



# PaveScan RDM™

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Image Your World®



# Why Asphalt Compaction?

**In 1989, Washington DOT:  
Density determines asphalt life span**

**(<93%) each 1% decrease in compaction = 10% loss in **pavement life****

**Traffic Safety  
Maintenance Cost  
Repair Cost  
Lane Closure**

****Pay Factor****



# Current Methods of Measuring Compaction

**Coring**  
**Nuclear Gauge**  
**Non-Nuclear Gauges**



# Limitations of Current Methods

**Coring**

**Nuclear Gauges**

**Spot Checks**

**Invasive**

**Regulatory Issues**

**Not full coverage**

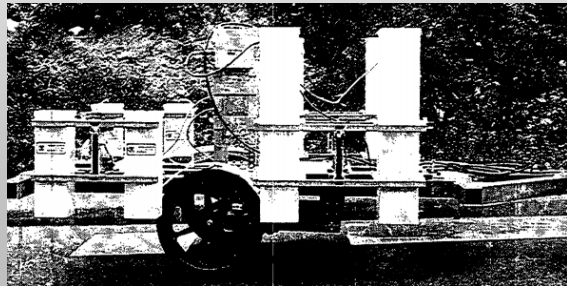
Can Ground Penetrating Radar (GPR) help?



# GPR Pavement Evaluation– History



**1992: SHRP1  
Initiative with  
TTI and GSSI**



**30 yrs: Pavement  
and Highway R&D**

**TTI, MnDOT, Infrasense  
and others with GSSI**



**2009: SHRP2 RO6C  
Initiative with**

**TTI/MnDOT and GSSI**





# GSSI



[www.geophysical.com](http://www.geophysical.com)





# GSSI 50 Years

1970

Geophysical Survey  
Systems, Inc. (GSSI)



1973

World's first  
commercial GPR

1990

GSSI joins the OYO  
family

OYO



# GSSI Around the World

Concrete Inspection



Utility Locating



Archaeology



Transportation



Geology



Search & Rescue

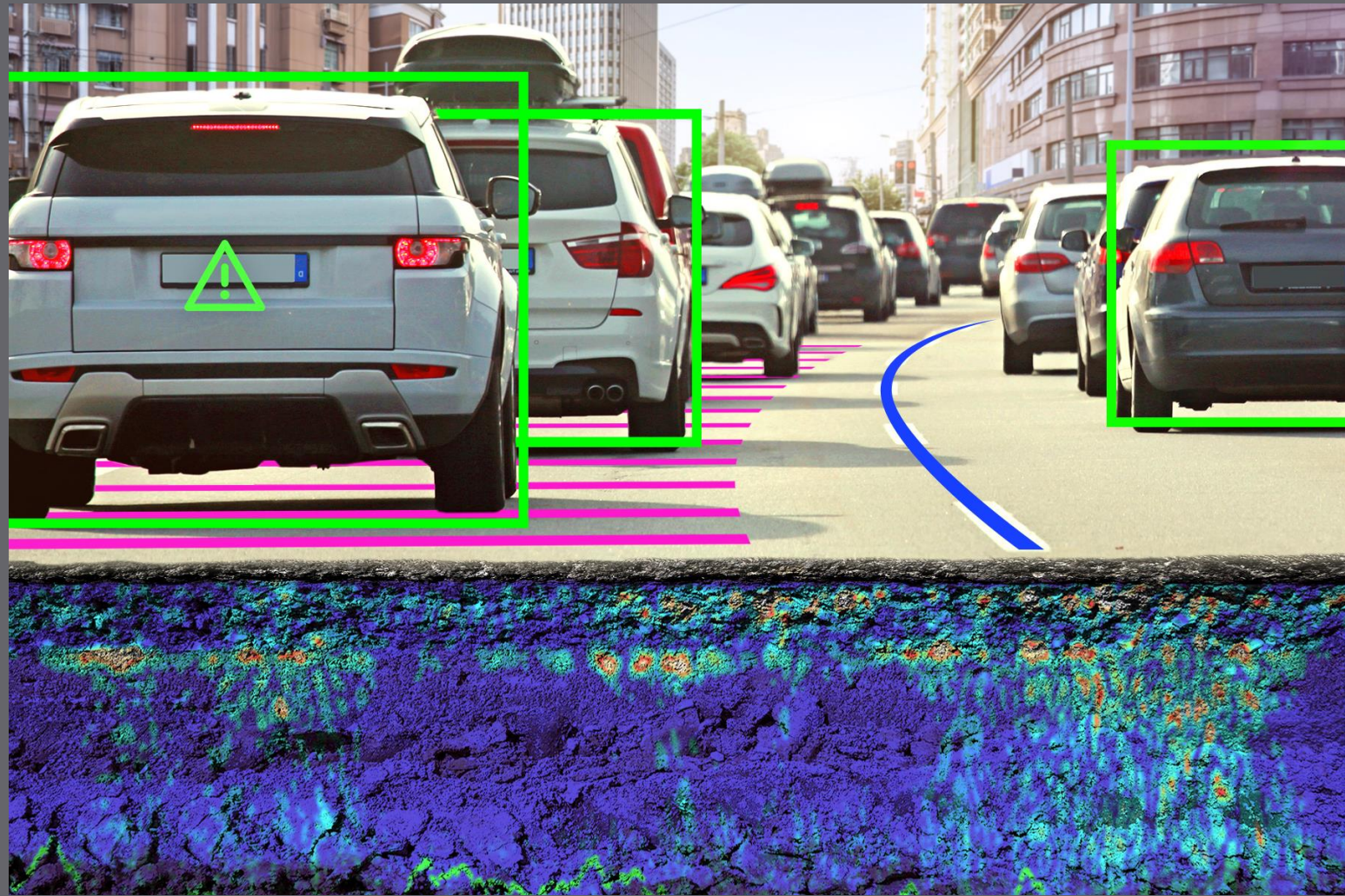




# Transportation

## Localizing GPR

autonomous vehicle navigation





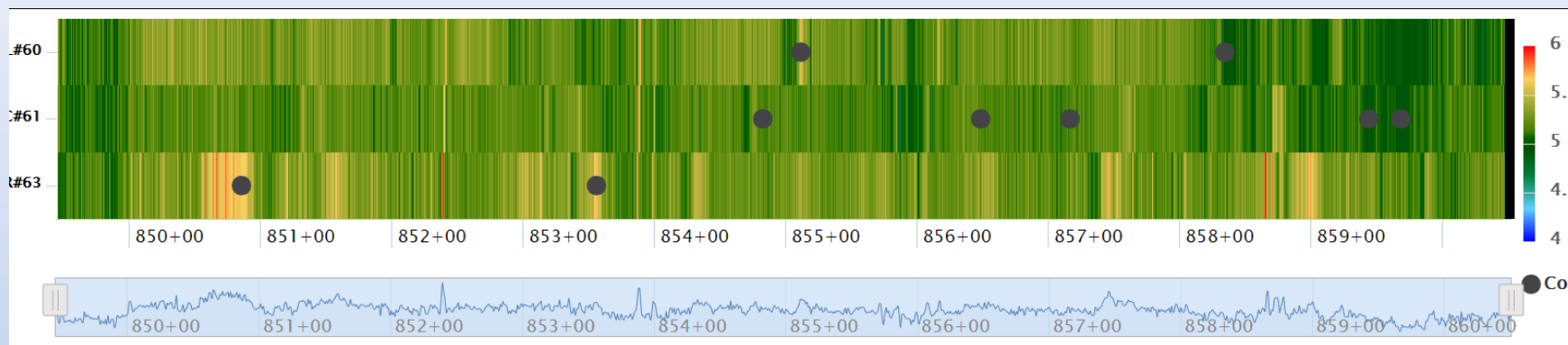
# Transportation

## Road and Bridge



Road NDT: pavement, base and sub-base evaluation

# PaveScan RDM – Innovation



- ✓ Highly accurate:  $\pm 1\%$  Compaction
- ✓ Accuracy for thin lifts (25mm)
- ✓ Fast Real-time collection
- ✓ Full Coverage: entire lane
- ✓ Automatically identifies core locations





# PaveScan RDM



Single Pass – Wheel Paths and in between

Two Pass – Down and back

**walking speed (1-2m/second)**



# PaveScan RDM

Toughpad  
Computer



Antenna



1-Channel Configuration

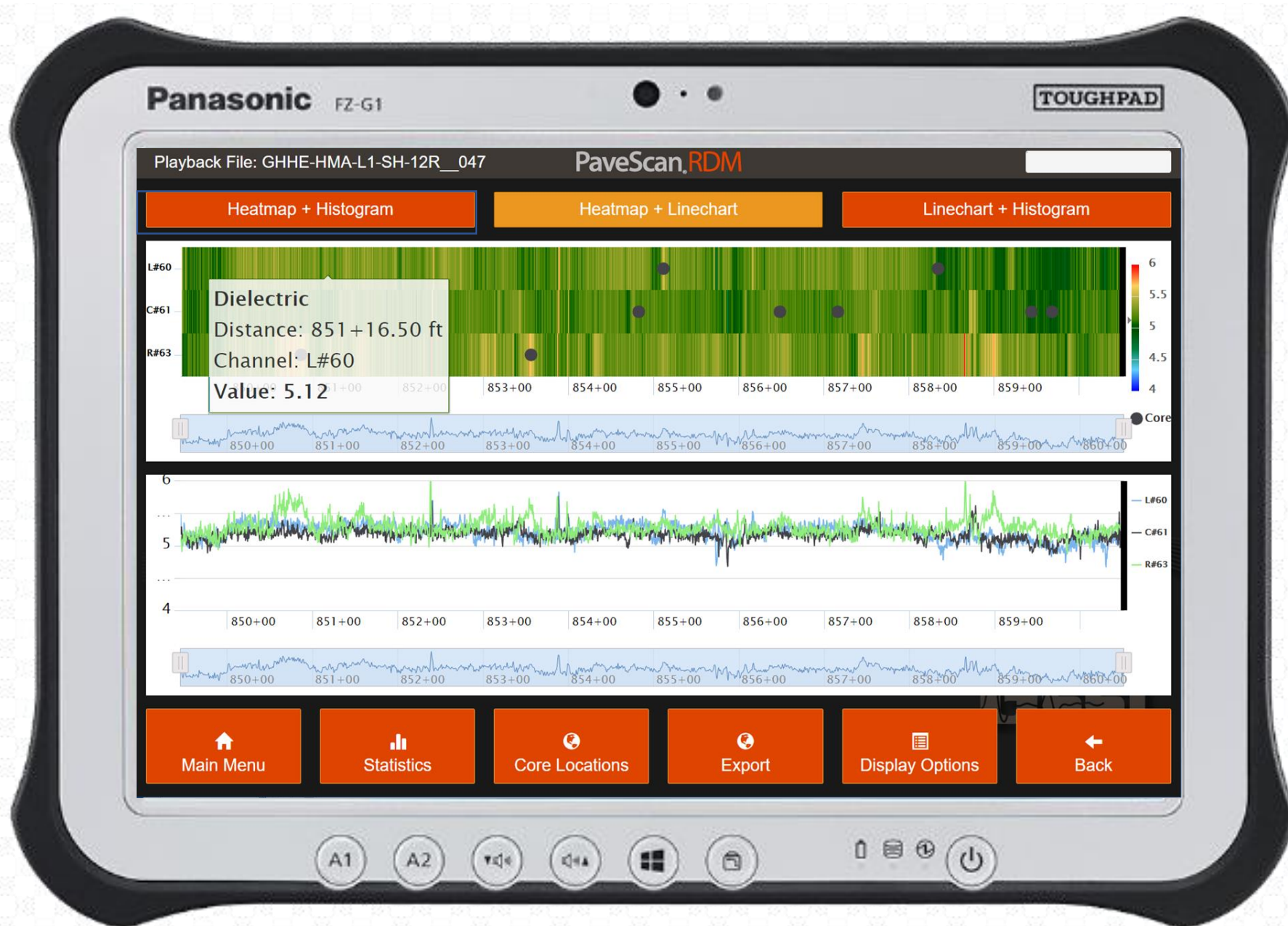


3-Channel Configuration





# PaveScan RDM –

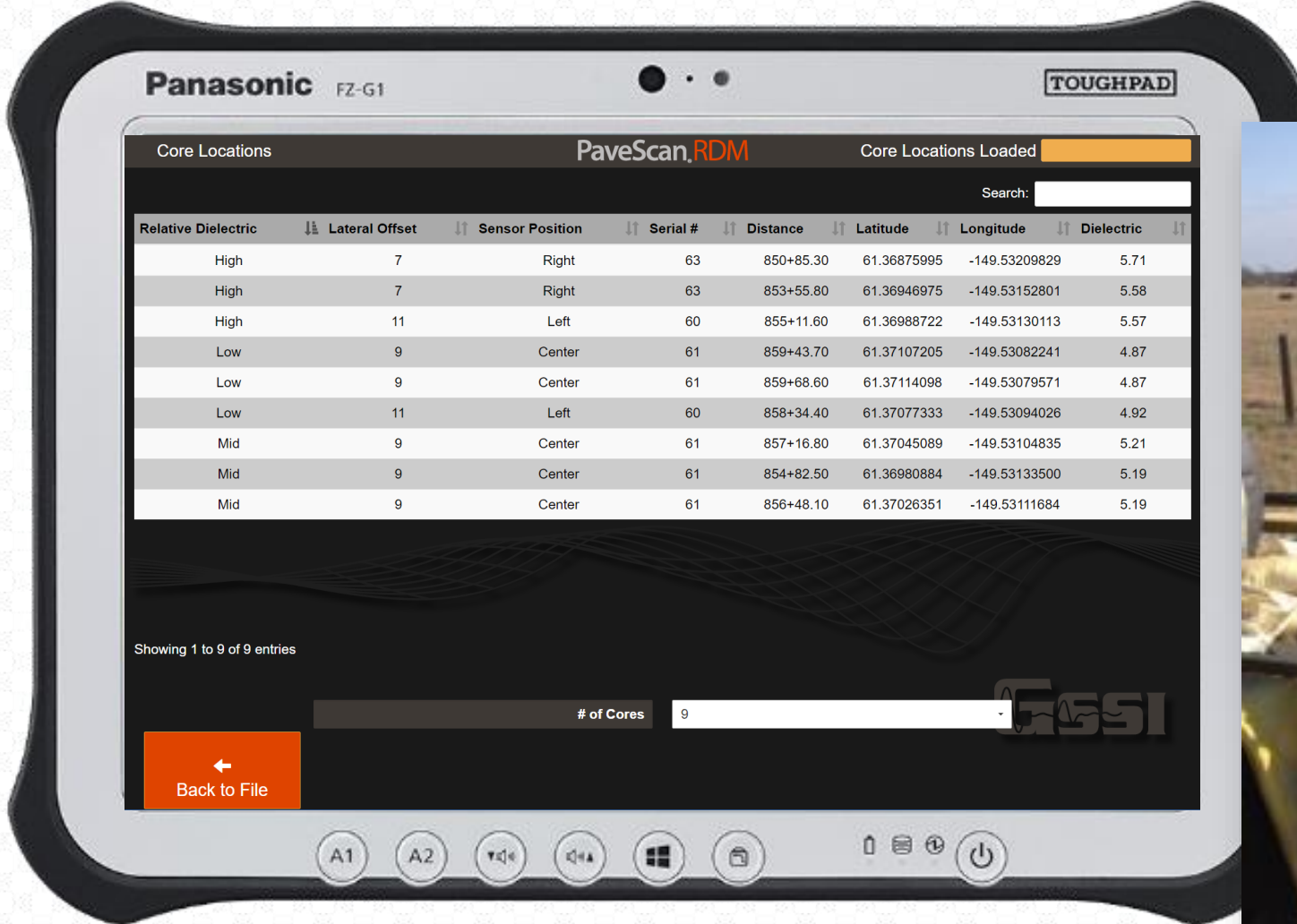




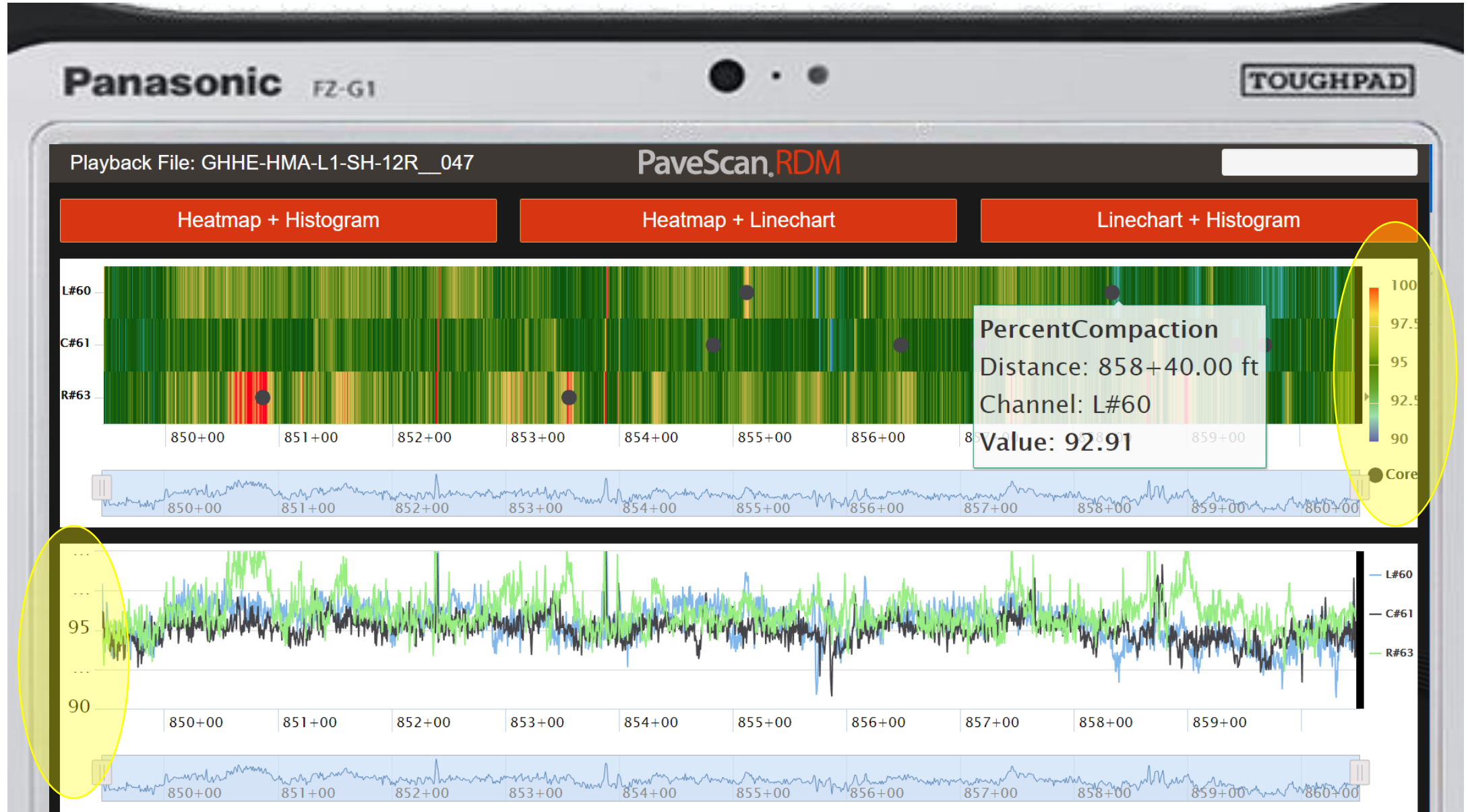
# PaveScan RDM – Playback



# PaveScan RDM – Locate Cores

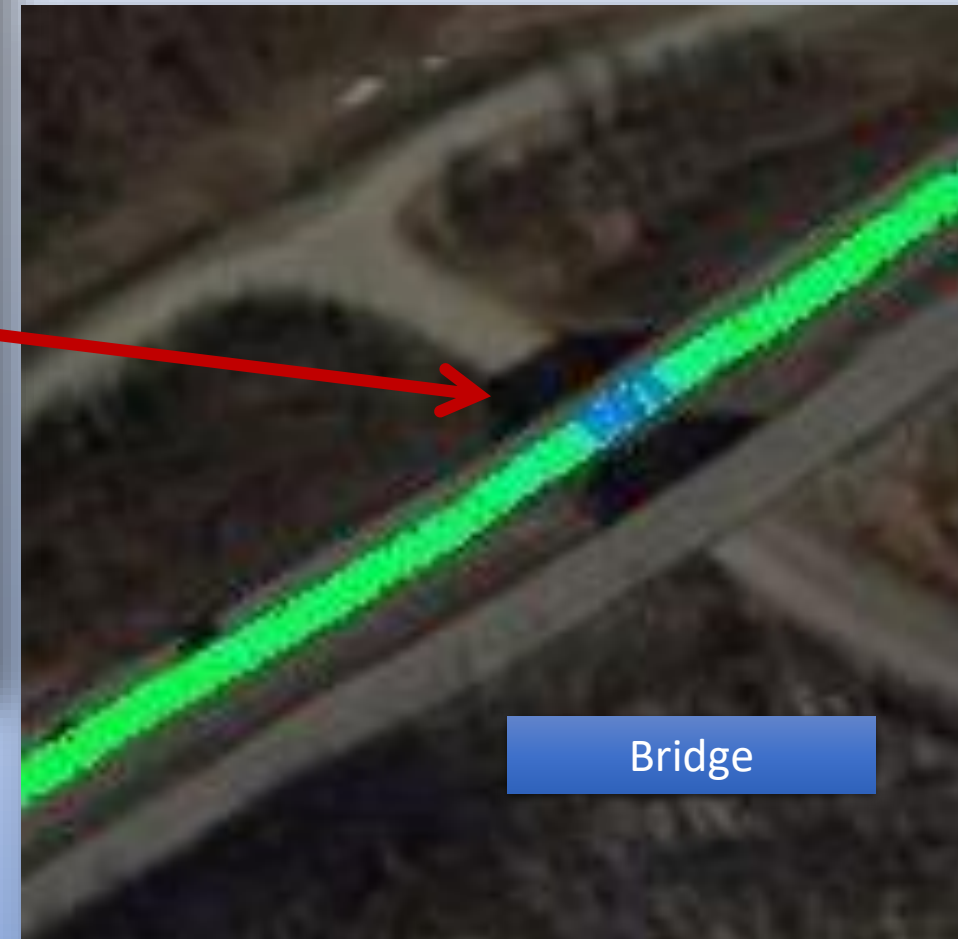


# PaveScan RDM – Percent Compaction





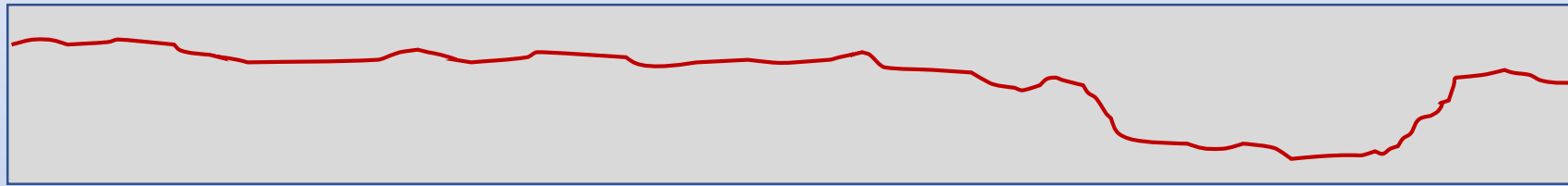
# PaveScan RDM – Google Earth



Data provided by Rich Giessel, Alaska DOT

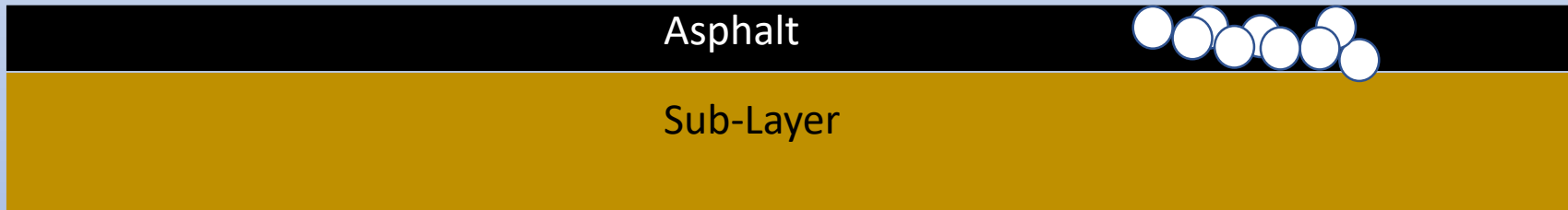


# PaveScan RDM – How it works



Asphalt : 4-7

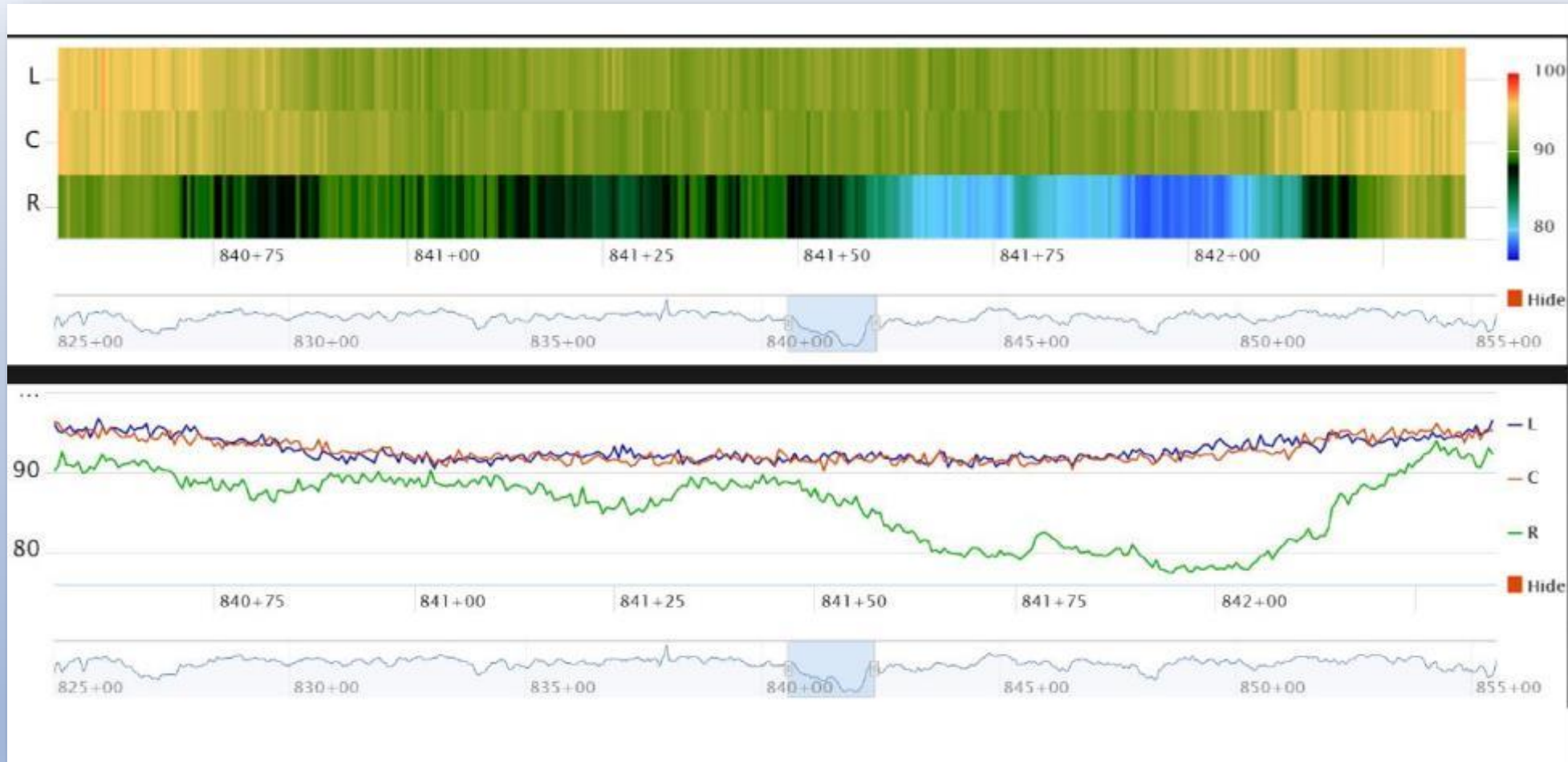
Air : 1



○ Air Voids



# PaveScan RDM – How it works



Collecting Data





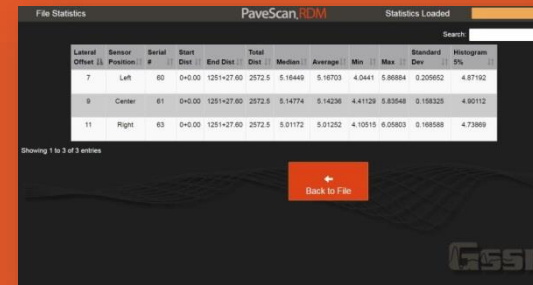
# PaveScan RDM – Reporting



**Core Locations,  
Manual and System  
Generated**



**PlayBack Data**



**Output Statistics**



**Export .csv files and  
.kml files**



# PaveScan RDM – AASHTO

**Standard Practice for**

**Ground Penetrating Radar for  
Asphalt Dielectric Variability  
Assessment**

AASHTO Designation: XX ##-## (2017)

Release: Group #

**AASHTO**

American Association of State Highway and Transportation Officials  
444 North Capitol Street N.W., Suite 249  
Washington, D.C. 20001

Standard Specified– October 2018

AASHTO # PP98

Publication – April 13, 2019



# PaveScan RDM – What's New/Upcoming

- Vehicle Mounted Systems
- Experimental option to measure dielectrics of pucks
- VETA data integration
- Cloud upload
- Enhanced GPS Accuracy





# PaveScan RDM – What's New/Upcoming

- **Skip Calibration** for short downtimes.
- **Verification** for precise and accurate measurements
  - Test blocks with known dielectrics
  - Routine to check antenna performance with supplied test blocks



# PaveScan RDM

## Advantages Over Nuclear Gauges



# Conclusion

- **Provides on-site evaluation of asphalt compaction**
- **Continuous Full Coverage (CFC), no more random locations**
- **Provides coring locations**
- **Core information gives % void content**
- **Non-nuclear**





# Thank You

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