CS8800 WALKING PROFILER

SSI
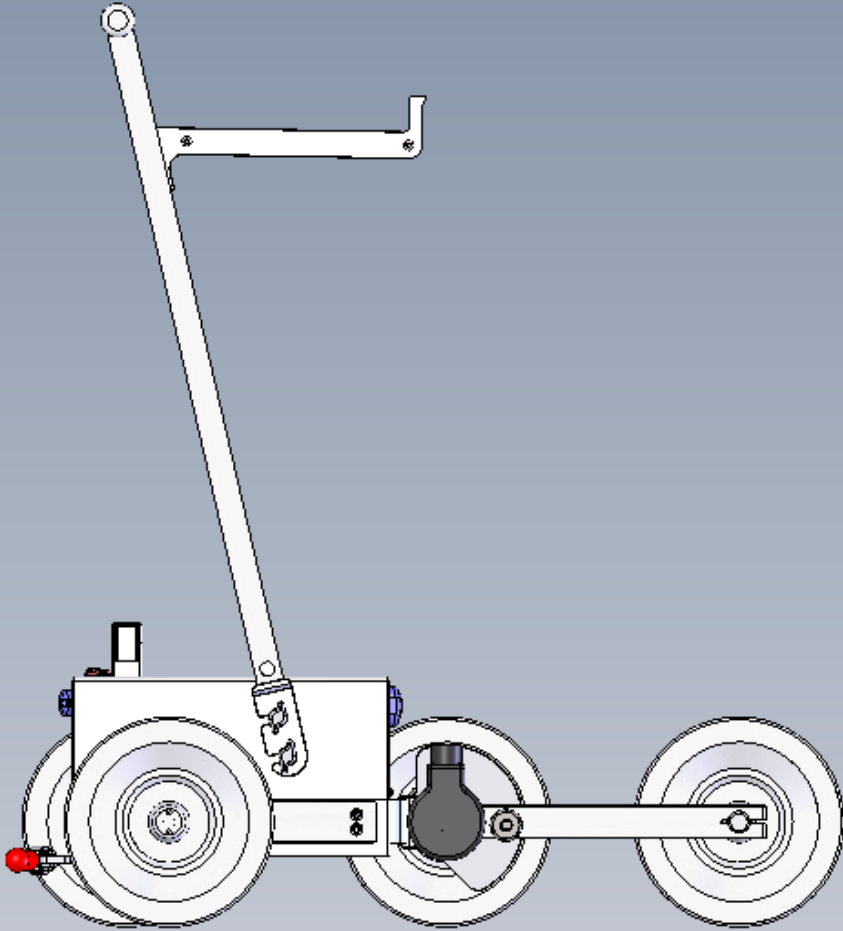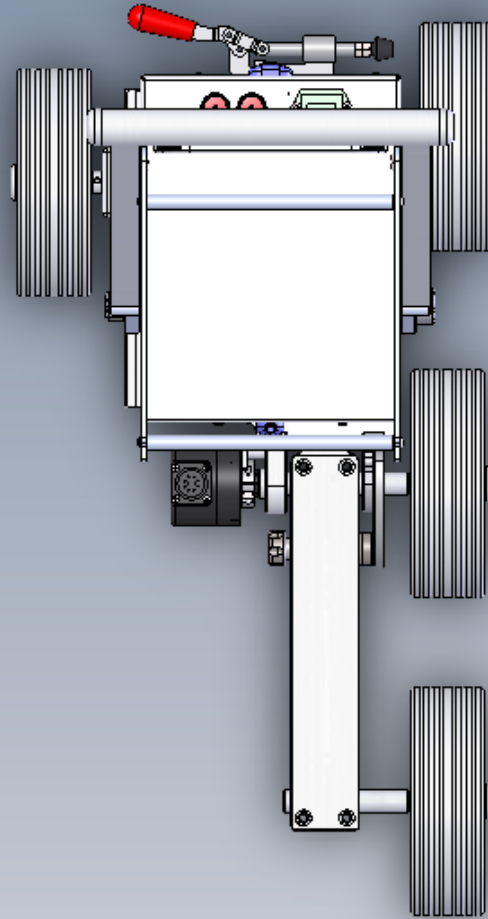
SURFACE SYSTEMS & INSTRUMENTS

Overview

- CS8800 Design and Measurement Method

- Operational Procedures

- Recent and Pending Enhancements

- Base Price & Options

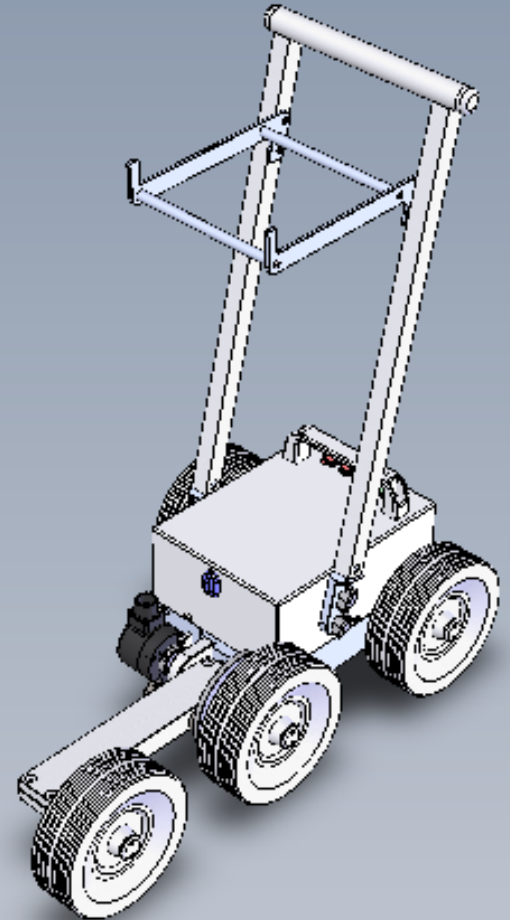- Comments on October 20009 FHWA Collections

CS8800 DESIGN

▲Side ▲

▲Top▲

▲Isometric▲

CS8800 Design Specification

Attribute	SSI CS8800
Warm Up Time	10 minutes
Working Surfaces	Firm and relatively free of stones and debris. Can be wet and dusty. Mud skim/soupy OK if firm below
Operating Speed	~2.5 kph / 1.5 mph; slower on rough or textured surfaces
Sampling Interval	25.4 mm (1.0 inches)
Output Parameters	IRI, MRI, HRI, PRI, RQI, CA Bridge, Variable localized roughness template. PDF, Excel, ERD/PPF and raw strip trace formats.
Localized Roughness	Adjustable template for calculating dimensions of defect areas
Operator Computer	Panasonic Toughbook 19 with Touchscreen. Windows XP/Vista/7
Application Software	Microsoft Windows user interface software.

CS8800 Design Specification

Attribute	CS8800
Height Precision*	±0.0025mm (±0001 inch) per 254 mm (12 inch) wheel-base
Profile Accuracy*	±0.381 mm (±0.015 inch) per 45.7 meters (50 yards)
IRI Accuracy*	±0 .05 m/km (± 3.0 inches/mile)
Correlation with Rod/Level IRI*	±.01 m/km (1 in/mi); 0.985 repeatability on 10 runs (dense AC).
Wavelength Limits	~0.45 meters (1.5 feet) to undetermined upper limit (beyond any relevant or useful wavelength).
Maximum Grade	1 in 4.7 or 12 degrees
Minimum Curvature	No worse than 15 meters (16 yard) radius
*Subject to variation depending on degree of texture and roughness of measured surface	

CS8800 Operation

Calibration

▲Hardware Detection/Diagnostics▲
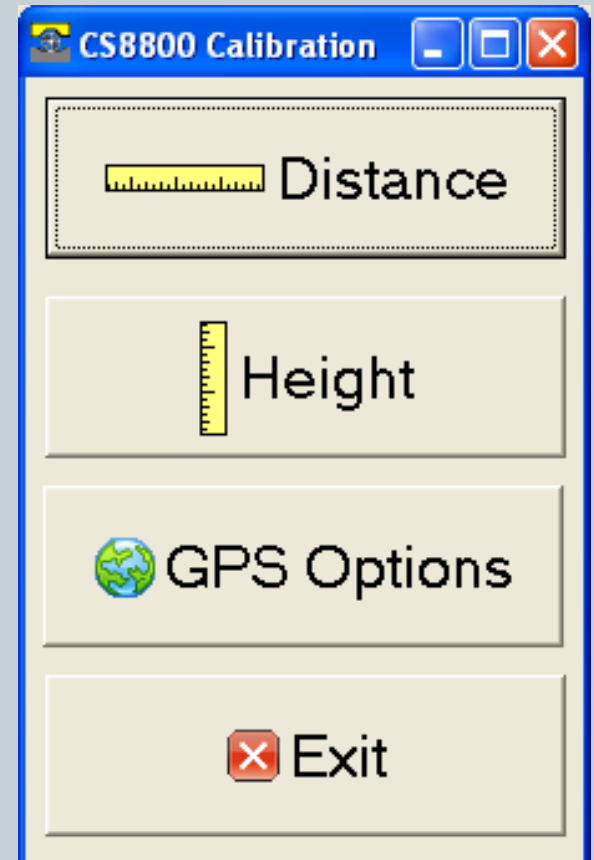
▲Calibration Options▲

Calibration

CS8800 Distance Calibration

Current Distance Calibration | Calibration Action

Initiate

Start

End Point

Save

Cancel

Set Distance and Units
Move Profiler to starting Location
Then press Start.
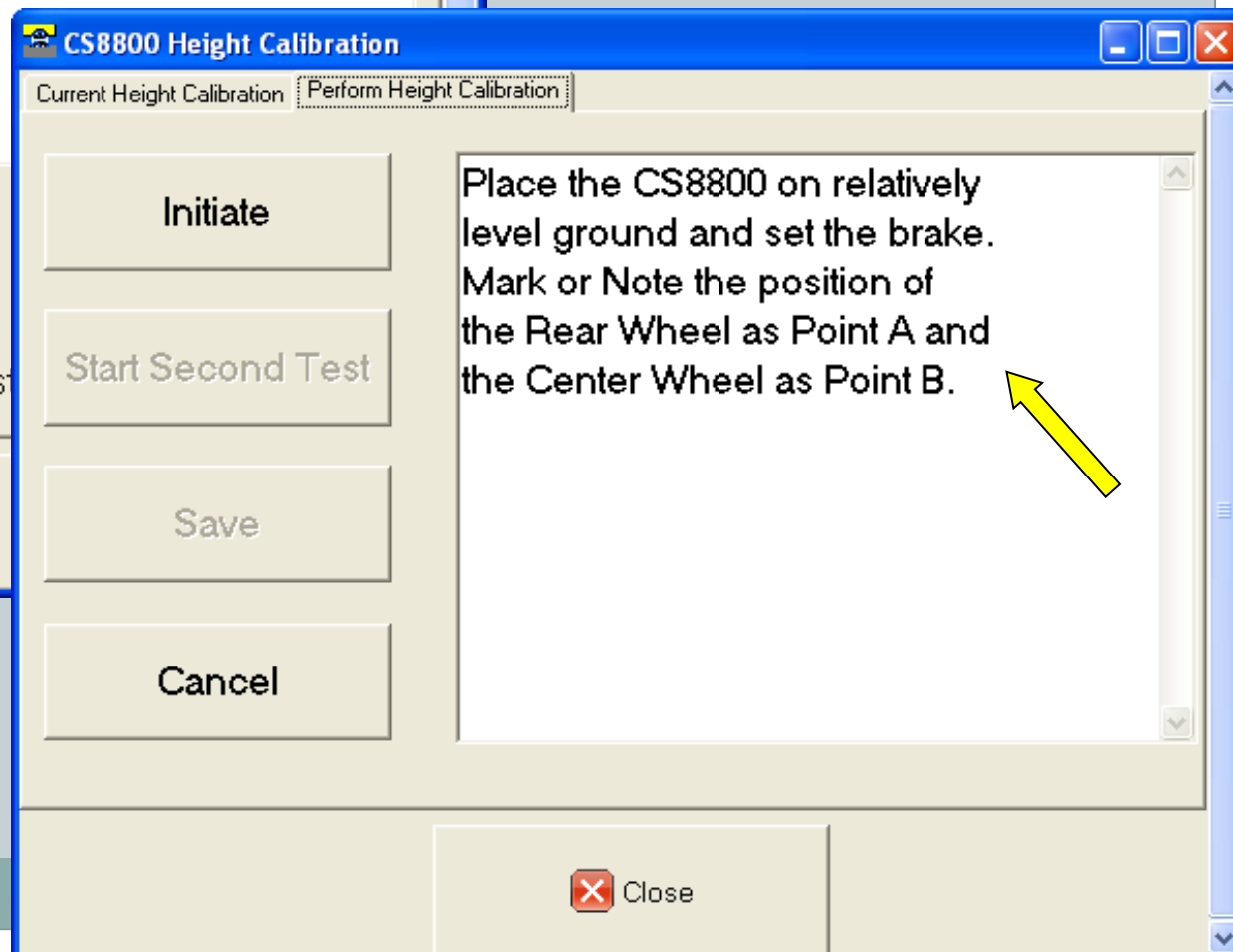
Calib. Dist Feet

Calib. Dist Units

Count Read Out [   ]   Dist. Est

[X] Close

▲On-Screen instructions▲

CS8800 Height Calibration

Current Height Calibration | Perform Height Calibration

Initiate

Start Second Test

Save

Cancel

Place the CS8800 on relatively
level ground and set the brake.
Mark or Note the position of
the Rear Wheel as Point A and
the Center Wheel as Point B.

[X] Close
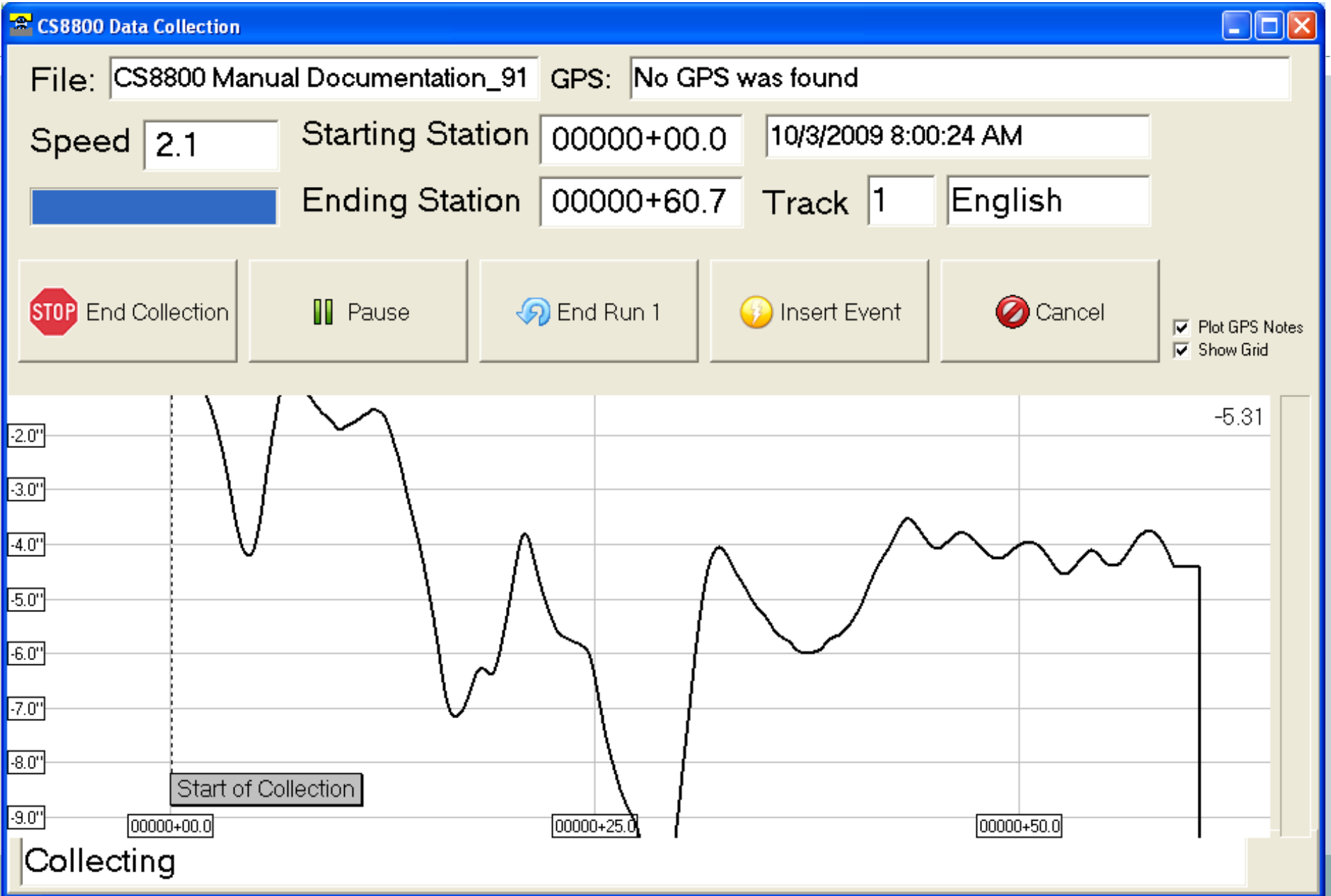
Data Collection

Data Analysis
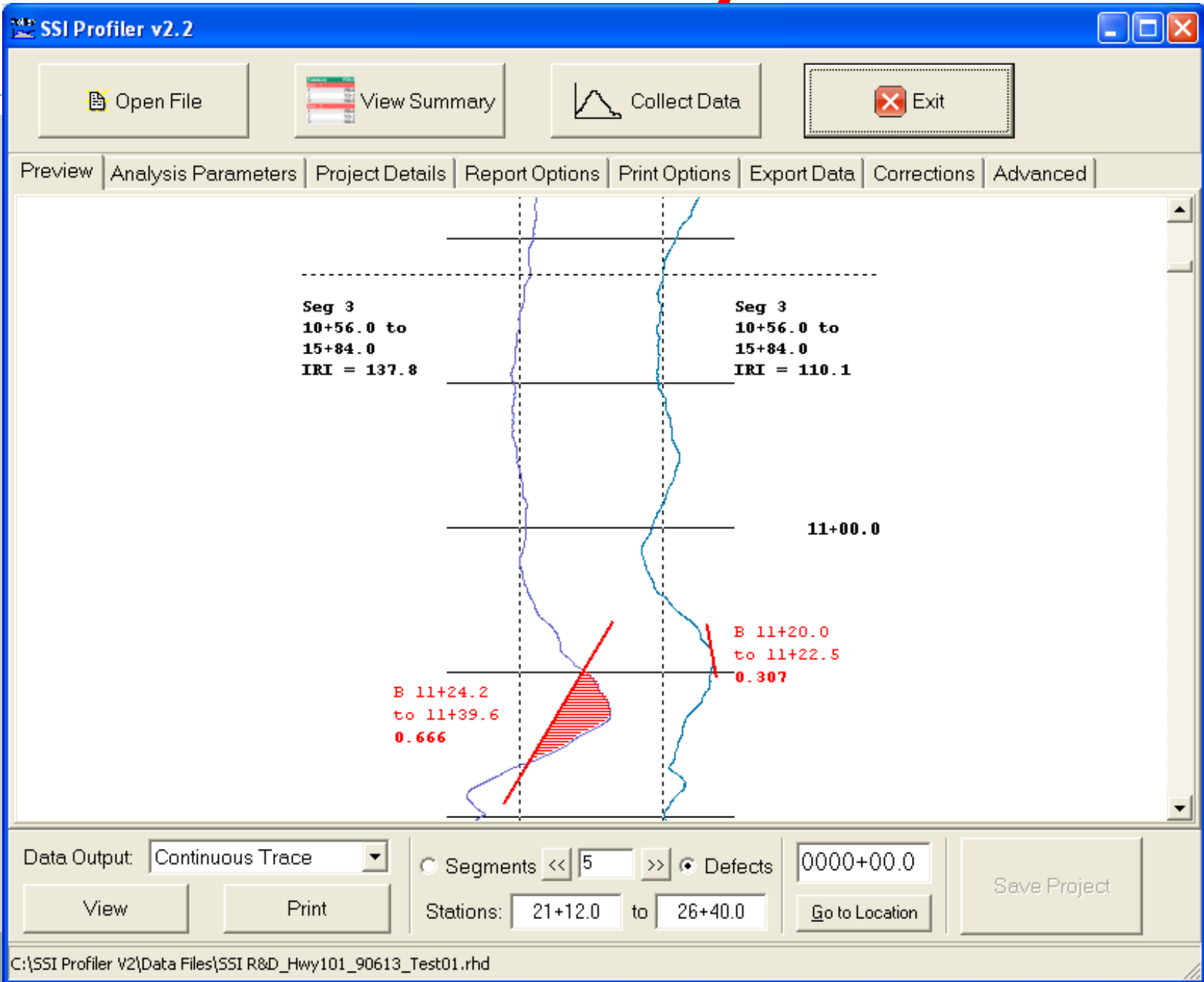
Data Analysis

CS8800 Performance
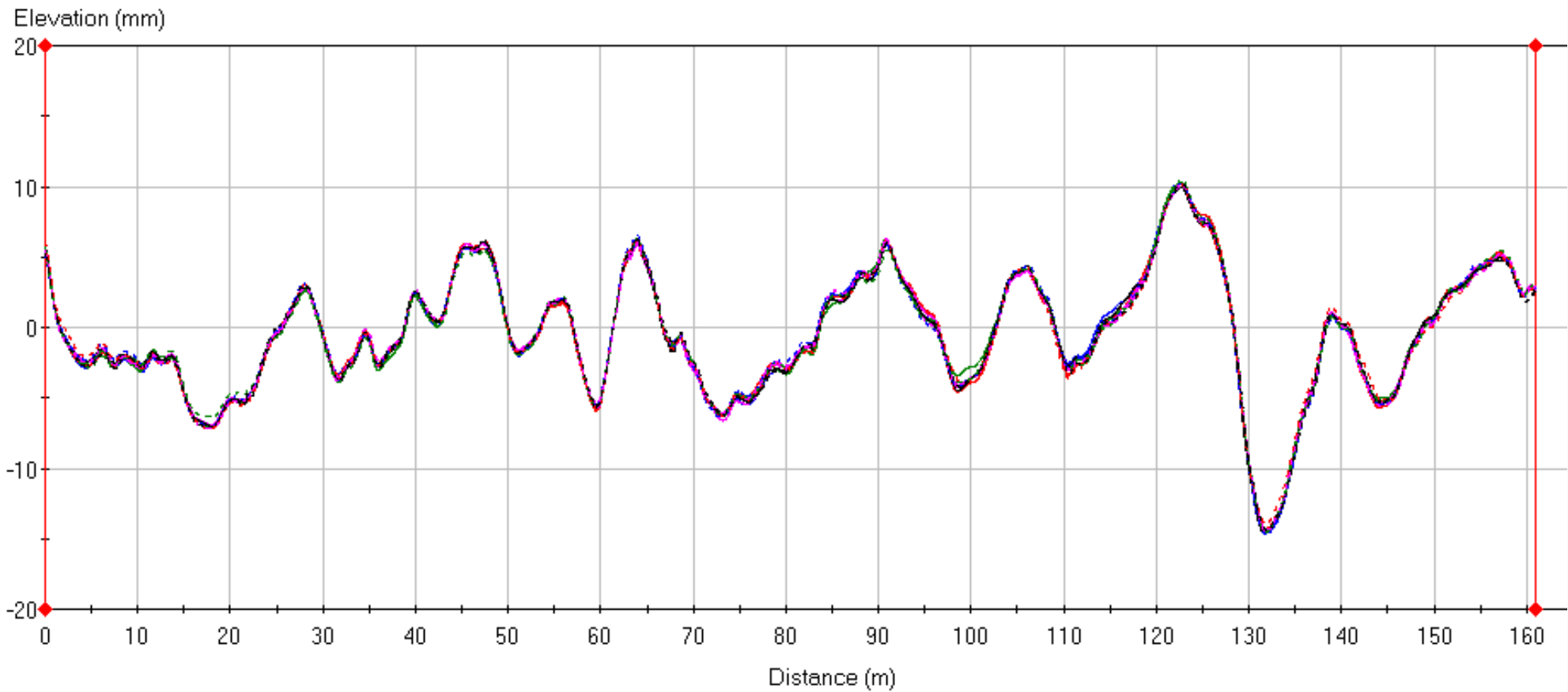
▲August 2008: Passed .985 IRI Profile Repeatability Threshold

for FHWA Reference Profiling Device Qualification▲

FHWA Data Collections (10/2009)

Asphalt (Dense Grade)

Chip Seal

Asphalt (Pervious/Open Graded)

Transverse Tined
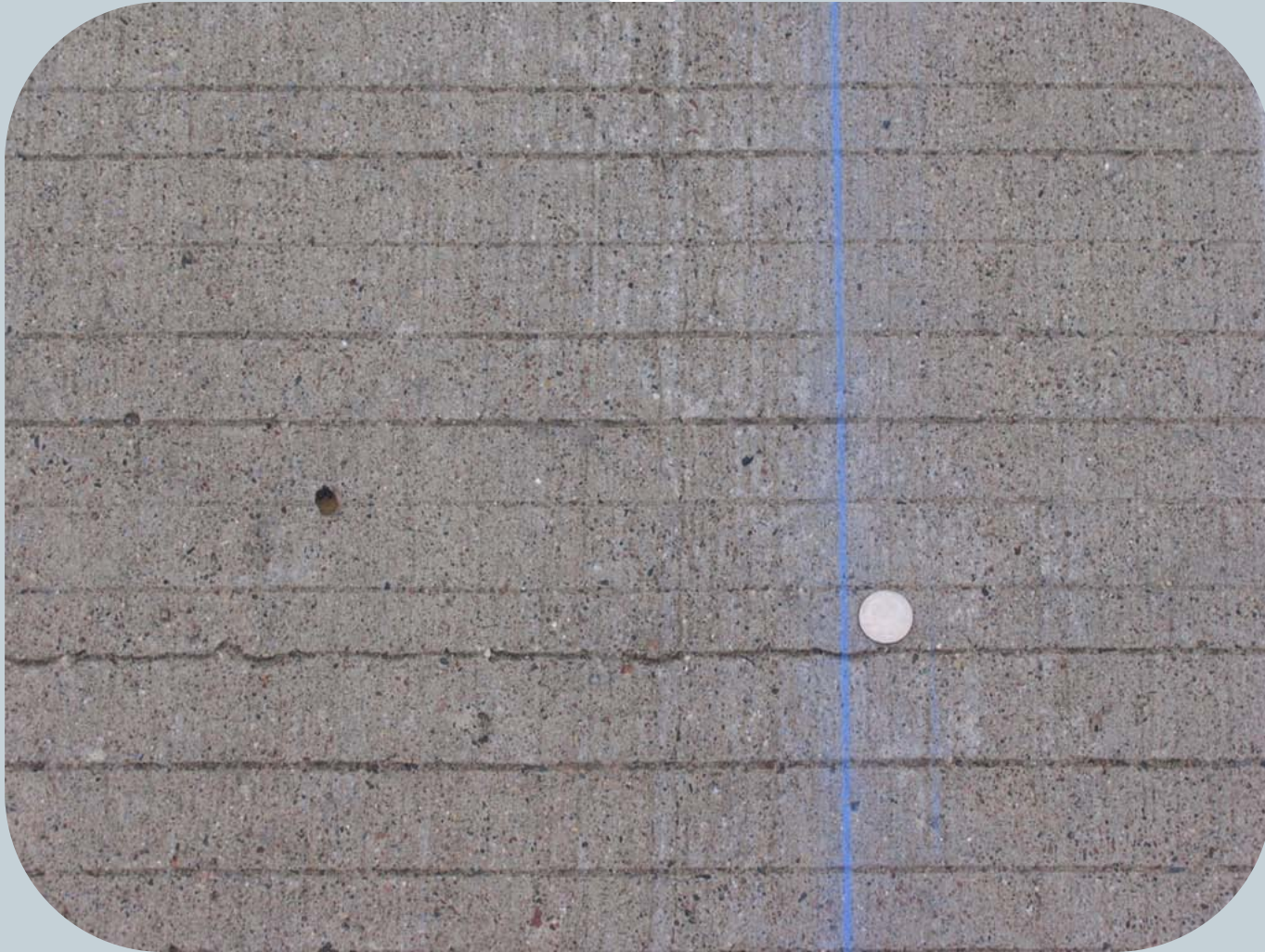
Longitudinal Tined

Diamond Grind (Longitudinal)

Conventional Grind at Night

FHWA Testing--Observations

► **Short Wavelength Features**

- Improve preservation of short wave content by optimizing data from CS8800 contacting height measurement apparatus

► **Volume of Collections**

- Five or Six is Enough??

► **Unwanted Variables Among Device Collections**

- Significant differences in timing of collections. Varying temperature, moisture/humidity, lighting, etc.

► **Where Should the Bar be Set?**

- 98/98/98/94% Waveband Thresholds Appropriate for All Surface Types?

FHWA Testing--Observations

▶ **Validation of Durability**

- Long testing hours and heavy rain demonstrate robustness of device

▶ **All Surfaces Representative of "Real World" Surfaces**

- Chip seal surface degradation

- Unopened longitudinal tined surface.

▶ **Second Data Collection Will be Valuable**

- Refinements based on first test should improve results on second.

- Staggered collections by Benchmarking Device vs. continuous by candidate devices

CS8800—Enhancements

▶ **Redesign of Core Electronics**

▶ **Engineered Wheels & Tires (75 mm/2.75" footprint)**

▶ **Optimization of Front-Arm Data**

▶ **Lithium Ion Battery / Power Meter**

▶ **Comprehensive Software Upgrades**

CS8800 Options

▶ **CS8800 with Texture Sensor**

▶ **CS8800 with Ground Penetrating Radar Sensor**

▶ **Floor Flatness / Floor Levelness (ASTM E-1155)**

▶**Pairing Surface Profiling with Survey Instruments for Topography Mapping and Machine Control Applications**

CS8800 With Texture Measurement

Simultaneous Collection of Surface Profile Data and Texture Content

▲Line Scanning LMI RoLine or Bytewise RoadMap) for 3-Dimensional Texture Data ▲
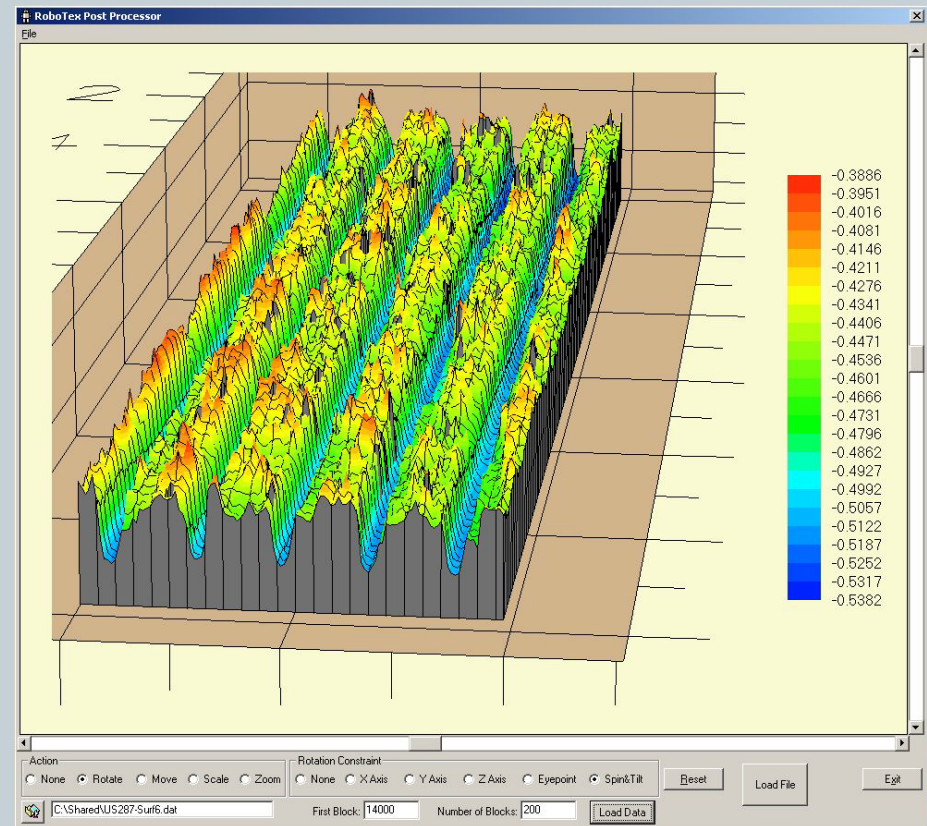
▲3-D Texture Imagery▲

CS8800 With Ground Penetrating Radar
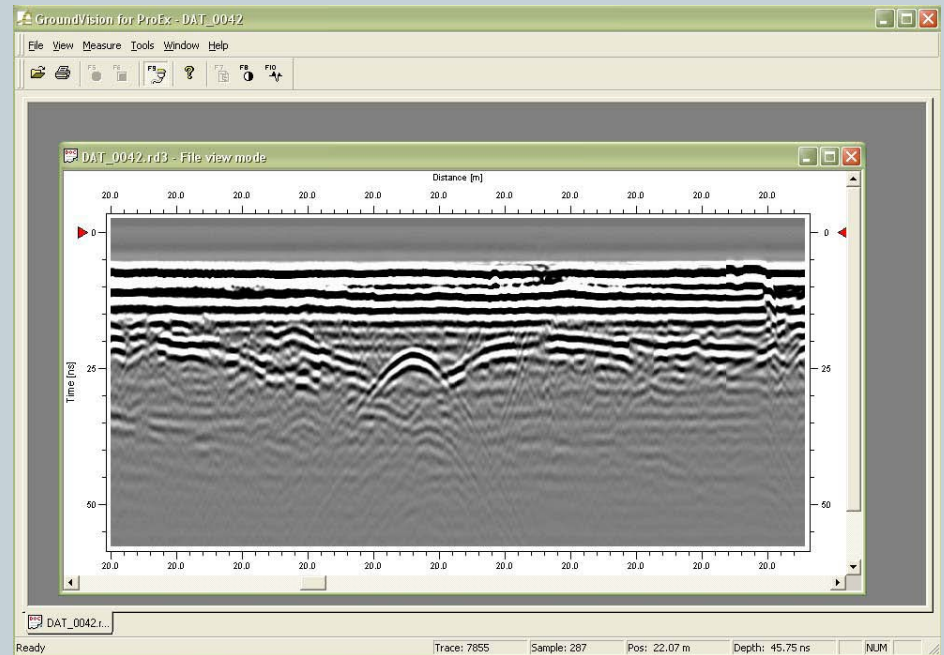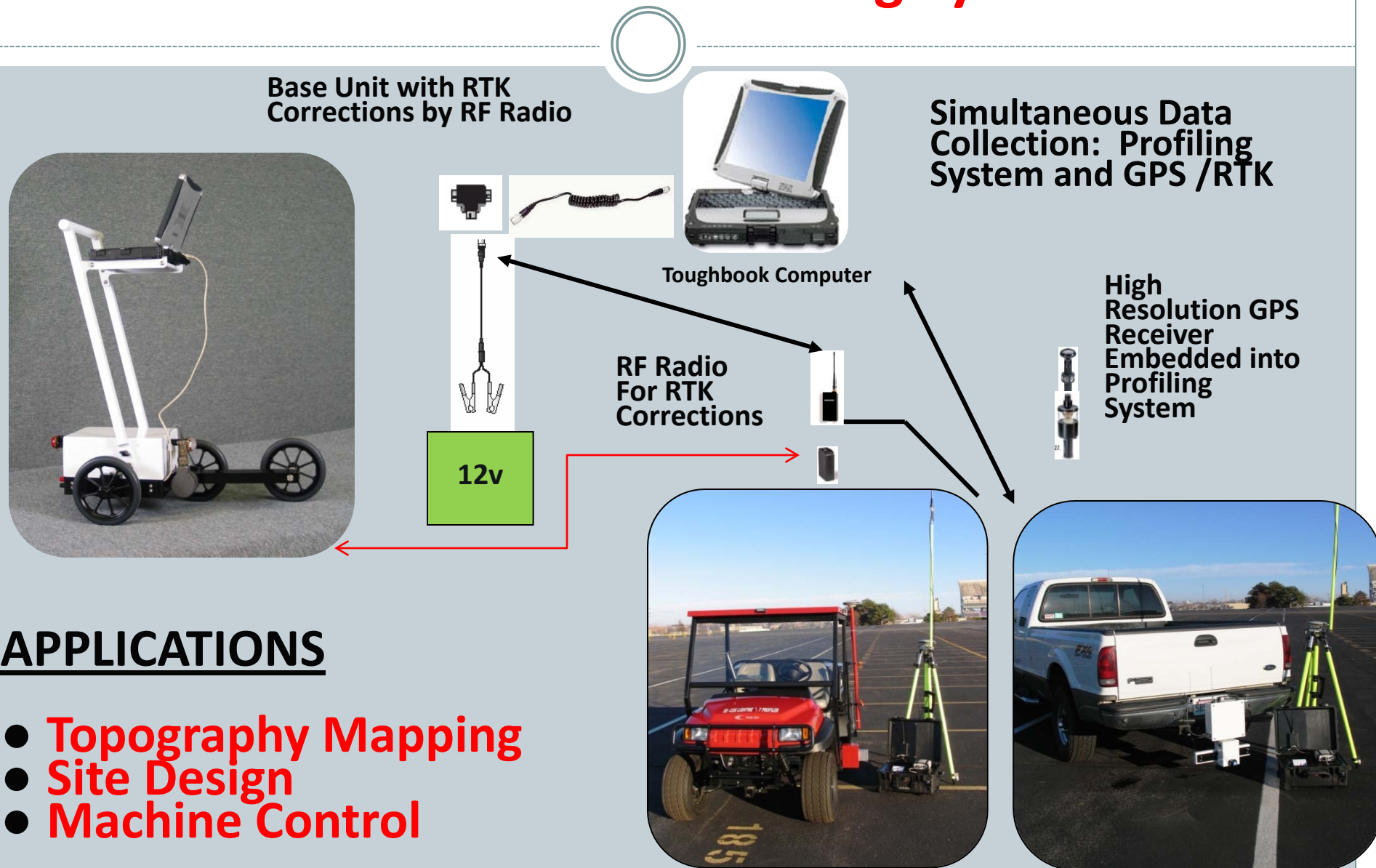
Simultaneous Collection of Surface Profile Data and GPR Content

Variable Frequency GPR Antennas Attach to CS8800 for Different GPR Applications

▲ **GPR Imagery on Toughbook with Windows Software** ▲

Survey Systems (Corrected GPS or Total Stations) PAIRED With Surface Profiling Systems

Base Unit with RTK Corrections by RF Radio

Simultaneous Data Collection: Profiling System and GPS /RTK

Toughbook Computer

RF Radio For RTK Corrections

12v

High Resolution GPS Receiver Embedded into Profiling System

APPLICATIONS

- **Topography Mapping**
- **Site Design**
- **Machine Control**

The End

Dennis Scott

SSI (Surface Systems & Instruments, LLC)

(800) 662-5656

dscott@smoothroad.com