

New Technology for Asphalt Paving

Presented at
Alaska Paving Summit
2007

Agenda

1. Introduce Topcon and GPS Alaska
2. Overview of Non-Contacting Systems for Asphalt Paving including the Sonic Averaging System
3. Current Status of GPS Technology
4. New Technology for Asphalt Paving ...
Millimeter GPS with Laser Zone
5. What's Next?... Site Link

Topcon Statistics

- Began in 1932
- Major shareholder: Toshiba
- Topcon business units:
 - Topcon Positioning
 - Topcon Medical
 - Topcon Industrial & Optics
- Developed many "World's First" products and technology

Topcon In The World Marketplace

- Major producer of vision testing, retinal cameras, surgical & electron beam microscopes.
- One of the world's leading suppliers of optical lenses used for reading CD's and DVD's.
- Major supplier of lenses for camera phones.



Most Complete Positioning Product Portfolio in the Industry

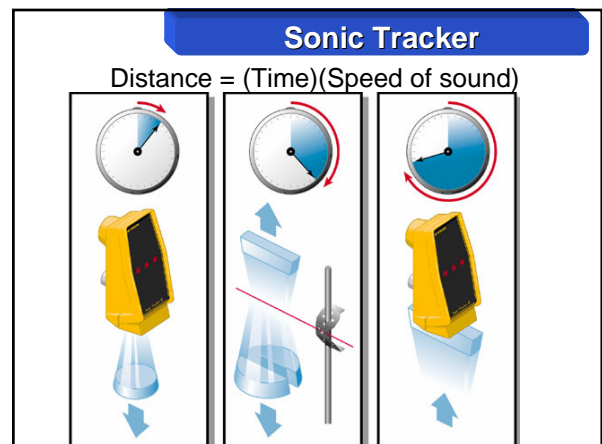
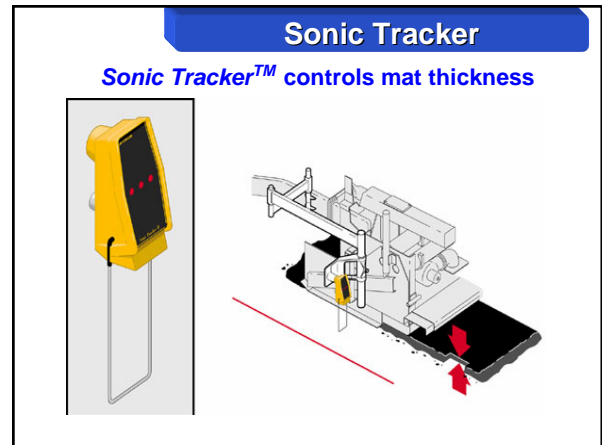
GPS+ Products Machine Control Grade Management System Networks High-End Optical

Laser Products Data Collection & Software

Automatic Levels Digital Levels GIS Products Digital Theodolites Construction Grade Optical

Topcon/TSD OEM Partners

CEARAPIDS LeBoy Ingersoll Rand
HÄMM JOHN DEERE MODULAR VÖGELE
ANTEC INDUSTRIES, INC. HDMATEC BOMAG PUMPHOUSE AG
KEE TECHNOLOGIES CATERPILLAR Power Curbers TEREX Straton
GOMCO GILSON ROADTEC LoBarge inc FONDTEC
ARROW EQUIPMENT LLC CARLSON CNH Leica AgGuide GUJARAT APOLLO
DYNAPAC Case New Holland Zjht.com FUERO
Güntert & Zimmerman Const Div Inc



Track an existing mat



Track a Curb



Track an averaging ski



Track Sonic Stringline



Track Surface Stringline



Surface Stringline



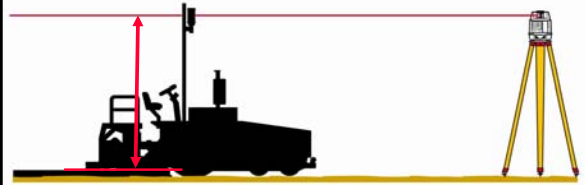
Laser control



Laser control

Laser receiver attached to paver "sees" the grade reference

Laser transmitter produces laser beam as grade reference



Laser control



Laser control

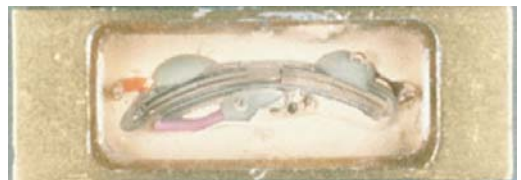


Slope Control

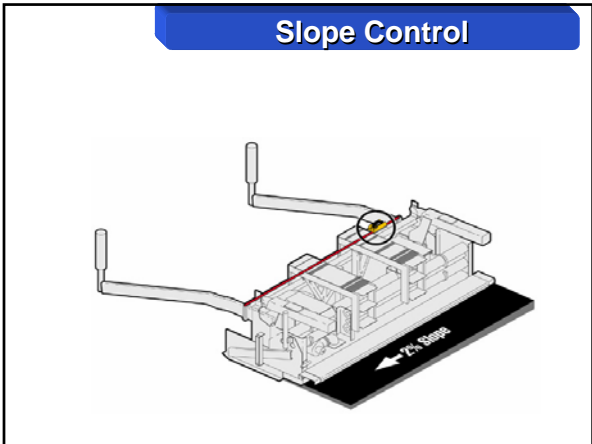


Slope Control

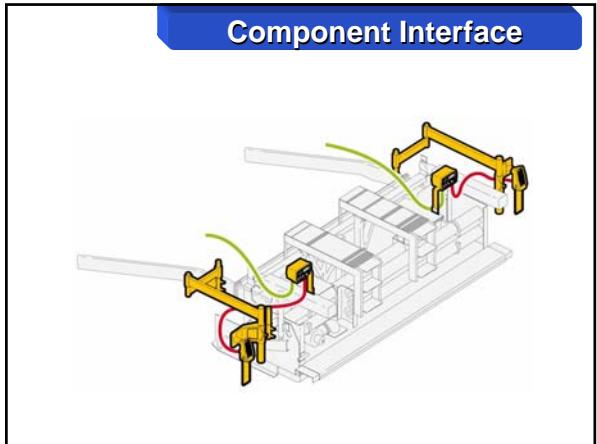
Electronic Level Sensor



Slope Control

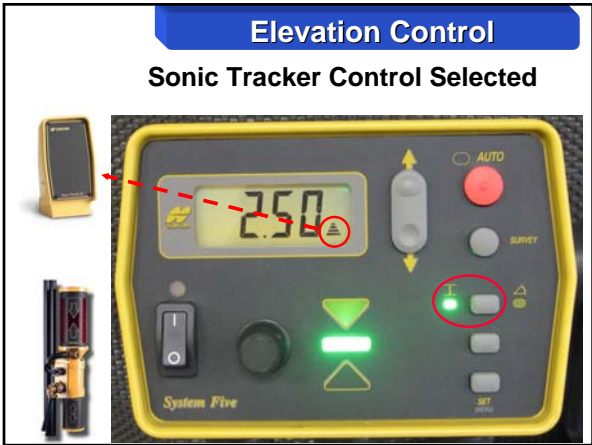


Component Interface



Elevation Control

Sonic Tracker Control Selected



Slope Control

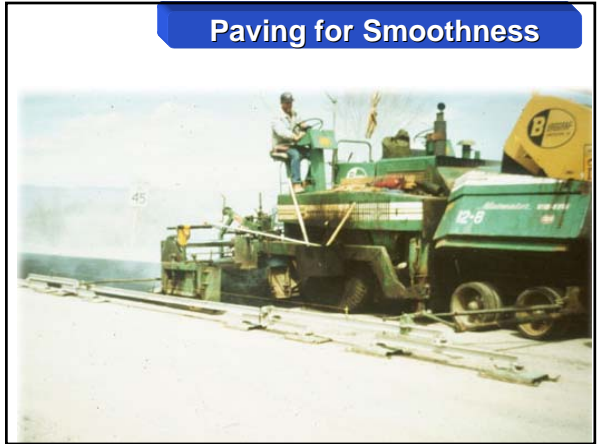
Slope Control Selected



Paving for Smoothness



Paving for Smoothness



Paving for Smoothness



Paving for Smoothness



Paving for Smoothness

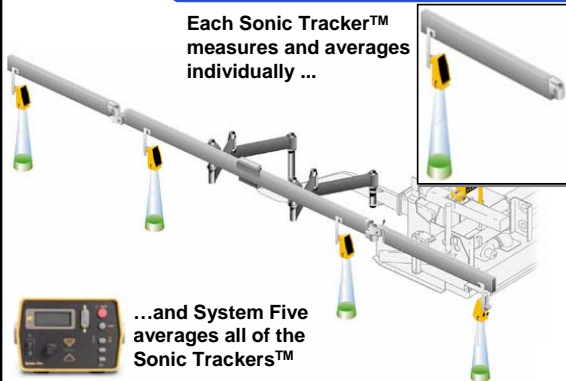


Smoothtrac



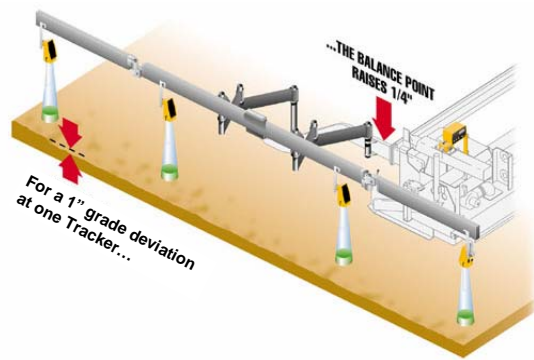
Smoothtrac

Each Sonic Tracker™ measures and averages individually ...

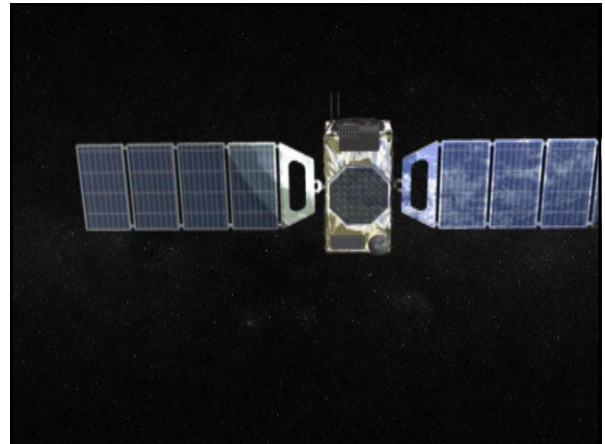


...and System Five averages all of the Sonic Trackers™

Smoothtrac



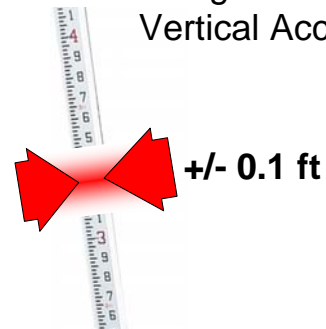
Current Status of GPS Technology



New Technology for Paving



**Satellite Positioning Weakness:
Vertical Accuracy**



MILLIMETER GPS



- Multiple user RTK advantages with vertical precision of a laser
- Plug-n-Play system design can be added to existing systems
- More versatile than robotic machine control
- Customer can choose to use Lazer Zone on selected projects
- Perfect compliment to GNSS network rovers

Millimeter GPS Components



**PZL-1
(Positioning Zone Laser)**

- Transmits Unique Lazer Zone Signal
- 2000 Foot Diameter
- Auto-Leveling
- 4 Channel Operation
- Alkaline Batteries, NiMH Rechargeable, & Ext Power



Millimeter GPS Components



PZS-1 (Positioning Zone Sensor)

- Receives & Decodes the Laser Zone Signal
- $\pm 10^\circ$ by 10° beam Detection Window
- 5/8x11 Standard Pole Mount

Millimeter GPS Components



PZS-MC (Positioning Zone Sensor for Machine Control)

- Receives & Decodes the Laser Zone Signal
- 360° beam Detection
- Rugged, Shockproof Design
- IPX6 Waterproof
- DC8V~DC32V Power Supply

MILLIMETER GPS



- Expands Applications for RTK GPS
- Adds precision vertical accuracy capability to existing systems
- Provides significant performance advantage over Robotic Systems
- Building block design offers customers the opportunity for future upgrade



Millimeter GPS-Asphalt

- Run any combination: mmGPS, sonic or cross slope
- Backwards compatible with System Four/Five
- Same GPS components used for grading



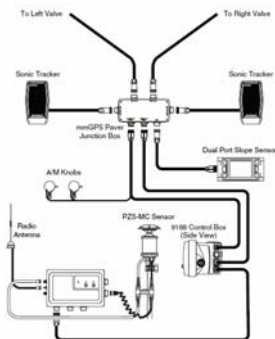


mmGPS Asphalt

mmGPS Paving

- PZS-MC w/ Sonic/Slope
- Compatible w/ System 5
- Same components as grading equipment
- Eliminate Stringlines
- Control Paver & rover at the same time

mmGPS Paving



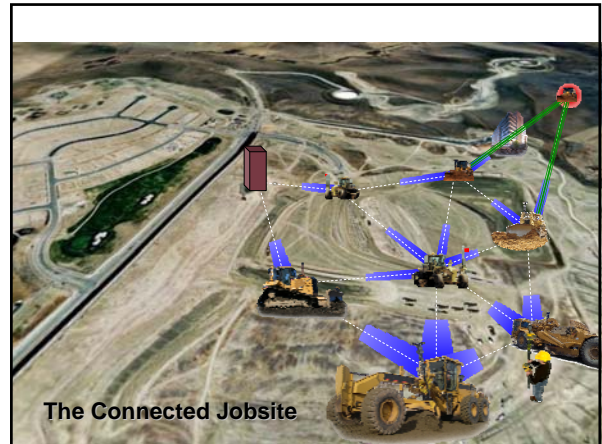
mmGPS Paving

- Simple J-box connects components to 9168
- Run mmGPS with sonic or cross slope
- Machine build

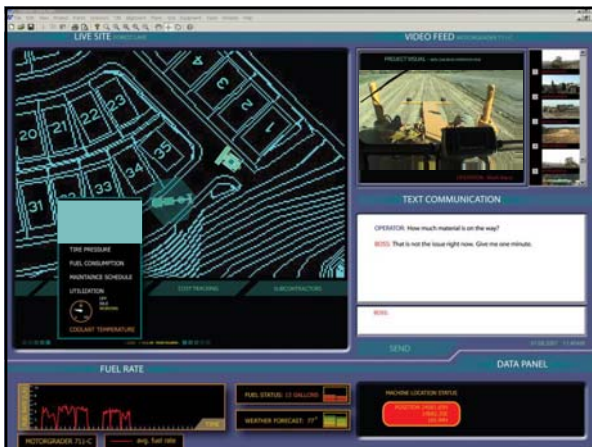
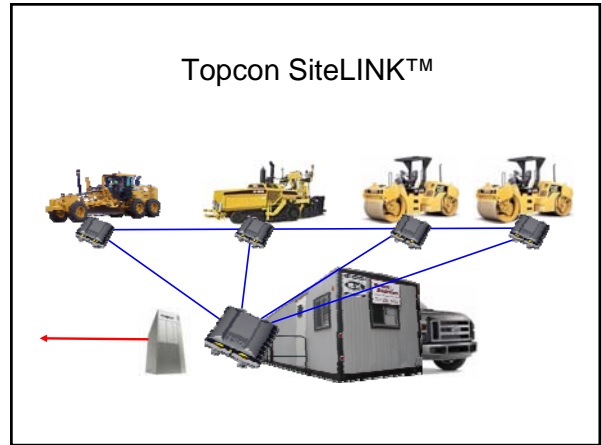
Additional mmGPS Machines



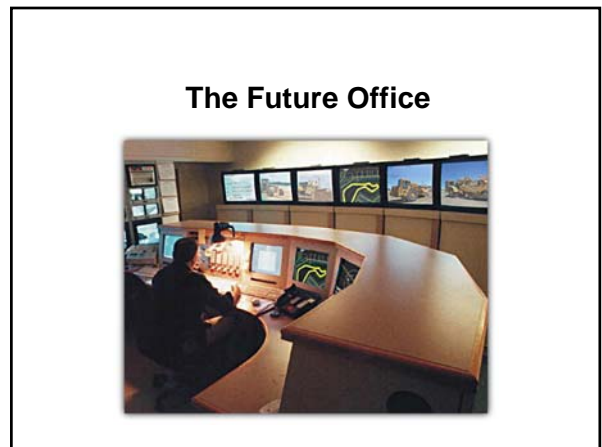
Site Communications Technology



Topcon SiteLINK™



The Future Office



Applications for IT Jobsite

Basic Monitoring

- Physical location
- On/off
- Hours of use

Machine Health

- Oil & hydraulic pressures
- Temperatures
- Engine RPM's
- Fuel levels & usage rates
- Engine idle time
- Real time warning alert

Real-time planning

- Production/percent complete
- Maximize equipment usage
- Deliver materials when needed
- Performance by operator or machine
- Predict service before failure

Applications for IT Jobsite

From the cab / office

- Download updated project file
- Aware of other machine locations
- Aware of other machine production
- email

From Topcon customer service

- See system status
- Remote troubleshooting
- Update firmware