

**Innovative  
Developments**

**Geomatics &  
Level Control Equipment  
for better Asphalt Quality**

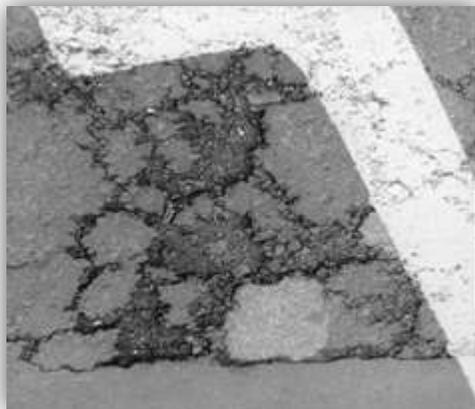
**Dr.-Ing.  
MOBA AG**

## ■ Dr.-Ing. Jaroslaw Jurasz

- Electrical engineer
- Ph.D. in
- 7 years at Wirtgen developing levelling systems
- 4 years at MOBA leading development department

## ■ Moba AG

- Medium-size electronic company in Limburg, Germany
- Specialized in MOBILE Automation, esp. road construction
- 41 years



holes

waves



cracks



grooves



**Considerable money can be saved by optimising the construction process!**

Crucial points during process...

- ...mass flow
- ...temperature
- ...thickness
- ...evenness
- ...segregation
- ...compaction

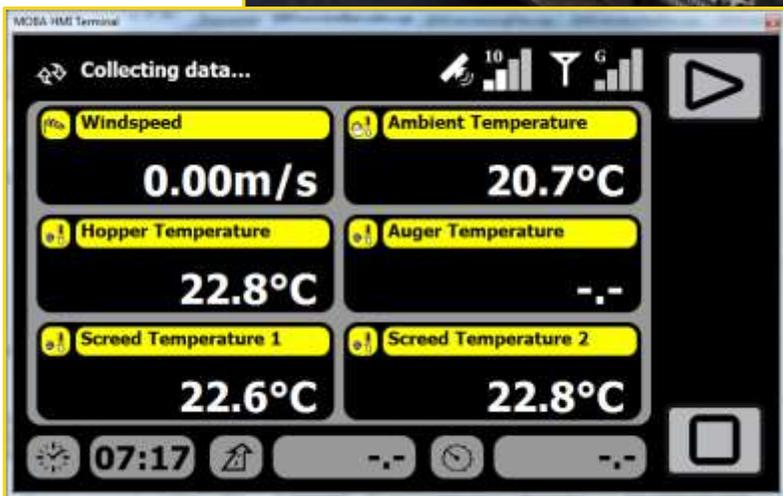


Improving these points will result in...

- ...massive cost savings
- ...reducing traffic jams
- ...long lasting roads
- ...less repairs
- ...better infrastructure

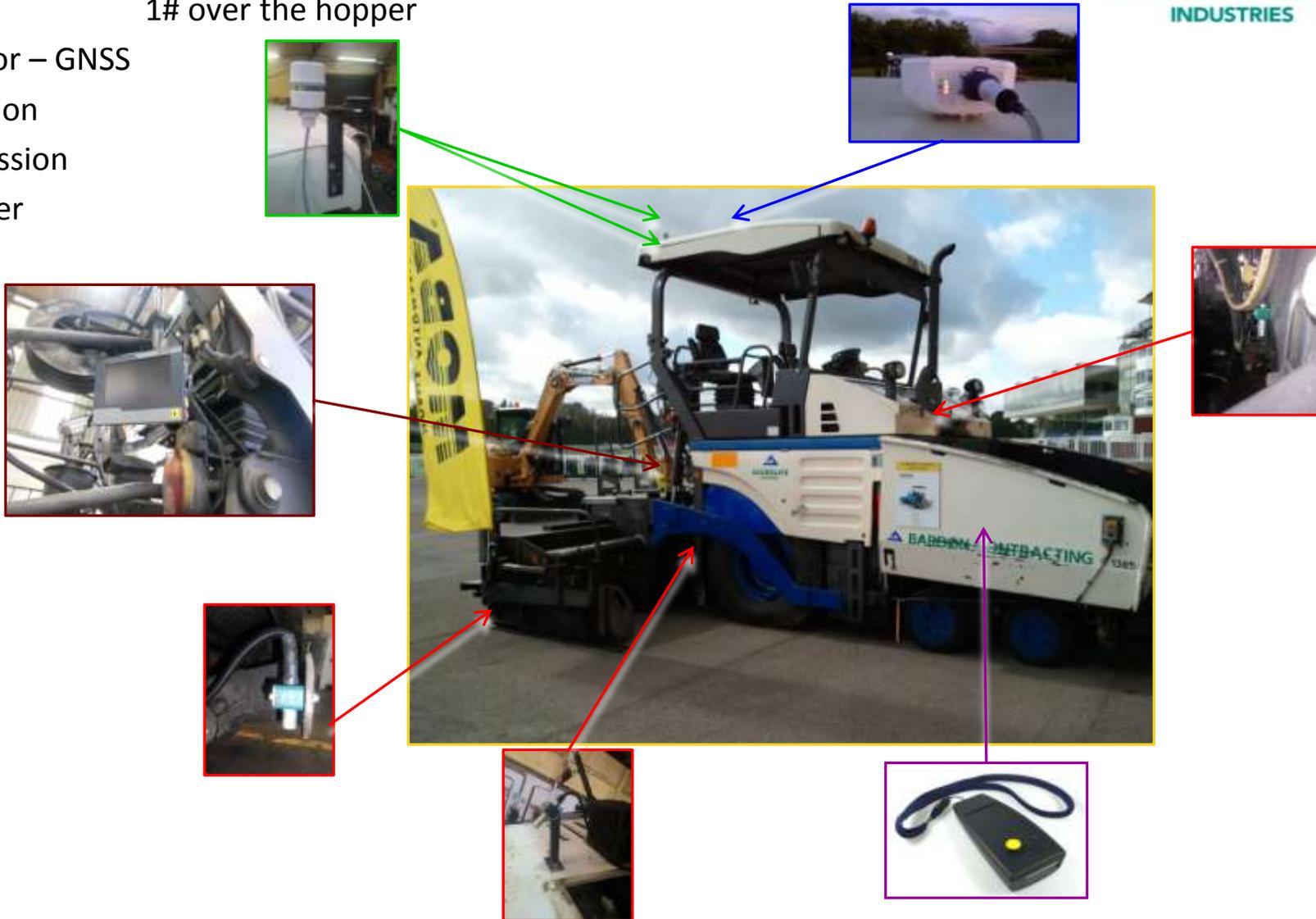


- A unique system created in the UK in partnership with Aggregate Industries



■ System Components

- IR Temperature Sensors – 2# on the rear screed, 1# over the auger, 1# over the hopper
- Position sensor – GNSS
- Weather Station
- GPRS transmission
- Barcode reader
- Computer





GNSS  
Smart  
Antenna



Weather  
Station



GPRS  
Antenna



Hopper  
IR  
Sensor



Computer  
& Display



Auger  
IR  
Sensor



Barcode  
Reader



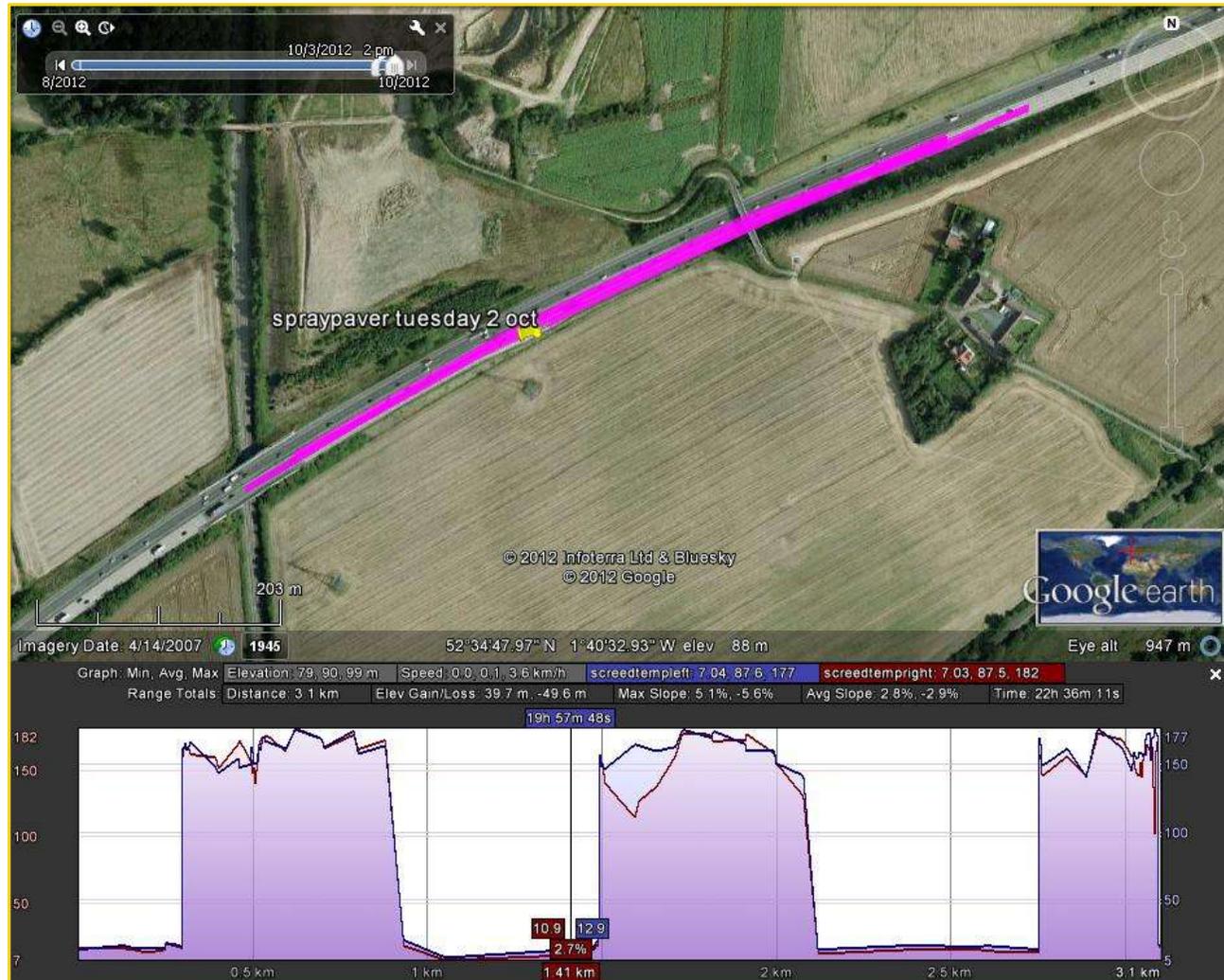
LH  
Screed  
IR  
Sensor



RH  
Screed  
IR  
Sensor



- The new system catches all the information required to automate the laying record and set up a comprehensive database for process improvement and customer communication
- Visualisation of output from the system
  - e.g. a screen shot from visualisation of data from Bar-Tec #4 on a Vögele 1803-2 tracked spray paver on the M42 on 2<sup>nd</sup> October 2012 using a Google Earth input tool





- Easy to mount and set-up, unobtrusive measurement
- Tight coverage, cold spots can be identified easily
- Automatic adaptation to paving width, can also be used to measure paved surface
- Obstacles and shadows, e.g. through working crew can be suppressed automatically

h.= 300.0 cm (l.= 300.0 cm)  
Mount height

300

Mount position 0.000 m  
0

Scanner 0.0 °  
0

Width [cm] 600

Slow : 100.0 ms  
 Normal: 20.0 ms,  
 Fast : 10.0 ms/

use max speed

speed [m/min] 10

lines:  
Scan 10

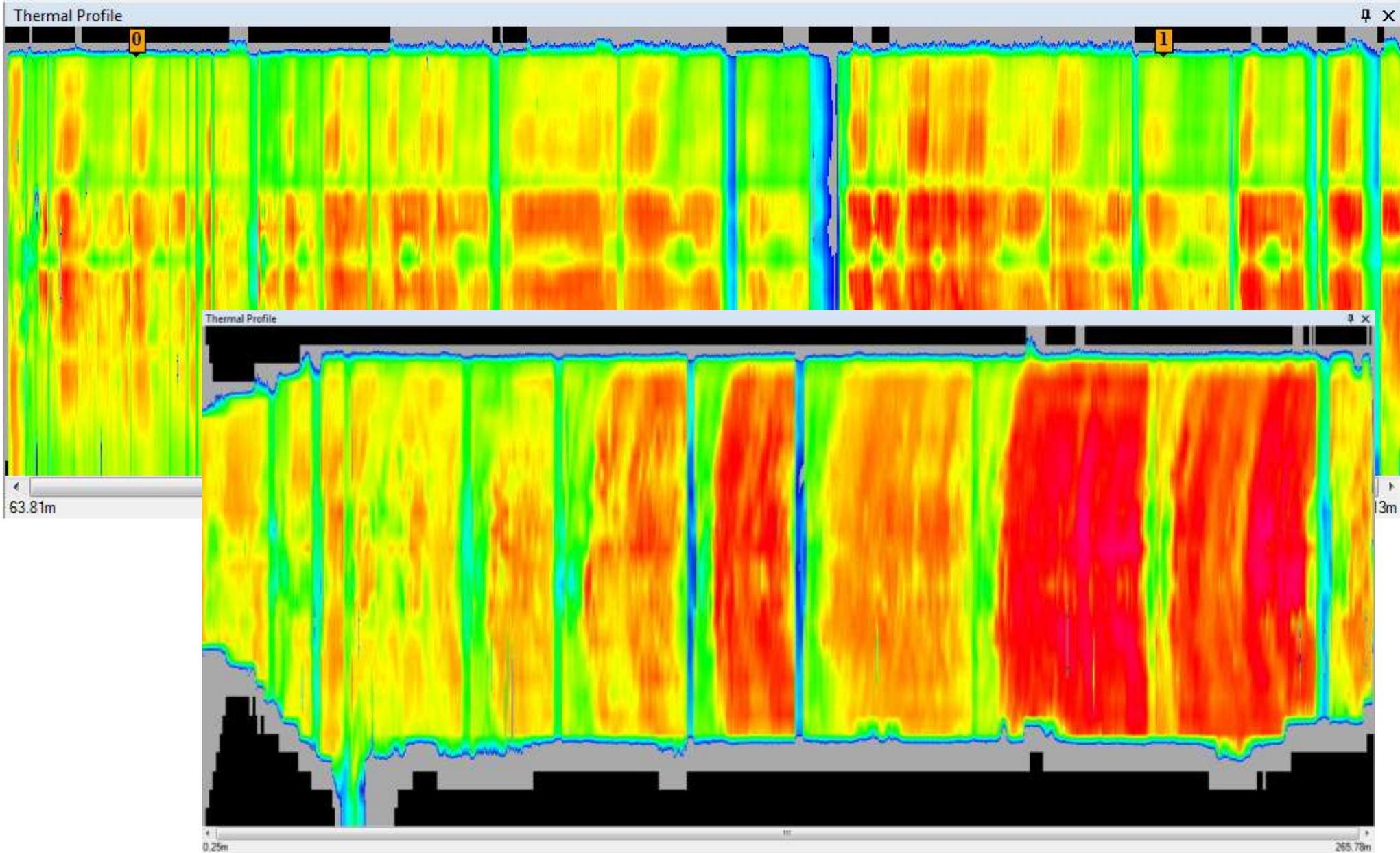
New Next point

Direction: 0.0 °  
Angle to ground 47.3 °  
Beam length 442.3 cm

show grid (25.0 cm)  
test beam 47.3 °

max paver speed:  
12.5 m/min  
paver speed:  
10.0 m/min  
measurement spots:  
27  
line time:  
1195.8 ms  
line distance:  
199.3 mm

Rear Top Diagonal Right



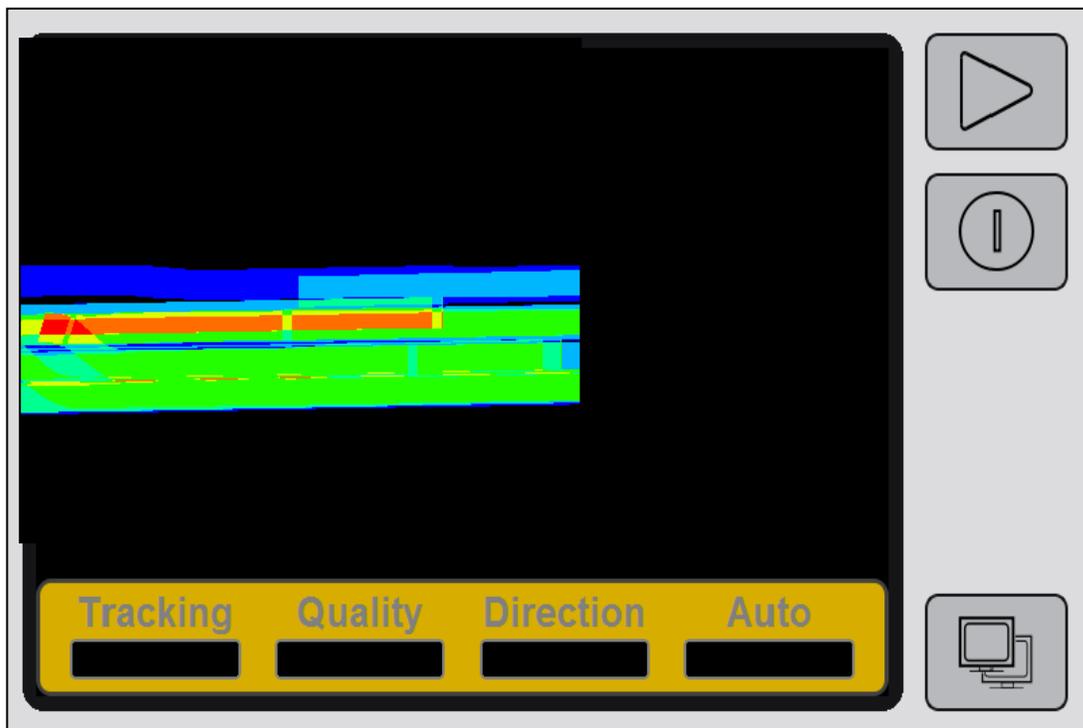
*„With the **Big Sonic-Ski** all advantages of the reliable Sonic-Ski are literally stretched to length.“*

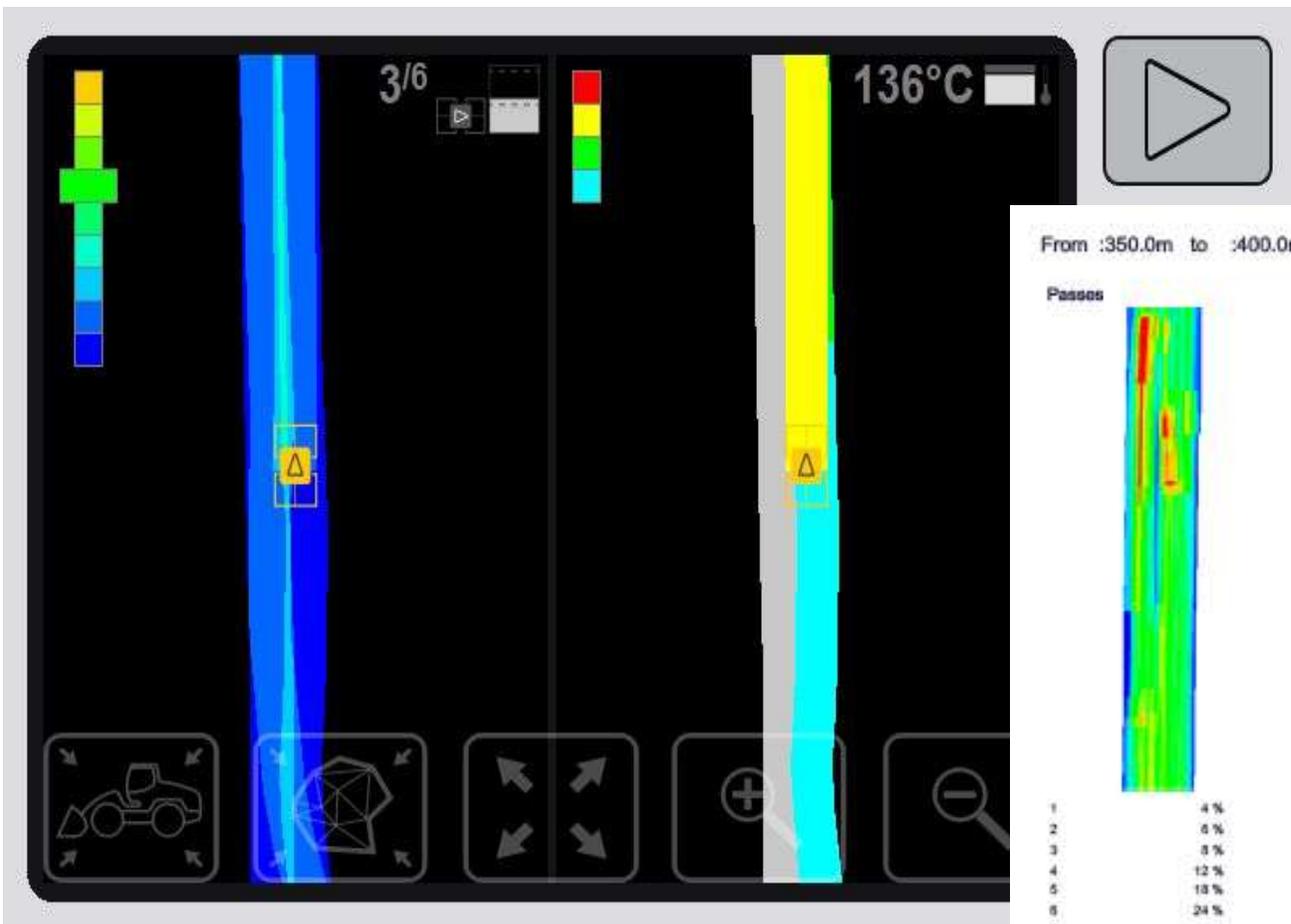




- Based on field-proven Big Sonic Ski principle
- Stable measurement within few mm, independent of temperature
- Enormous material savings without sacrificing the road quality
- Automatic quality assurance obsoletes manual measurement, can be submitted digitally
- In the future: automatic thickness levelling, with priority on evenness, but keeping the layer thickness constant

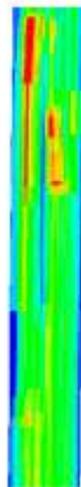
- Overcompaction in the middle, undercompaction on the shoulders – known since the sixties
- Count passes
- Measure temperature
- In a cost-optimized way





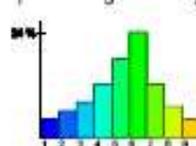
From :350.0m to :400.0m

Passes



1	4%
2	6%
3	8%
4	12%
5	18%
6	24%
7	12%
8	7%
9	4%

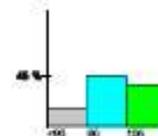
Min Avg Max  
1 5 9



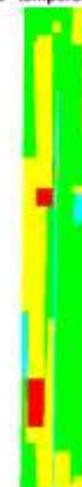
Surface temperature(last)



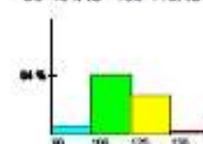
<90	16%	
90	45%	
105	37%	
Min	Avg	Max
<90°C	90-104°C	105-119°C



Surface temperature(first)



90	7%	
105	54%	
120	30%	
135	3%	
Min	Avg	Max
90-104°C	105-119°C	135-149°C



## Benefits of using intelligent and supporting quality management systems

- Increasing the quality of the road
- Decreasing maintenance costs, repairs or possible re-builds
- Potential worldwide cost savings of approx. £3,600 million when the quality (longevity) of road is improved by 10% (an additional year based on a previous expectation of 10 years) (UK = ~320,000 km trunk roads = £36 million)
- Quality assurance by temperature profile and location tracking
- Improved and documented jobsite process chain
- Bonus to administrations/agencies for using assurance tools to prove the quality of the road
- Multiple ways to improve workflow and decrease on-site working time

*Assumptions based on 2008 data:*

Place, Country, State	Road network length in km
Europe	5.270.000
United States	6.430.000
India	3.383.000
China	1.931.000
France	951.000
Germany	630.000
World	>32.000.000

- Adoption of automated quality management system like Bar-Tec greatly assists in bringing about the 1 year (or more) average increase in life expectancy for the road system
- The overall investment for each paver is a mere **~1/50,000** of the cost of just the asphalt saved by extending the life of the road from 10 to 11 years
- And this excludes the costs saved via reduced fuel use, other materials & labour, removal of traffic holdups, delay reduction, etc., etc.