

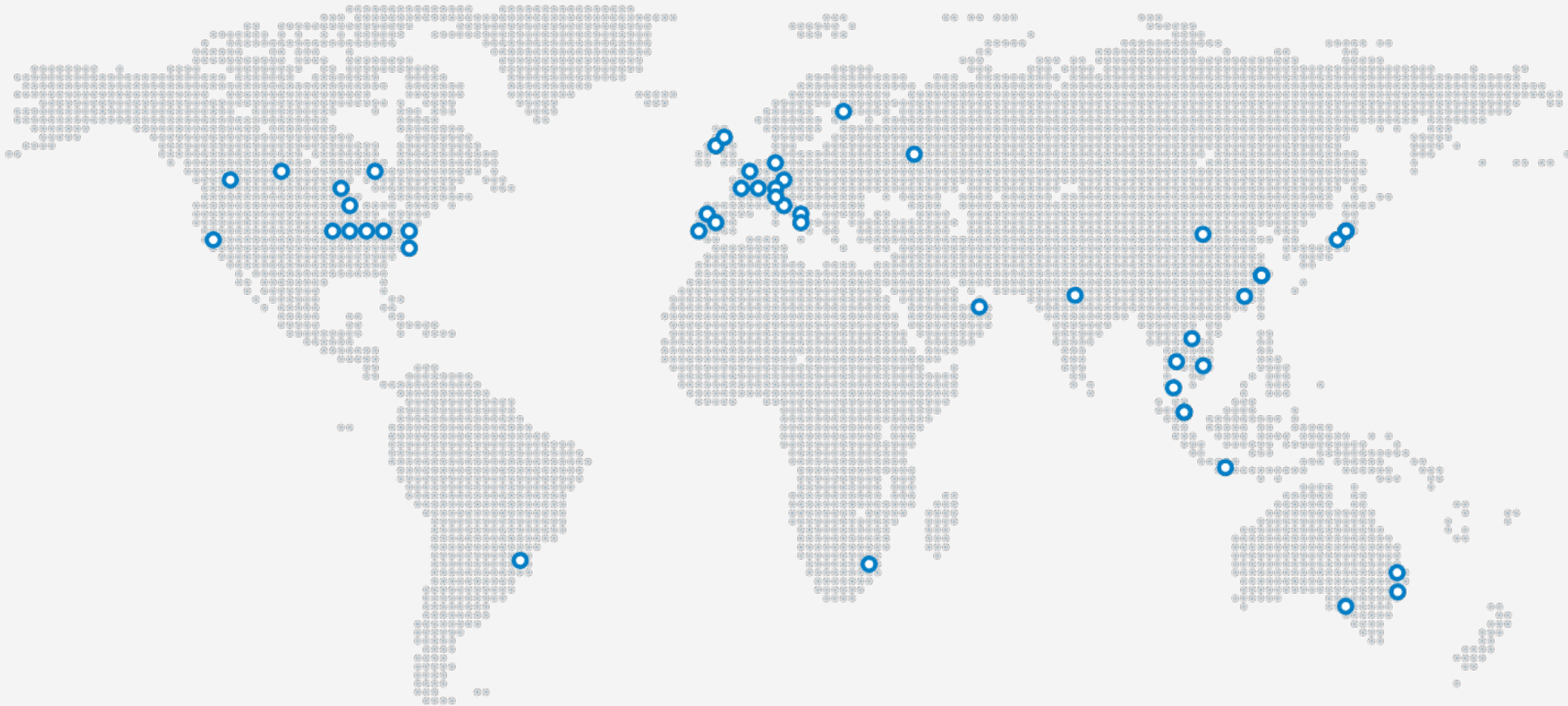


Will Burt – AIS Positioning Solutions
Jim Preston – Topcon Positioning Systems
Nick Martin – Topcon Positioning Systems



Topcon Positioning Group

2100+ Active Patents | 500+ Engineers | 45+ PhDs



Topcon Today

Global Network





A U T H O R I S E D D E A L E R



Traverse City Grand Rapids Lansing Saginaw New Hudson Richmond



Always One Step Ahead



1932
Founded
in Tokyo

1953
Topcon 35A
Camera

1980
Mass Market
Total Stations

1994
Laser & Machine
Control Systems

2000
GNSS
Technology

2004
mmGPS
3D precision with
GNSS and Laser Tech

2006
Precision
Agriculture

2009
3D-MC²
Advanced
Grade Control

2010
CropSpec
Crop Health
Monitoring

2017
SmoothRide
Road Resurfacing
Technology

2019
GTL-1000
Scanning Robotic
Total Station

2022
MC-X Accelerate
Machine Control

More than a company slogan, 'Always One Step Ahead' is a philosophy that permeates who we are and what we do. It's a promise to our partners and customers, and a rallying cry for each and every one of us at Topcon.



Modern Road Resurfacing



SmoothRide

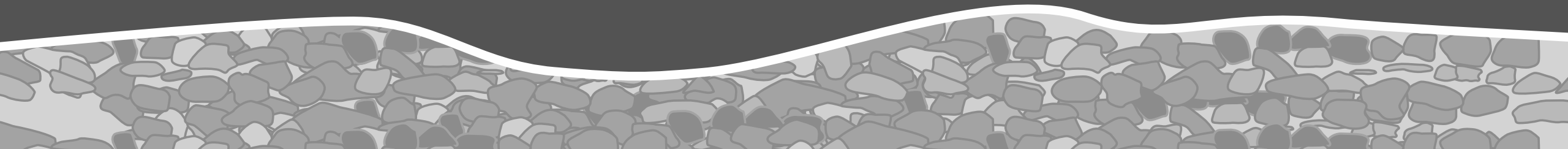
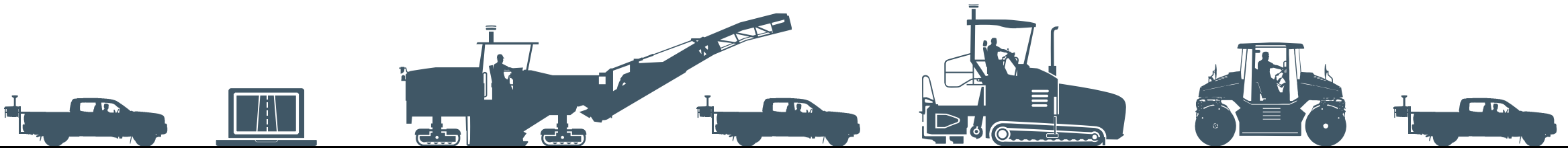
SmoothRide

Time

Safety

Quality

Cost



Core Technologies



GNSS



**Equipment
Automation**



**Mobile
Mapping**

Resurfacing



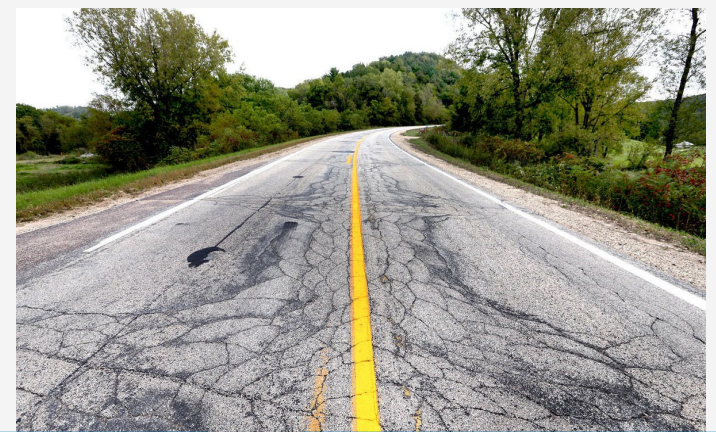
Smoothness

Incentives and disincentives



Material Management

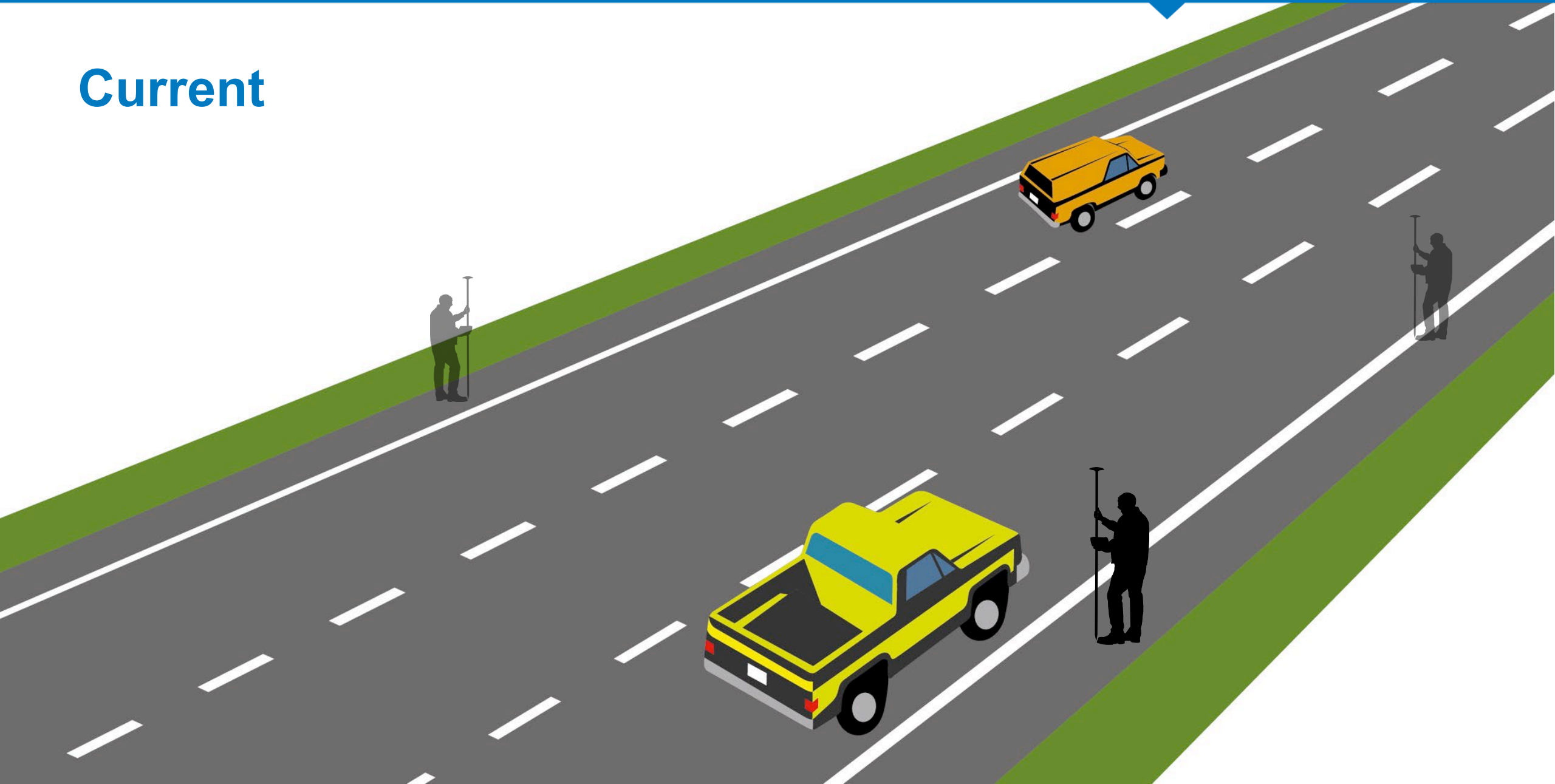
Quantity versus surface



Unknown Situation

Surface data and change orders

Current

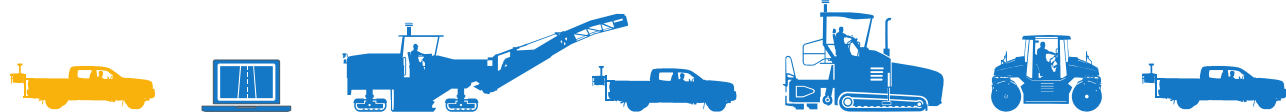


Conventional Methods



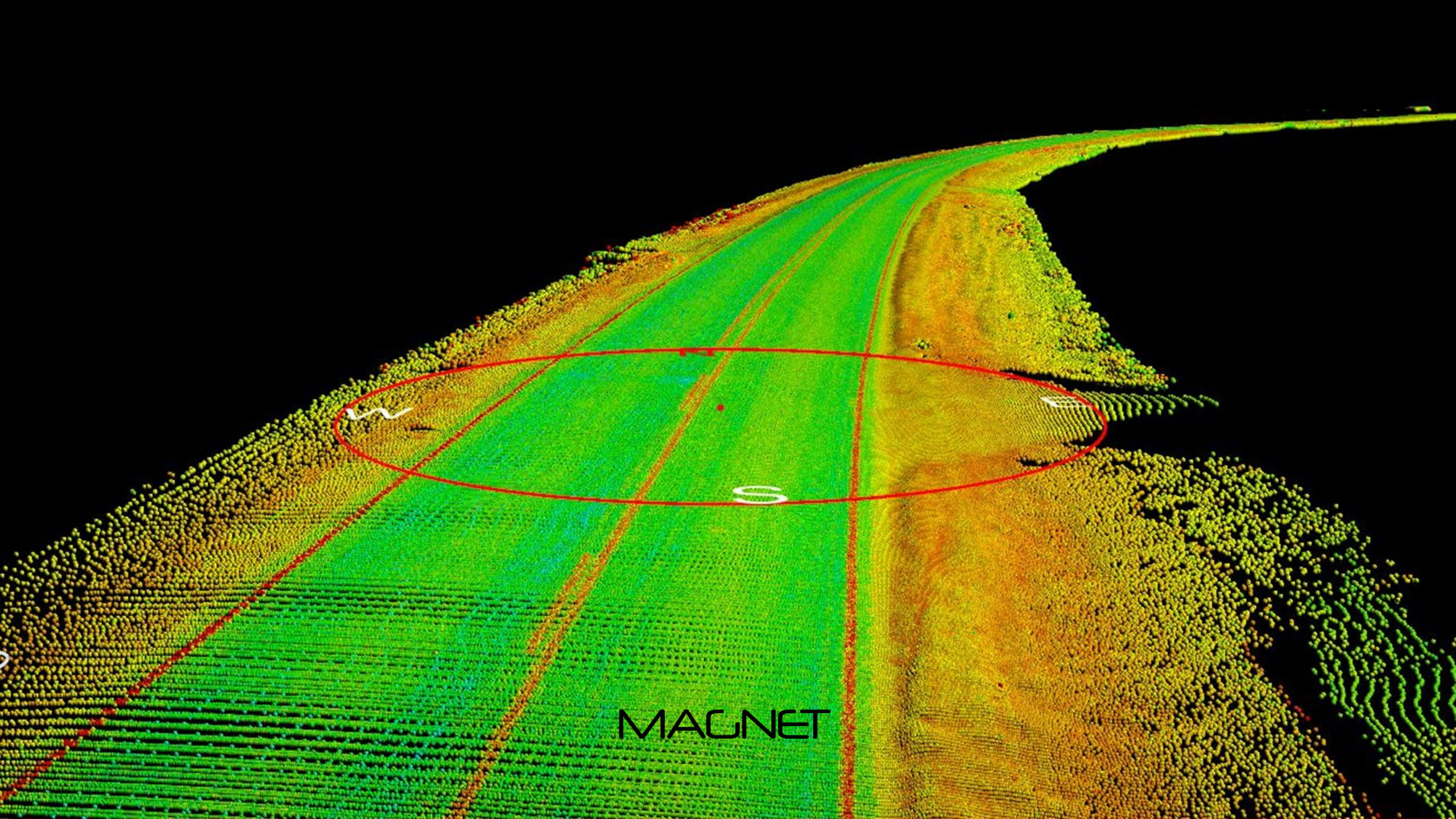
Topcon RD-M1





RD-M1 Scanner

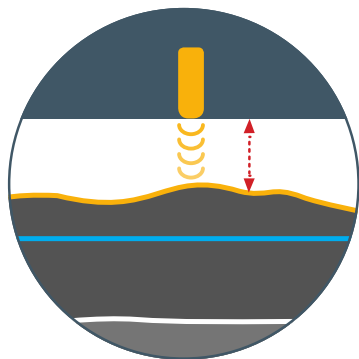
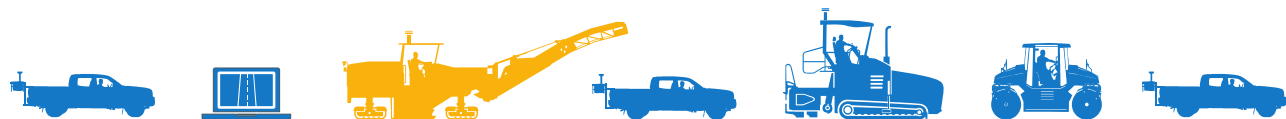




MAGNET



SmoothRide Milling & Paving



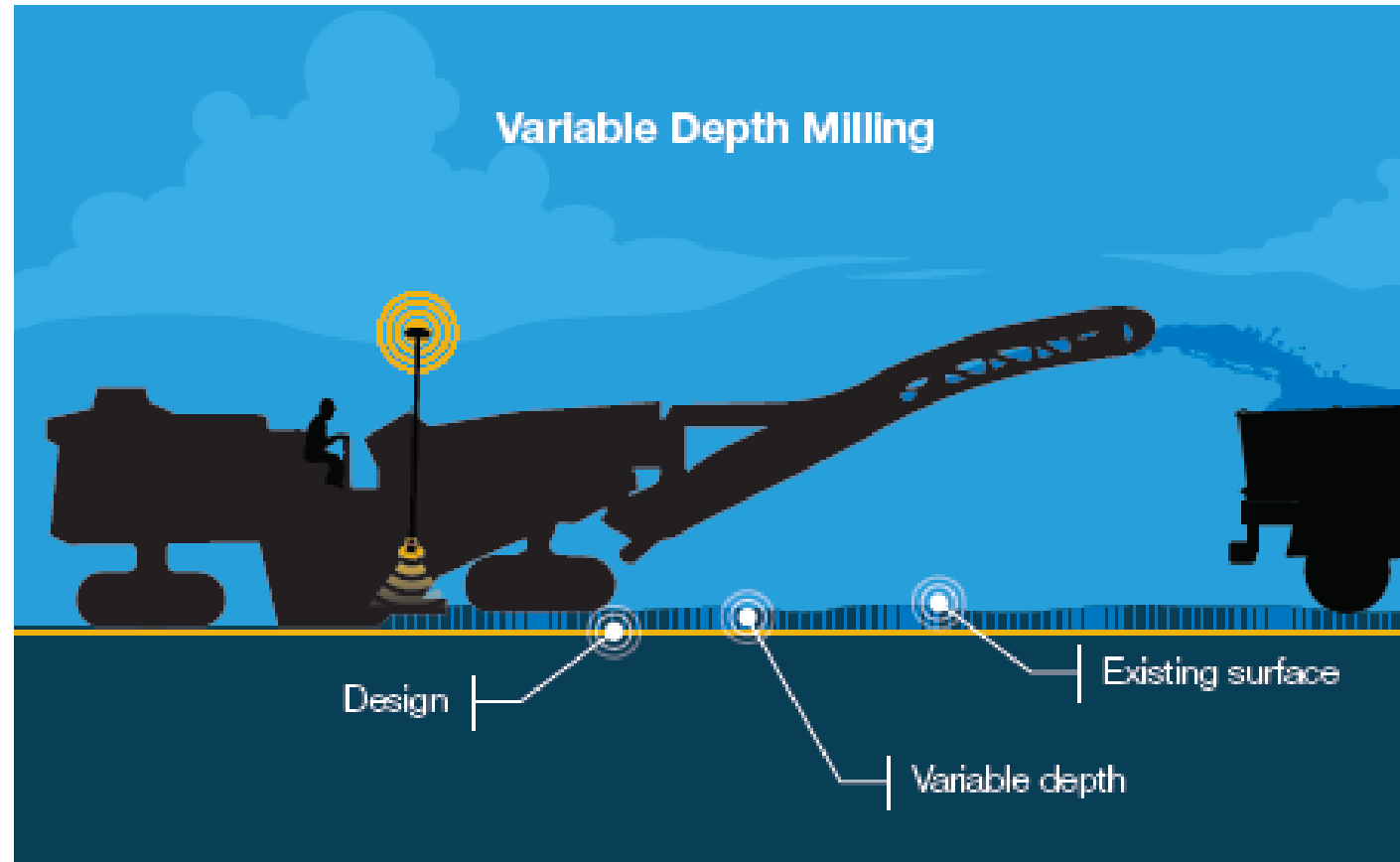
DESIGNED MILLING THICKNESS

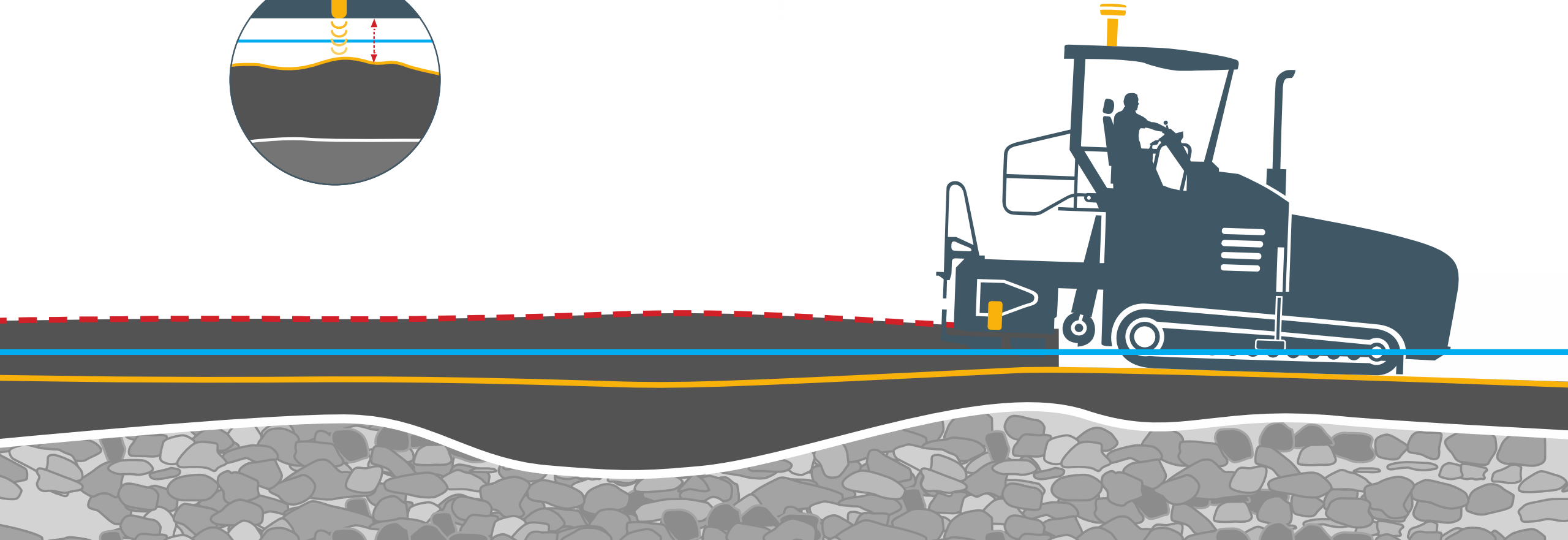
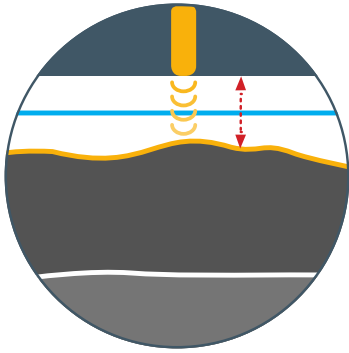
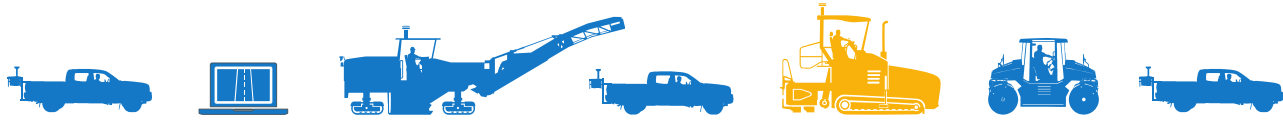
ORIGINAL SURFACE

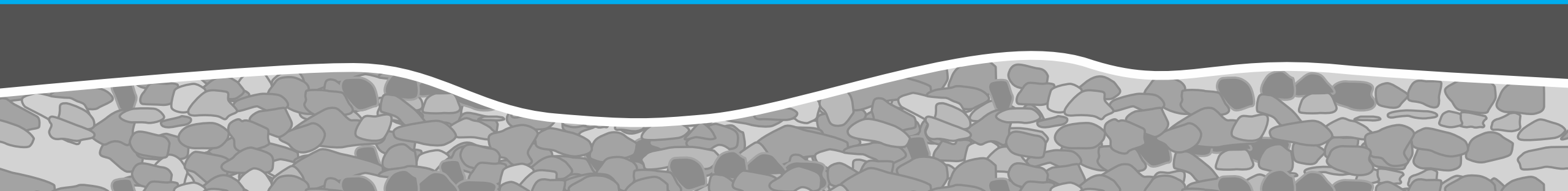
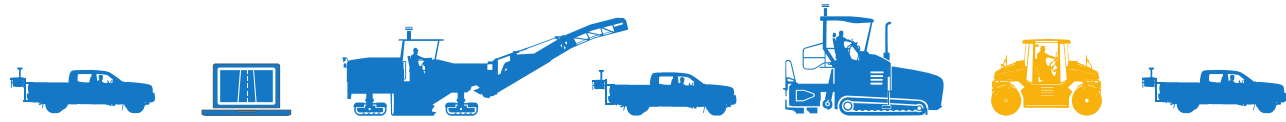
TRUE
VARIABLE
MILLING



How It Works









SmoothRide Paving

DOT Projects

- WisDOT
- RT. 83 Project
- IRI from +200 down to 30



Reports

- Cross Section report
- Profile Report
- Resurface Report
- Slope Report
- VC Report

Reports

Road Name: PATCHING

Surface Name: DESIGN

	Station	Offset	Northing	Easting	Level	Code	Cross Slope(%)							
	378+25.000	-23.000	2811607.514	710734.085	168.857	LMATCH	-4.91							
	378+25.000	-20.000	2811606.174	710736.769	168.902	LT5	-6.73							
	378+25.000	-16.000	2811604.388	710740.348	168.984	LT4	-7.58							
	378+25.000	-12.000	2811602.601	710743.927	169.076	LT3	-5.63							
	378+25.000	-8.000	2811600.815	710747.505	169.145	LT2	-5.94							
	378+25.000	-4.000	2811599.028	710751.084	169.217	LT1	-7.21							
	378+25.000	0.000	2811597.241	710754.663	169.305	CL								
	378+25.000	4.000	2811595.455	710758.242	169.261	RT1	-3.61							
	378+25.000	8.000	2811593.668	710761.821	169.178	RT2	-6.83	3.13	3.94	4.47	0+00.000			
	378+25.000	12.000	2811591.882	710765.400	169.113	RT3	-5.34	2.47	3.74	5.07	0+25.000			
	378+25.000	16.000	2811590.095	710768.978	169.058	RT4	-4.45	3.13	4.15	4.36	0+50.000			
								3.17	3.98	5.26	0+75.000			
								3.50	4.01	3.96	1+00.000			
	378+30.000	-23.000	2811611.988	710736.318	168.835	LMATCH	-5.06	3.58	4.57	3.03	1+25.000			
	378+30.000	-20.000	2811610.648	710739.002	168.882	LT5	-7.01	4.00	4.44	4.02	1+50.000			
	378+30.000	-16.000	2811608.861	710742.581	168.967	LT4	-5.93	4.21	4.56	3.90	1+75.000			
								4.16	4.43	3.71	2+00.000			
					2+25.000	-3.12	-3.21	-4.41	4.33	4.46	3.59	2+25.000		
					2+50.000	-2.88	-3.24	-3.94	4.14	4.40	4.15	2+50.000		
					2+75.000	-2.79	-3.03	-3.75	3.24	3.84	4.41	2+75.000		
					3+00.000	-2.92	-3.08	-3.45	2.61	2.99	2.52	3+00.000		
					3+25.000	-5.07	-2.63	-3.07	2.09	2.41	2.50	3+25.000		

Topcon TM-1

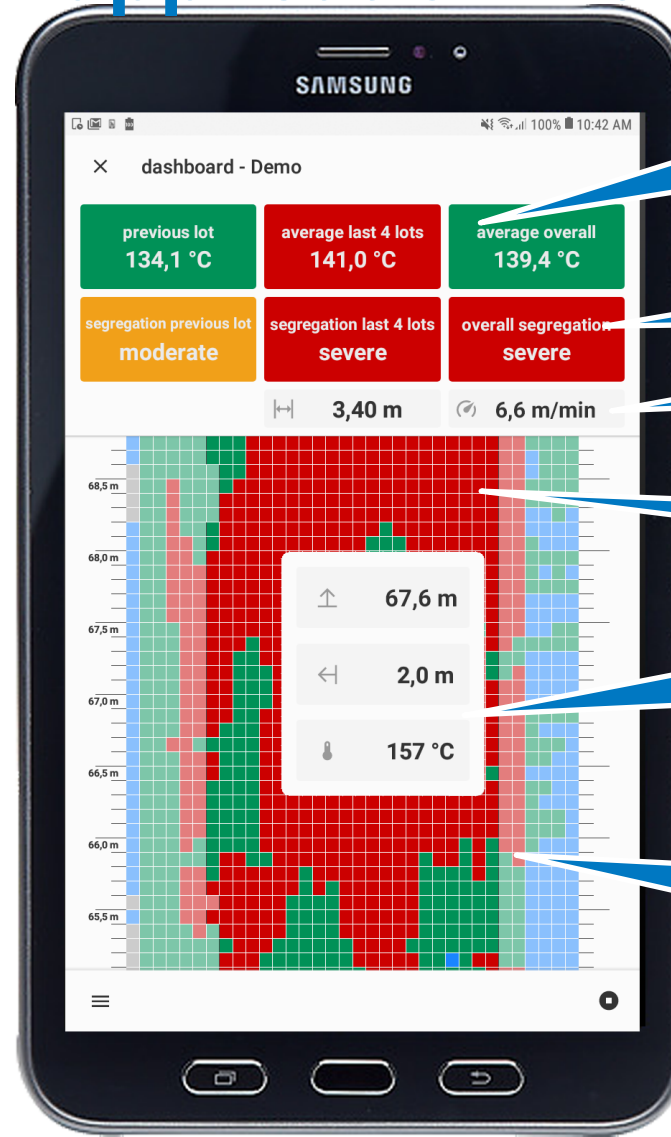
Paver Mounted Thermal Profiler
PMTP





Pavelink Thermal Mapper application – the display

- Information presented by lot or truck load area
- No overwhelming information to process on-site
- Easy to see color coding



Average temperature of current, recent and all areas.

Segregation information

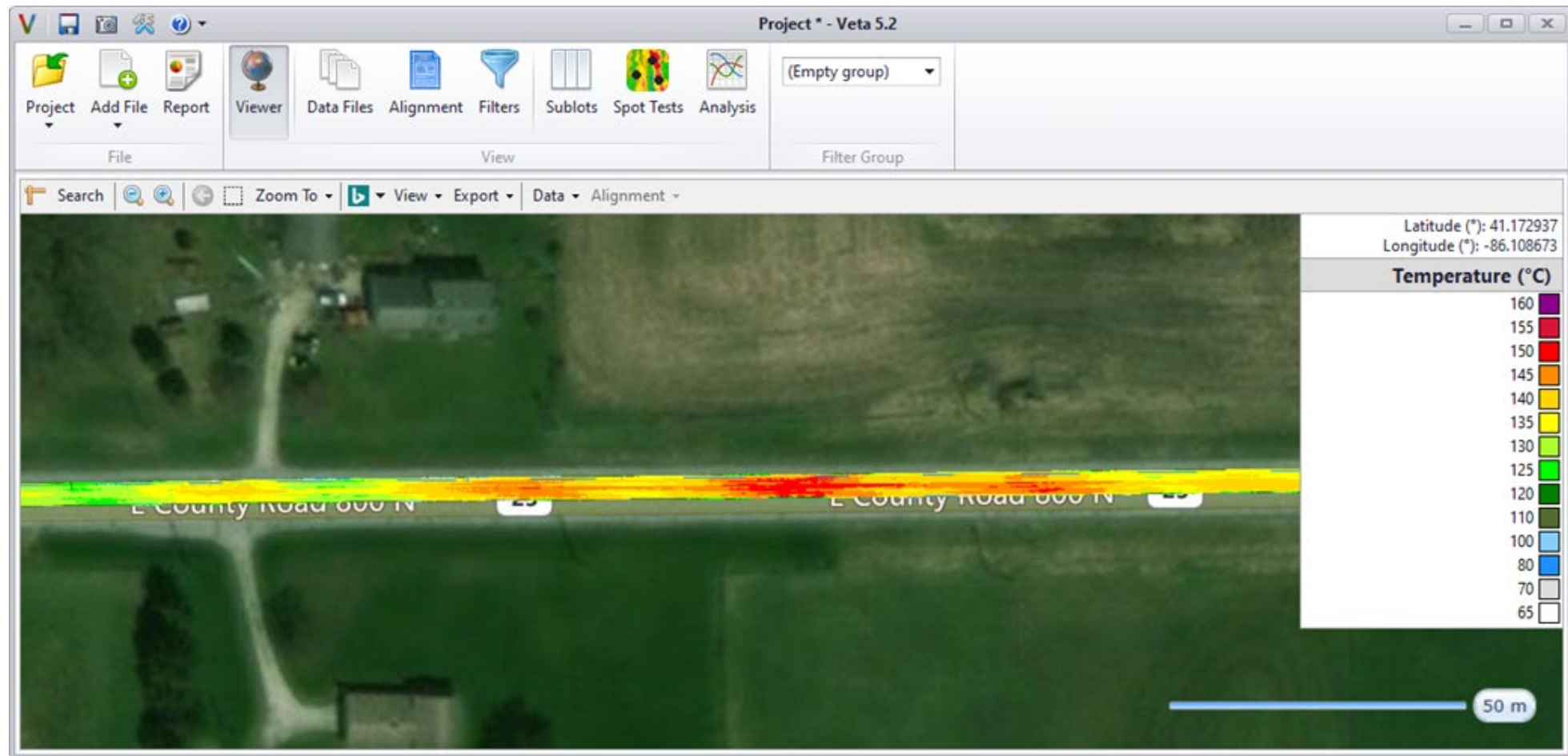
Width and paving speed

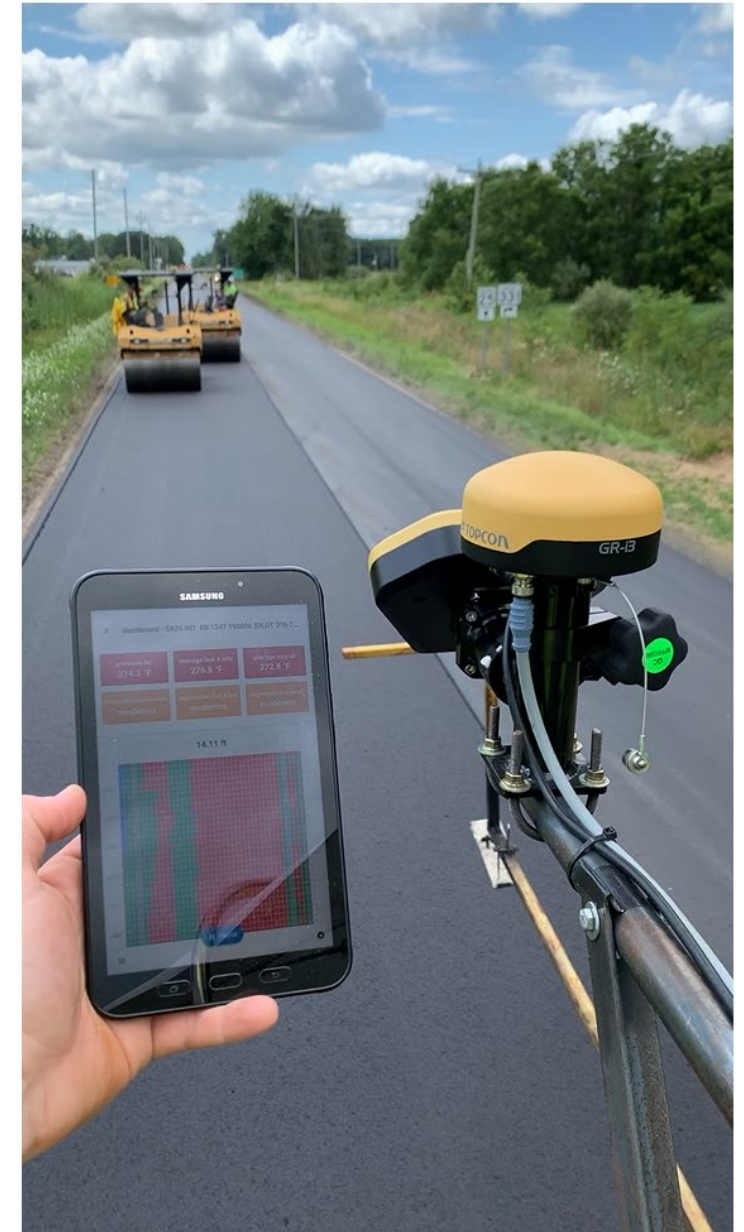
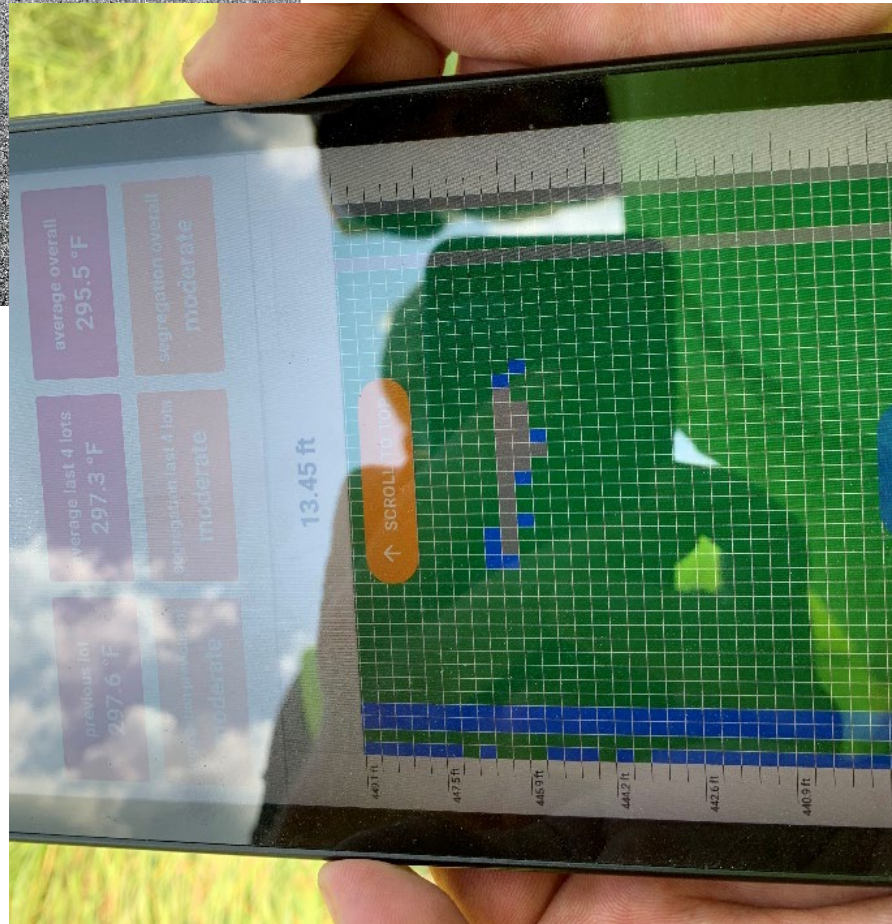
Interpreted thermal image

Touch and hold for local temperature

Transparent part is measured but discarded for statistics: adjustable edge cut-off

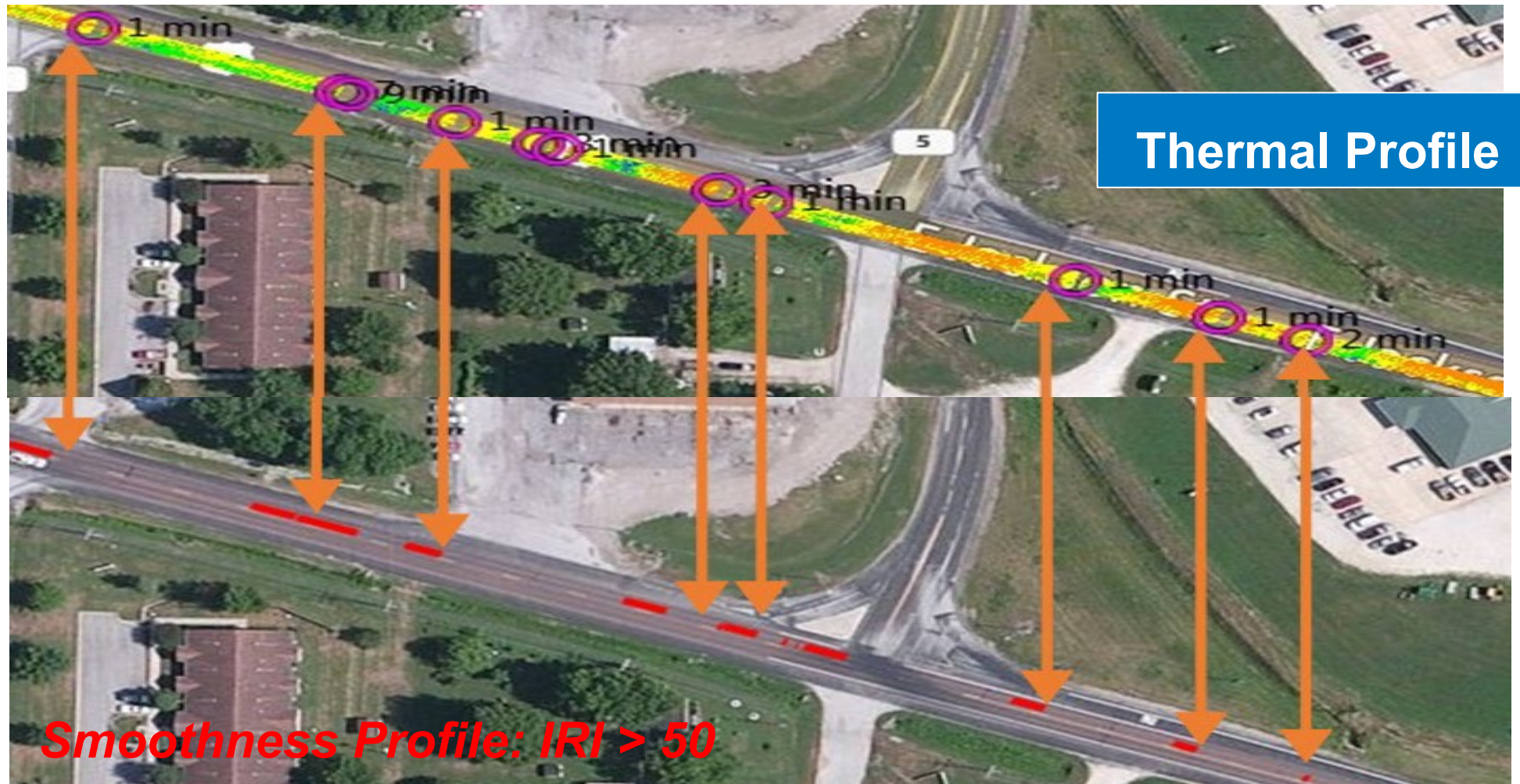
Dashboard Example (Veta)





Relationship - Segregation, Temperature & Smoothness

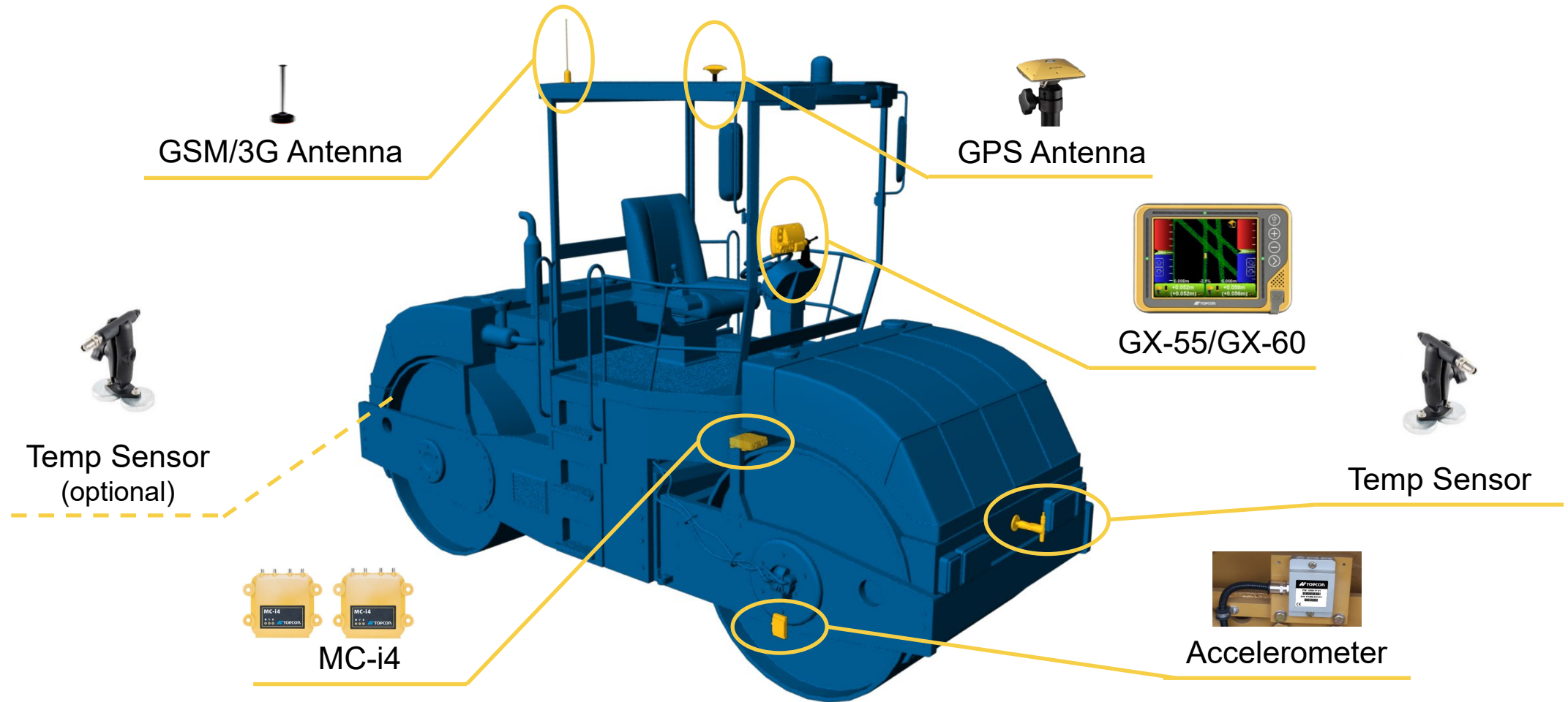
- Open Texture
- Low Temperature
- Low Density
- Rough Ride





Intelligent Compaction

Machine Layout



Why Intelligent Compaction?

Shortcomings in Conventional Compaction



Limited on-the-fly
feedback

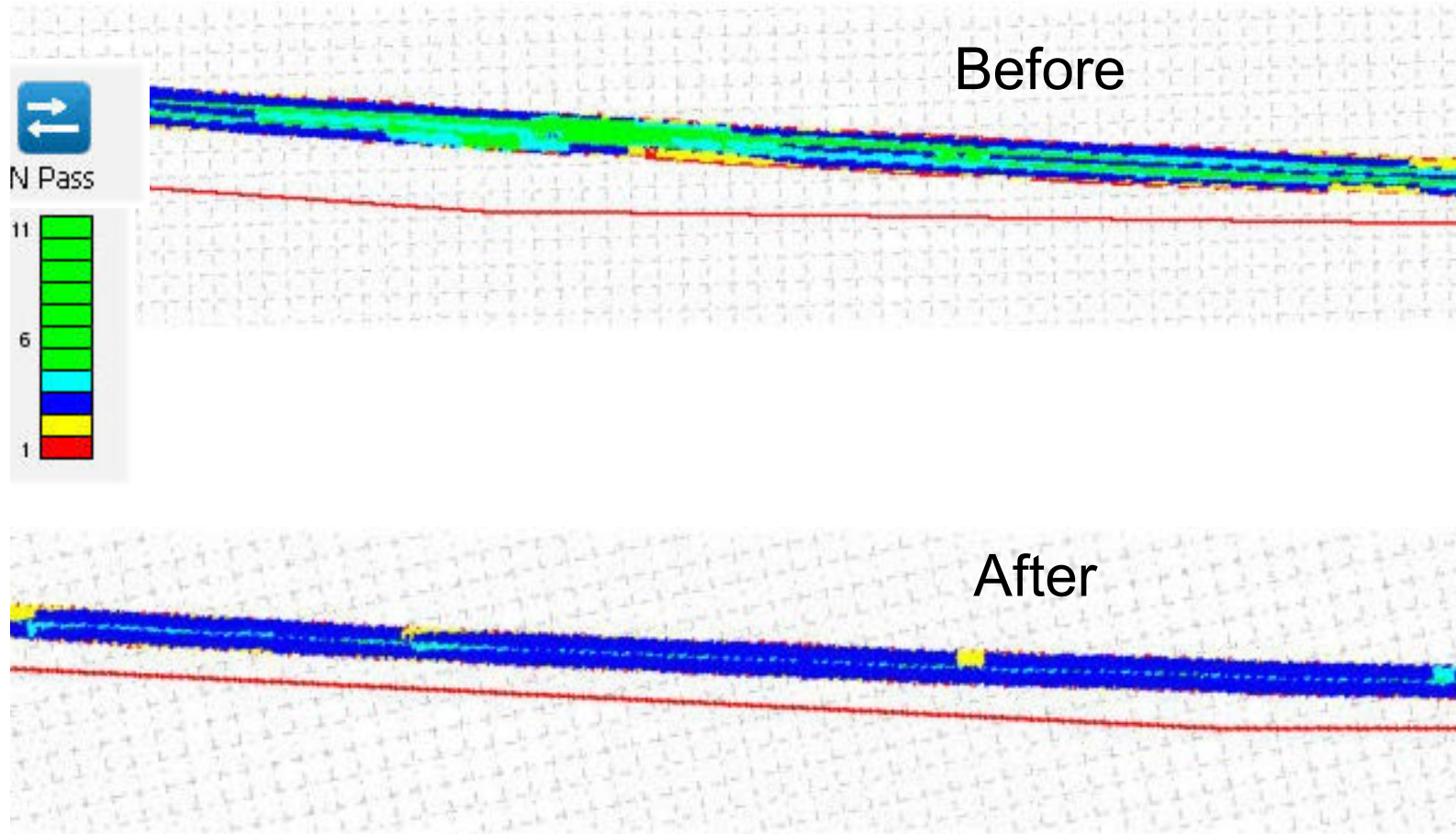


Over-compaction breaks
down material



Under-compaction leaves
air voids

Improved Rolling Pattern



Reporting and Analysis



SmoothRide

Time

Safety

Quality

Cost

