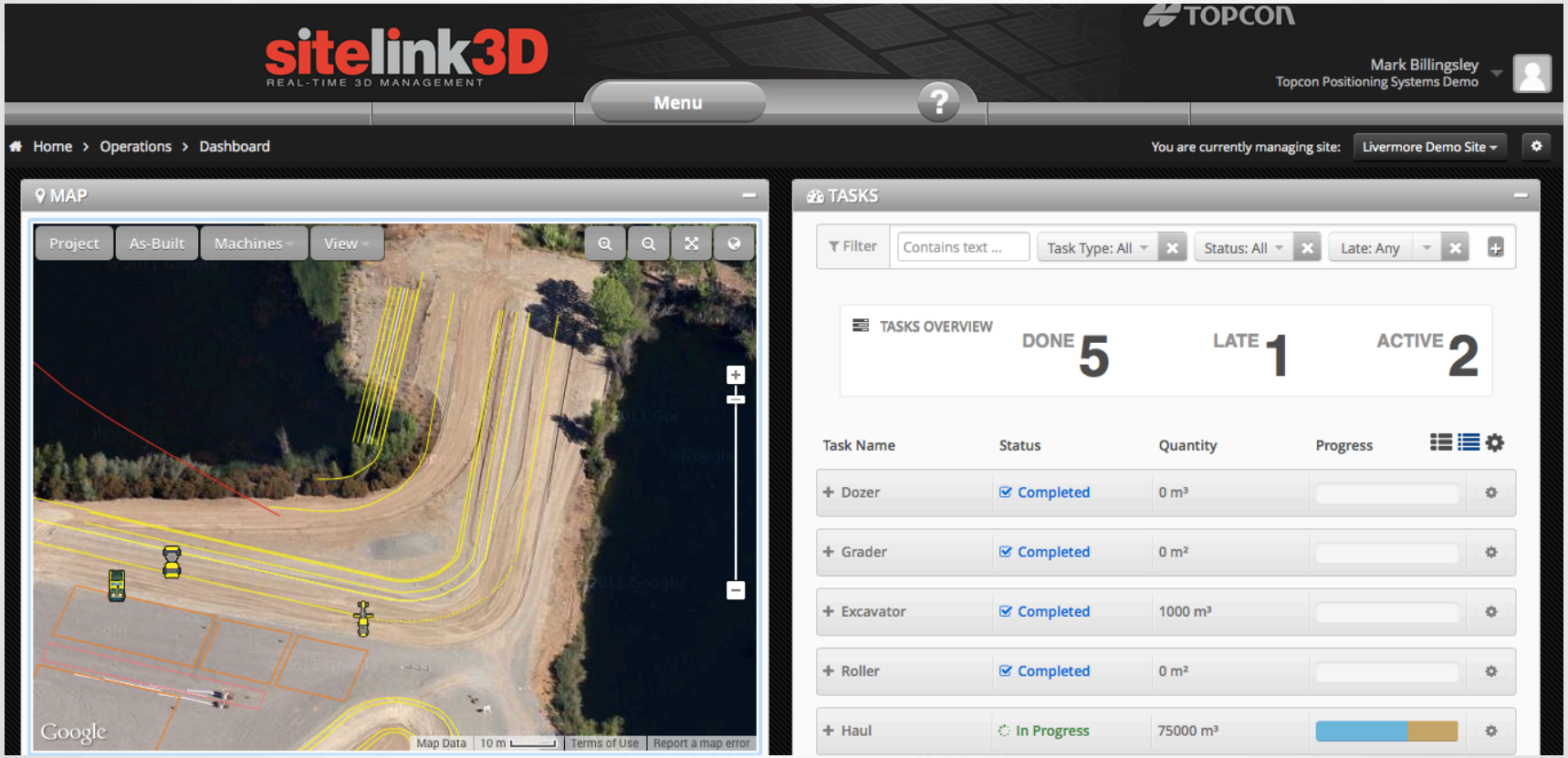
From Civil 3D to any Machine via Sitelink3D

One File .TP3 straight from AUTODESK across all platforms

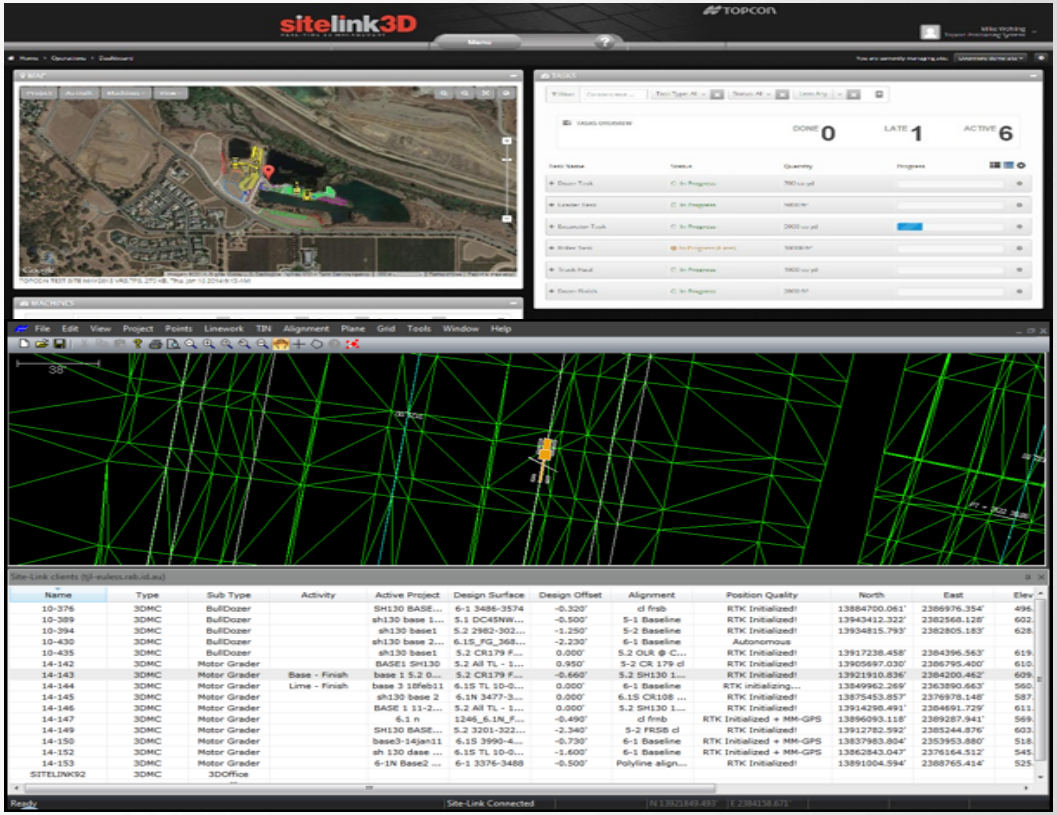


Sitelink3D - Features and Value

Real-time monitoring – "Watch it happen live!"

- Monitor the location and activity of all Sitelink-enabled equipment in real-time via Topcon's Sitelink3D iPhone app, or any internet device.

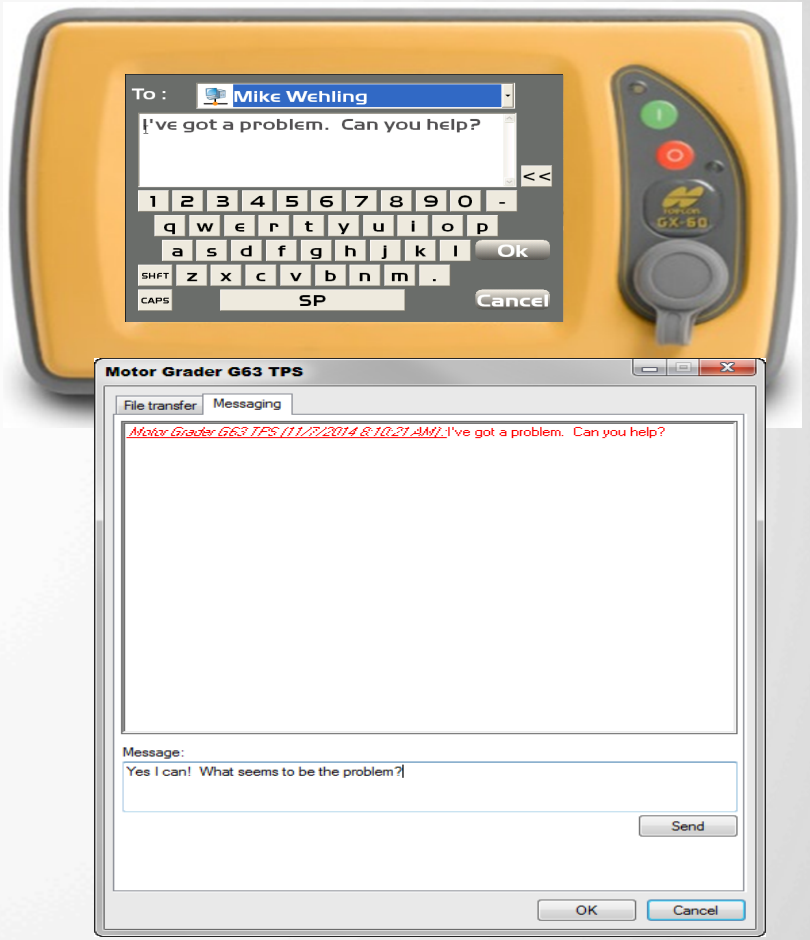
- Where's the value?
  - Catch mistakes before they happen
  - Reduce visits to the jobsite



Sitelink3D - Features and Value

Messaging – "Maintain communication!"

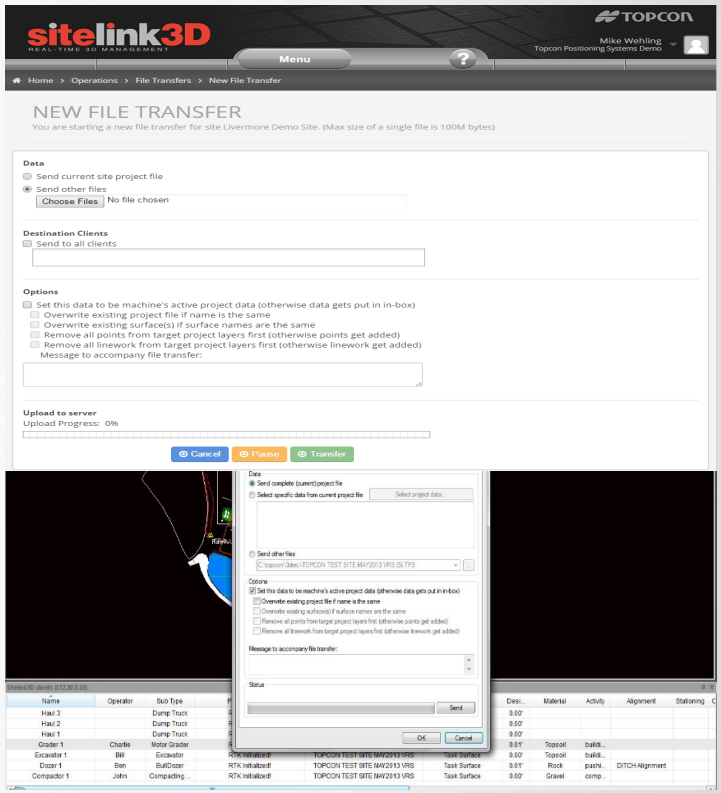
- This feature allows all Sitelink3D enabled devices, including PC's, to instantly message one another.
- Where's the value?
  - Operators can quickly report issues
  - Supervisors can redirect work
  - Keeps everyone communicating



Sitelink3D - Features and Value

File Transfer – “Plan revisions? No Problem!”

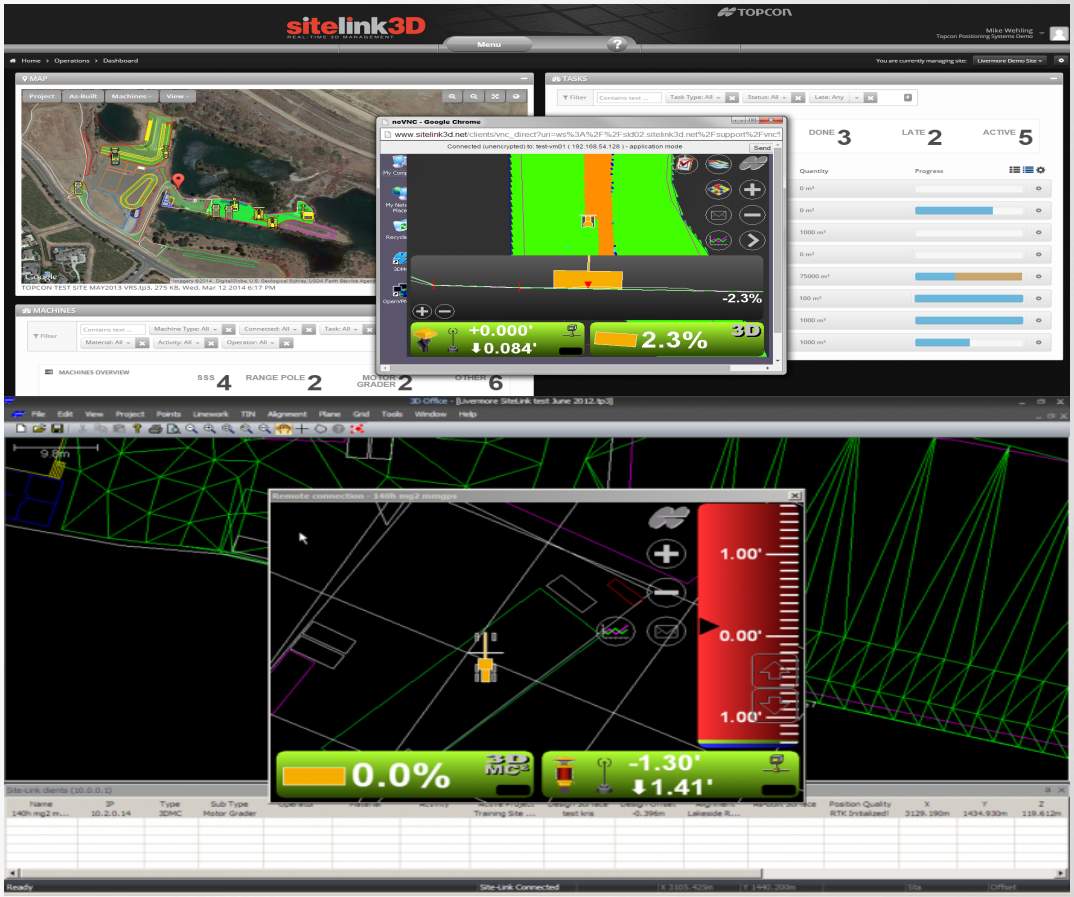
- Quickly send new and updated project data or any file directly to Sitelink3D-enabled equipment straight from your desktop.
- Where’s the value?
  - Eliminates the need for manual distribution
  - Easy to keep all the machines working with the same information
  - Send files, even when the machines are offline



Sitelink3D - Features and Value

Remote Support – "Take Control!"

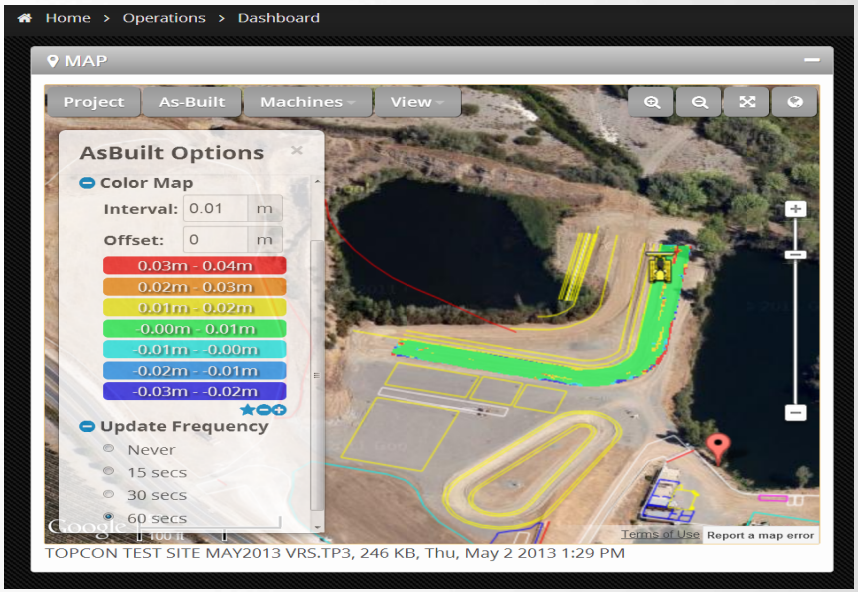
- This powerful tool puts you right in the cab of the machine, offering the ability to remotely take control and support your Sitelink3D-enabled fleet from any location.
- Where's the value?
  - Reduce service calls
  - Reduce equipment downtime
  - Remote training



Sitelink3D Enterprise - Features and Value

As-built surface – “Progress topo? Done! Pay me!”

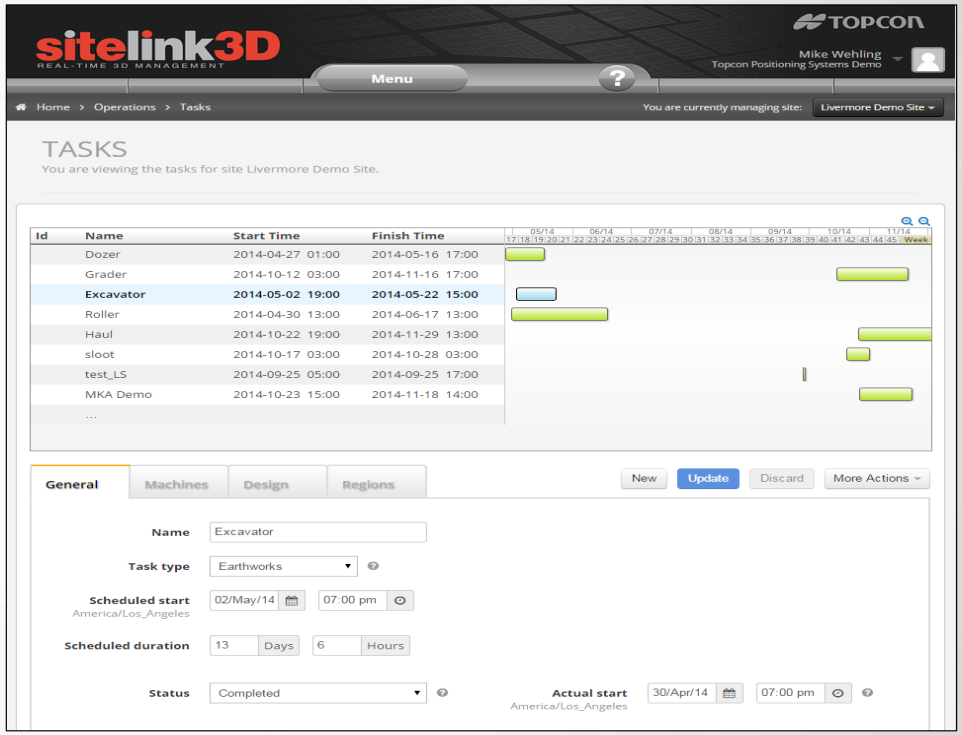
- Store real machine data in the cloud, maintaining a current as-built surface at all times.
- Where’s the value?
  - Dramatically reduce the need for topo surveys
  - Cut/Fill and pass count color mapping



Sitelink3D Enterprise - Features and Value

Create & assign Tasks – “Stick to the plan!”

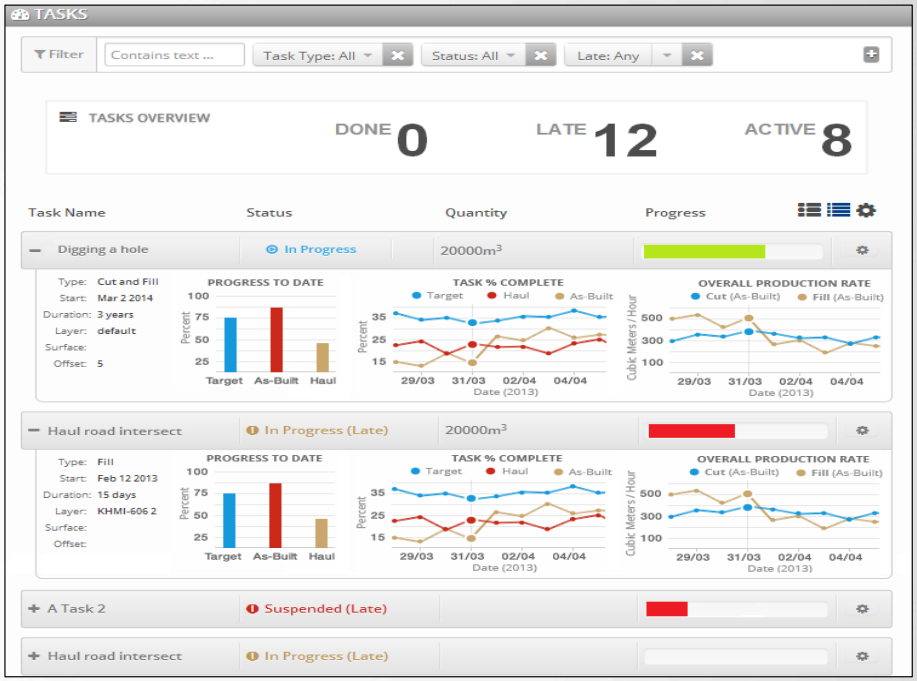
- This feature allows you to define, schedule and assign a Task for an entire crew, just as you bid it.
- Where’s the value?
  - Keep everyone using the same information
  - Keep everyone working according to the plan



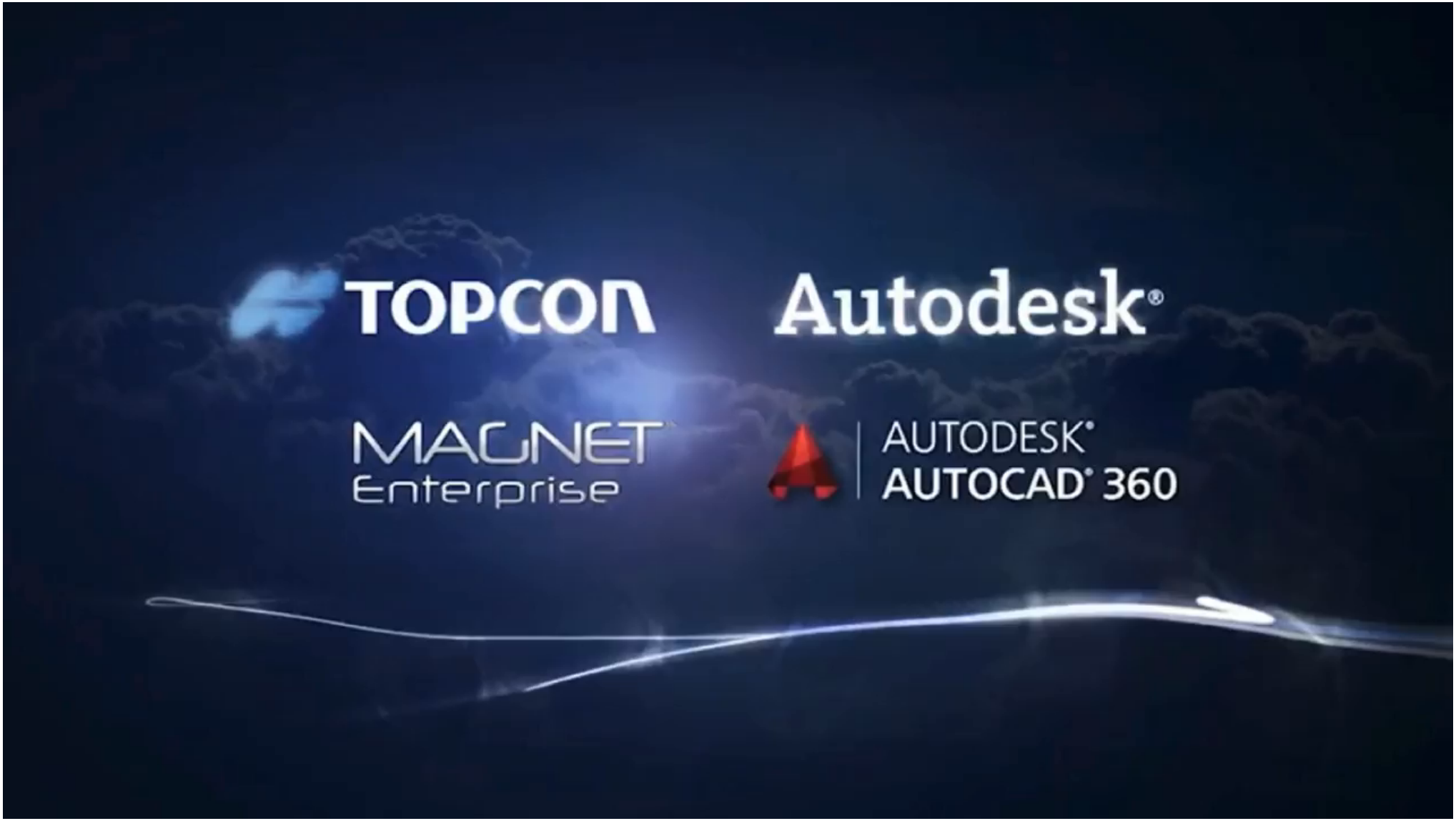
Sitelink3D Enterprise - Features and Value

Reports – "Let's keep it real, HANDS OFF!"

- Create reports once and schedule them to automatically generate and distribute periodically, ensuring accuracy.
- Where's the value?
  - Reduce redundant data handling
  - Eliminate hours of number crunching turning field reports into volumes and production rates.
  - It's REAL data.




Demonstration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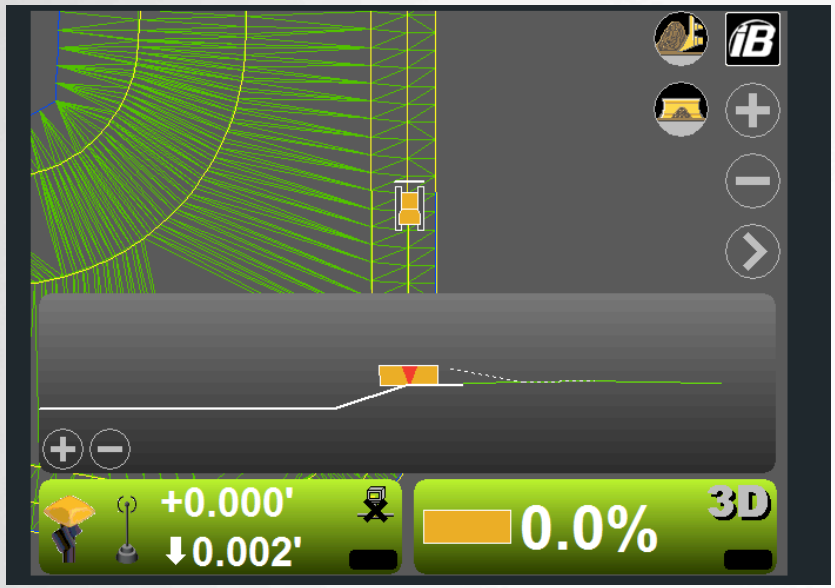
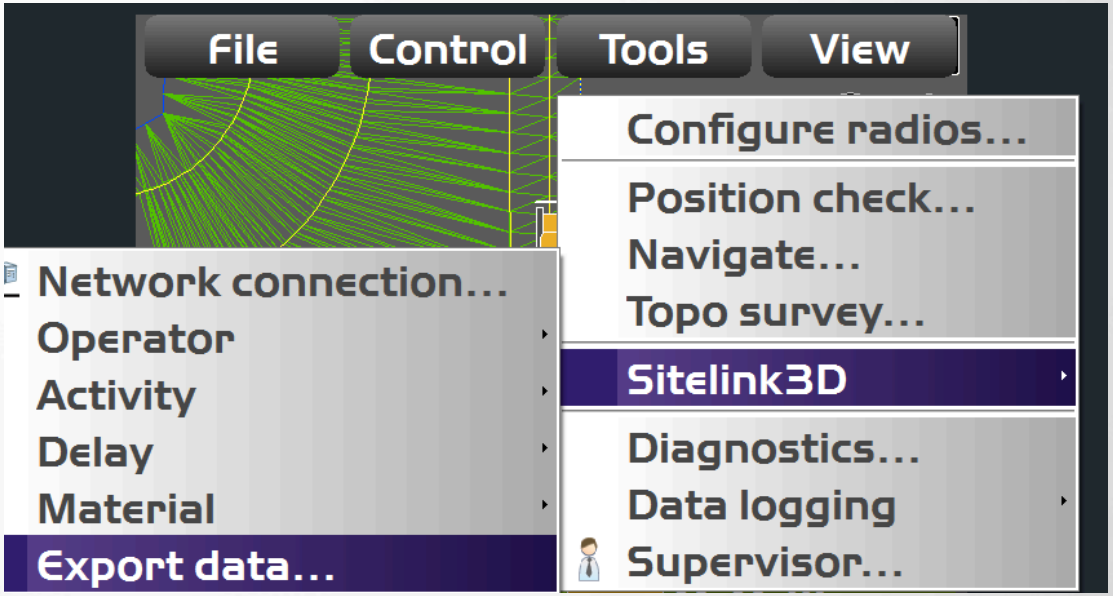


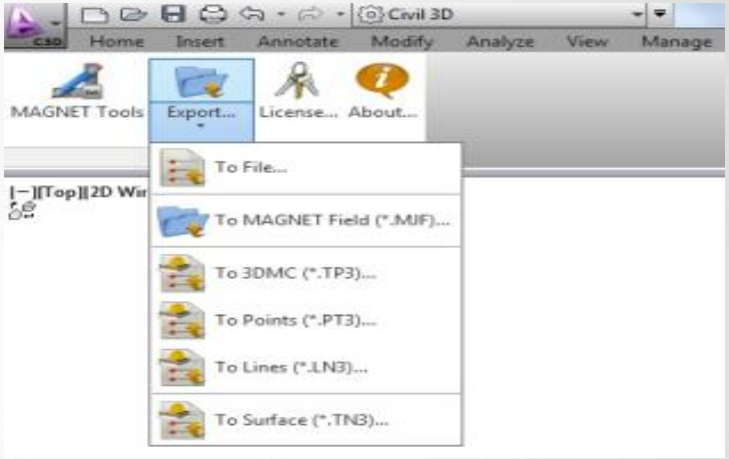


AutoCAD Civil 3D Support

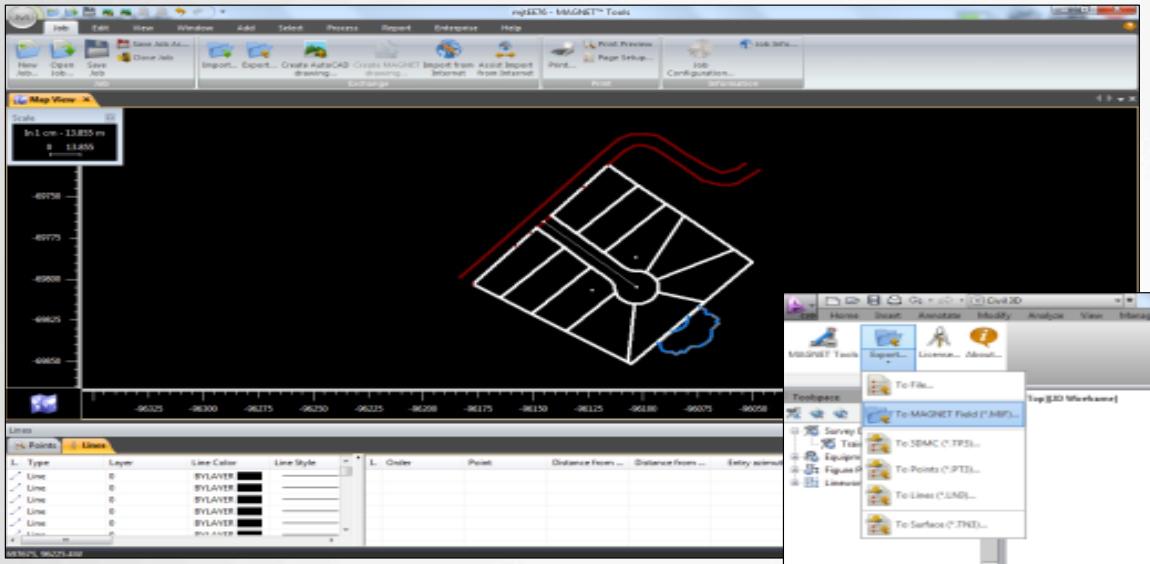
- Just a single button-click and your linework is ready for further design in AutoCAD Civil3D environment!

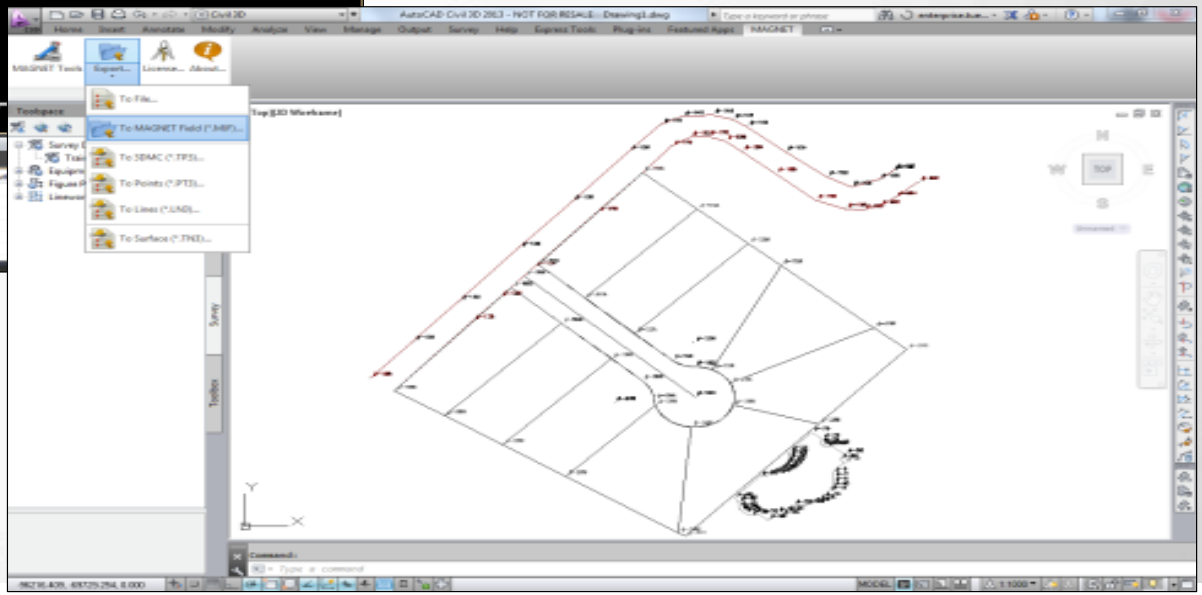
- Take advantage of the time-saving ability to open a MAGNET Field job that contains Quick Code-generated 3D linework and let MAGNET Office Tools do the rest.

- Your linework is quickly converted to a DWG drawing file format and opened within AutoCAD Civil 3D software. ..no manual file creation and sharing required any longer.



MAGNET Office





Seamless transition to Civil 3D

Conclusions

- Demand for increased productivity and **real-time** data transfer to and from a construction jobsite like never before
- The ability to edit designs and seamlessly transfer updates through the cloud is becoming an **expectation** rather than just wishful thinking
- As we have come to expect in our social media lives, we now also demand in our professional lives …..technology has changed our demands
- Together AUTODESK and Topcon have created a seamless workflow from a design environment, to a live construction site, to seamlessly pass data back and forth in a way that will be be the benchmark for the construction industry from here on in.

Thank you

Ben Huber

bhuber@topcon.com

Mark Billingsley

mbillingsley@topcon.com

Session Feedback

- Via the Survey Stations, email or mobile device
- AU 2015 passes given out each day!
- Best to do it right after the session
- Instructors see results in real-time

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