

2008 ConnDOT Photolog Program Overview

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Supervisor

Northeast Pavement Preservation
Partnership 2008

Good morning. Thank you to the Northeast Pavement Preservation Partnership for asking me to come present today. My name is Brad Overturf and I am the Photolog Supervisor here at the Division of Research. I've put together a brief overview of our photolog program.

Photolog?

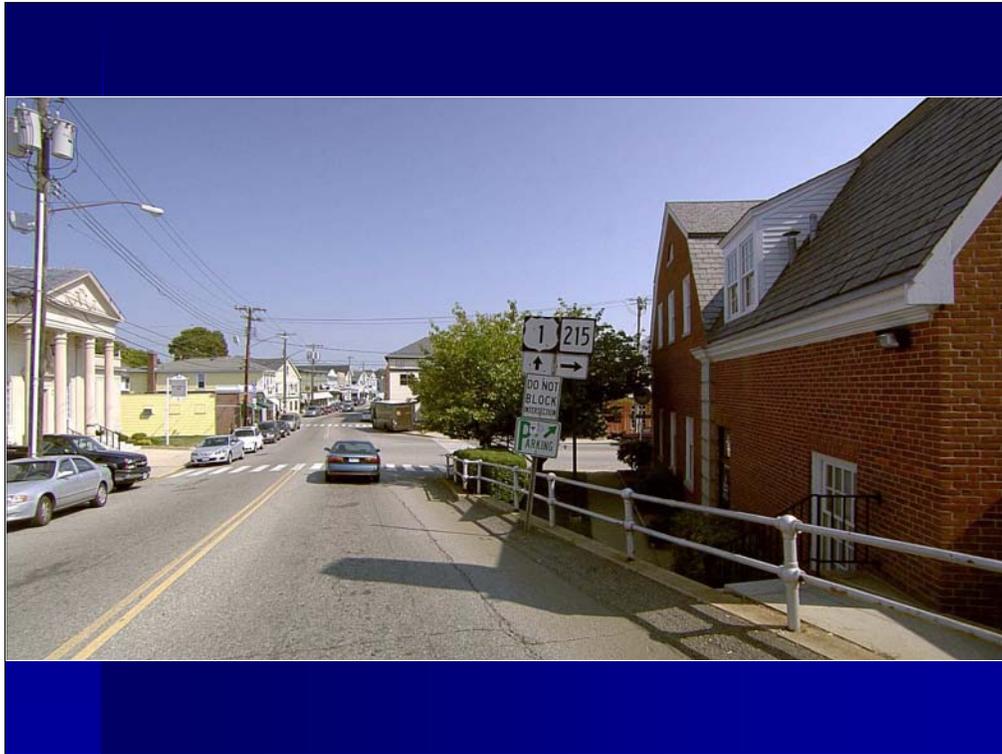
Let's address the obvious first. Pertaining to transportation, a photolog... is what you see here: A sequence of roadway images captured at a consistent interval in an automated fashion. Multiple cameras and camera angles are often used. In Connecticut, we collect forward-facing High Definition images and downward-pointing or pavement-view images.



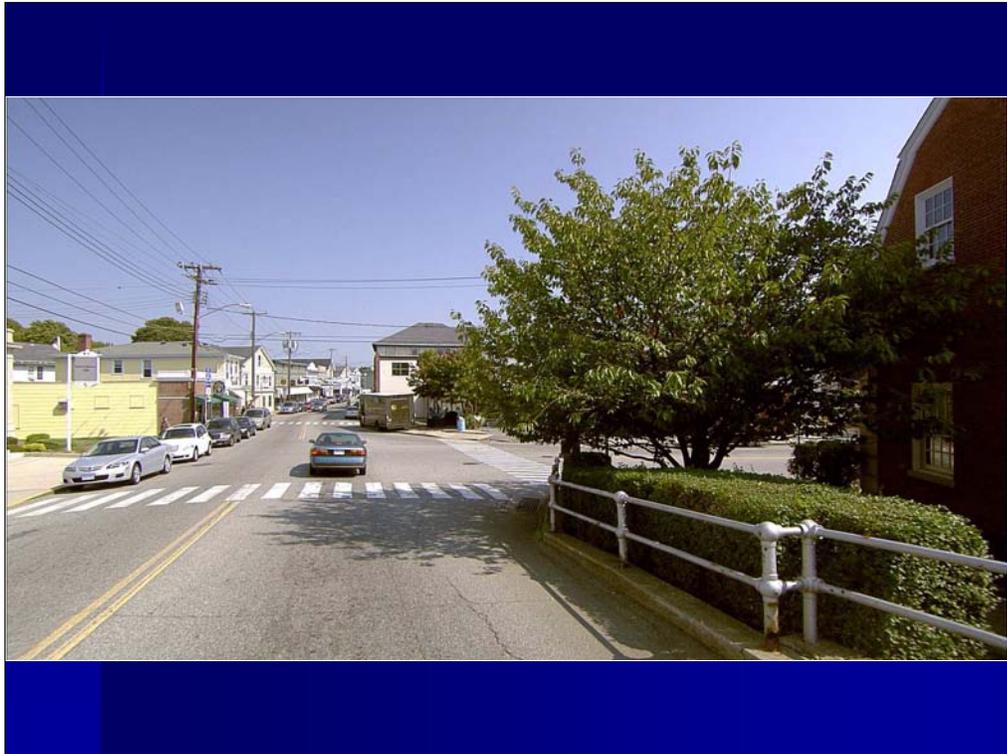
is what you see here:



A sequence of roadway images in an automated fashion.



captured at a consistent interval



in an automated fashion.



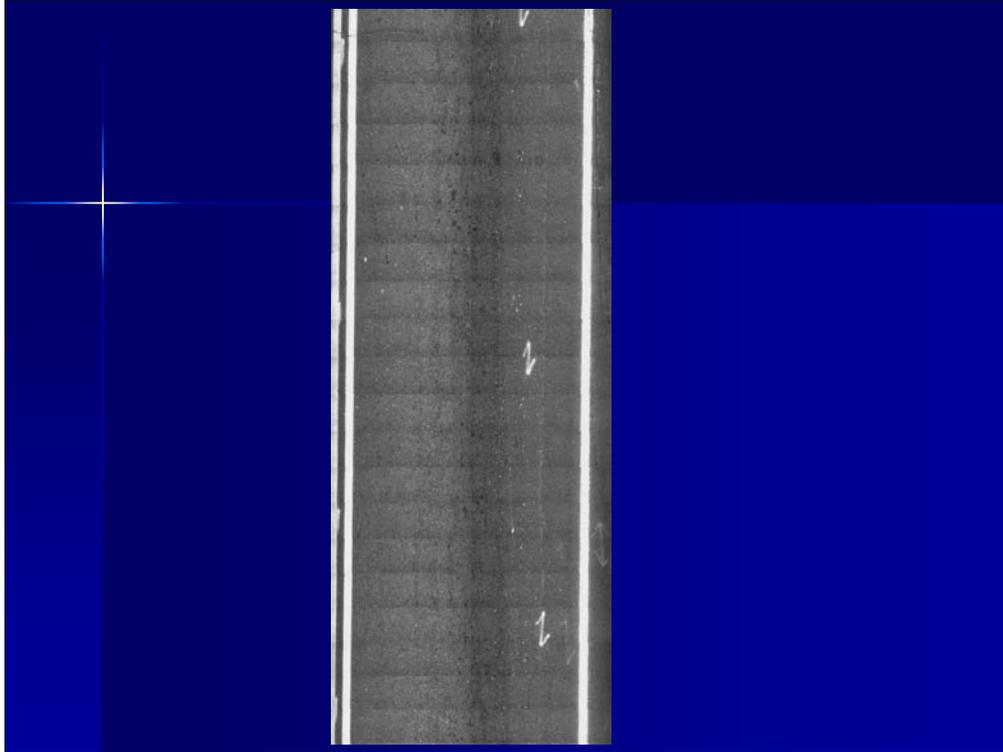
MOVE



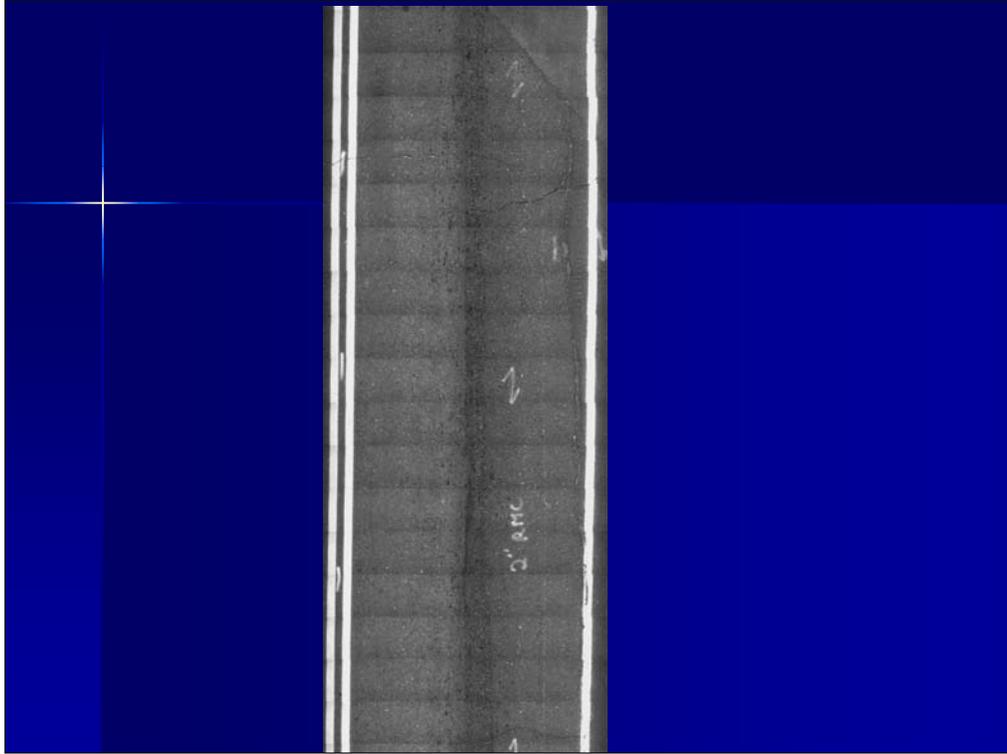
Multiple cameras and camera angles are often used.

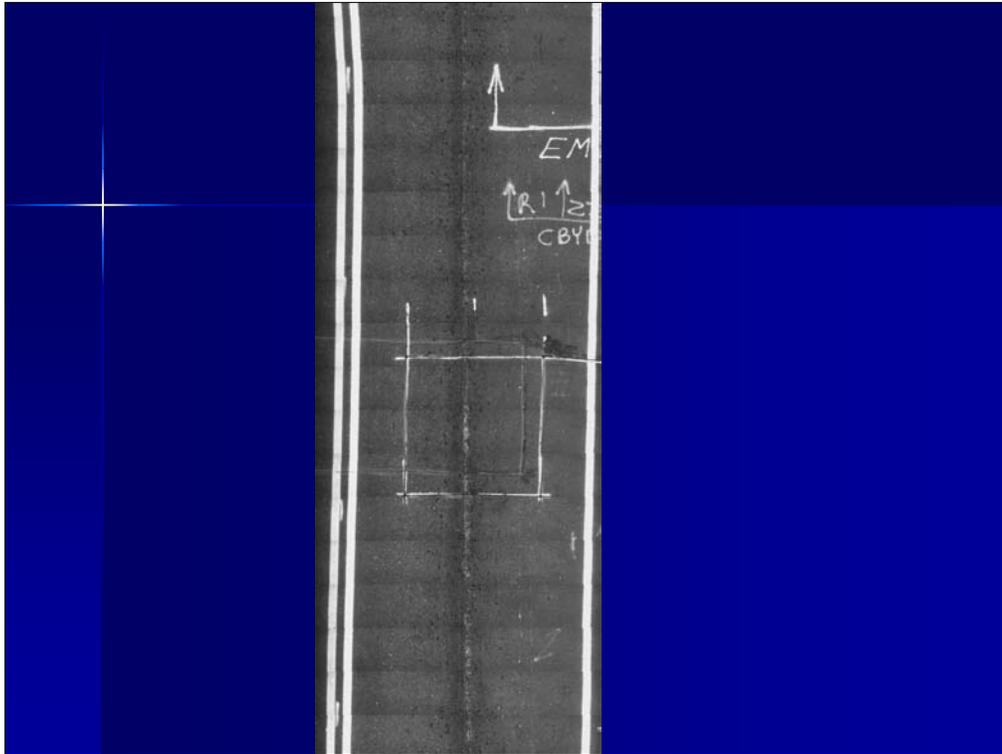


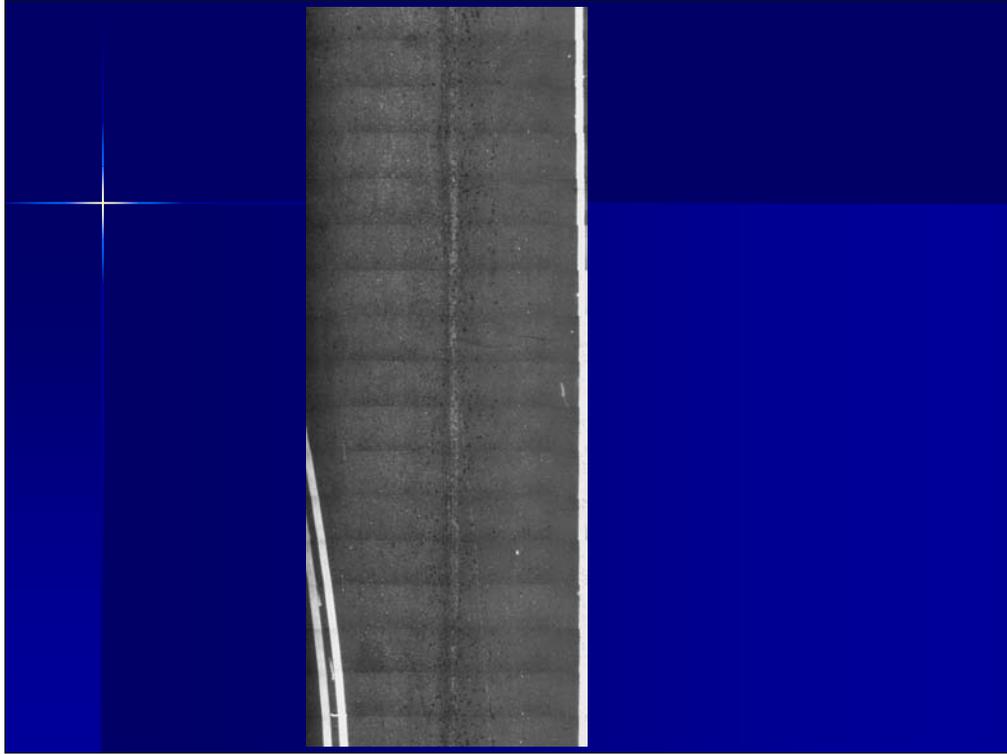
In Connecticut, we collect forward-facing High Definition images...

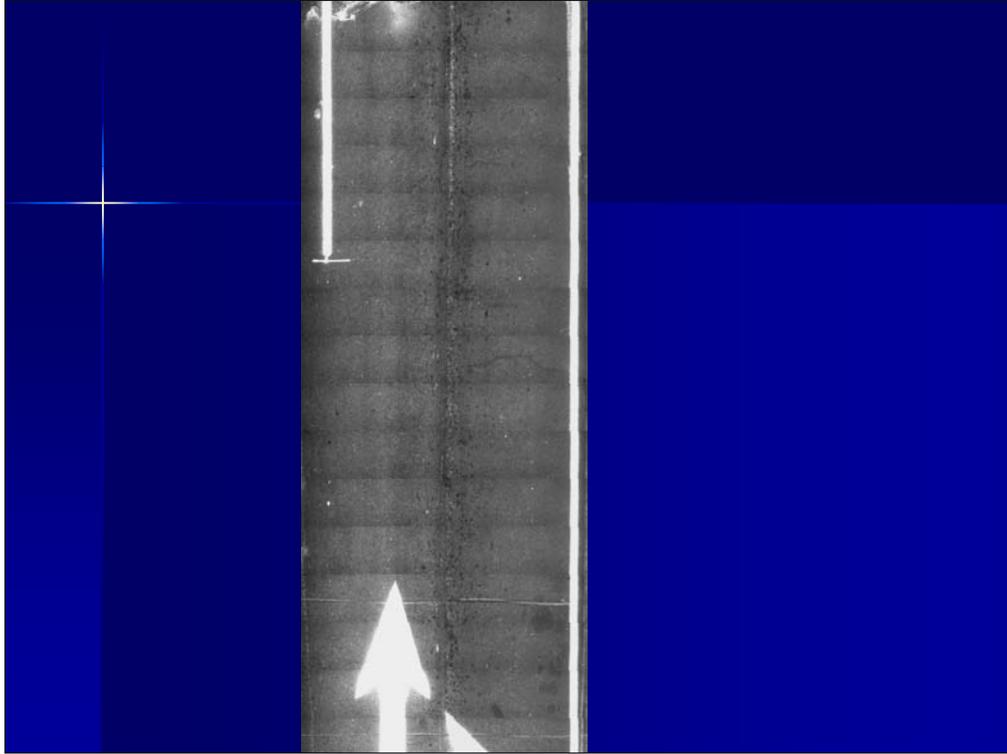


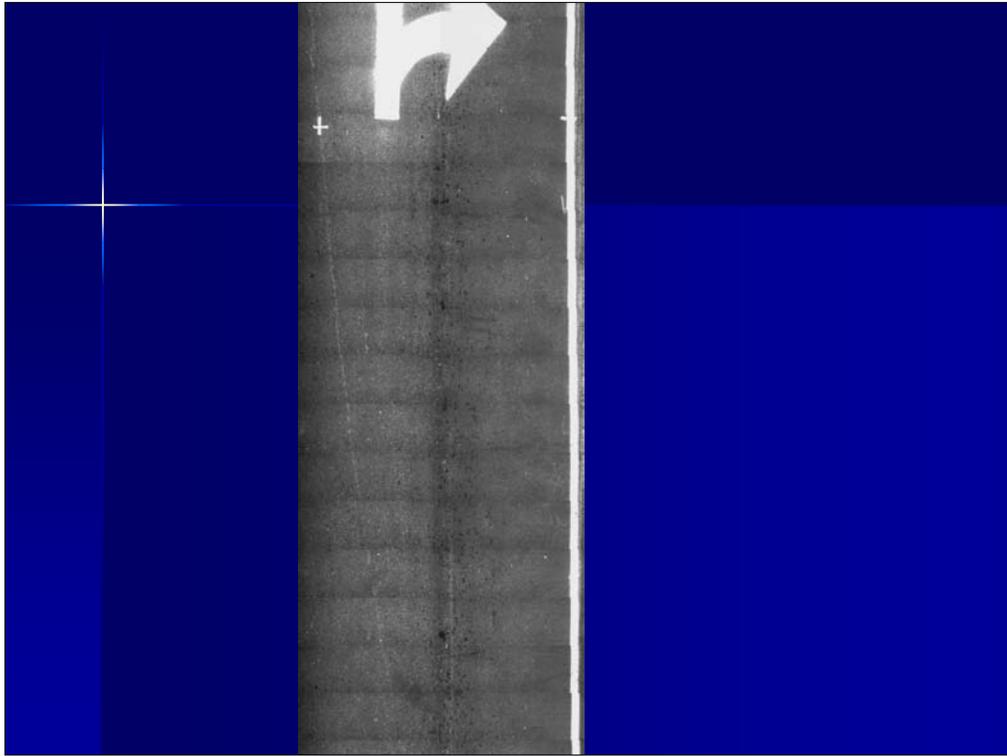
...downward-pointing or pavement-view images.

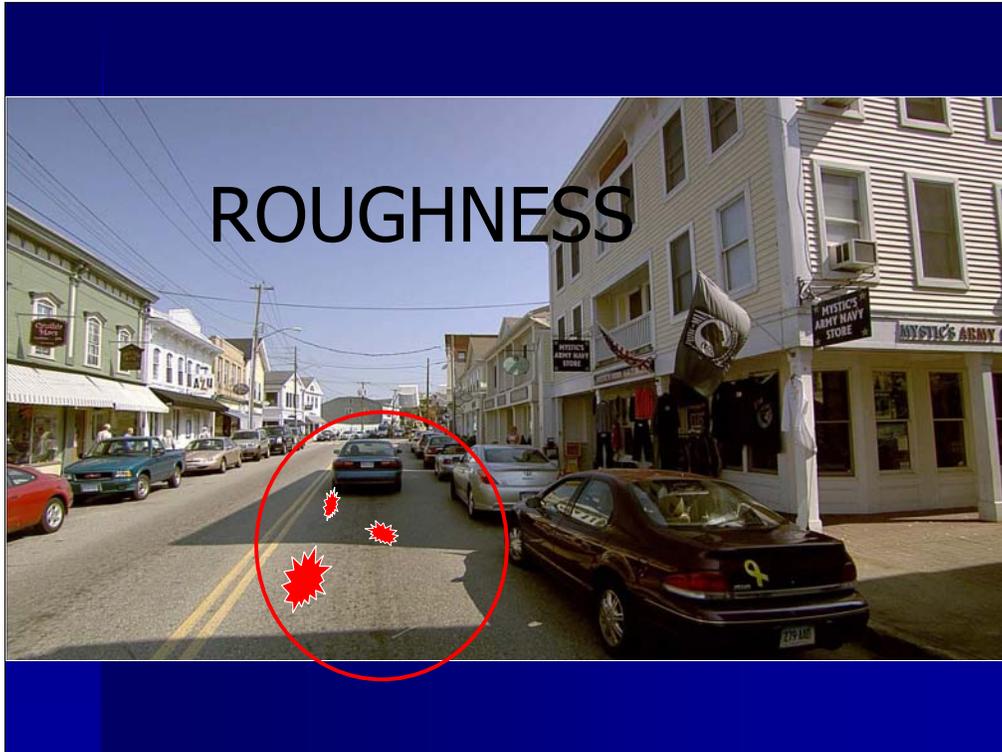






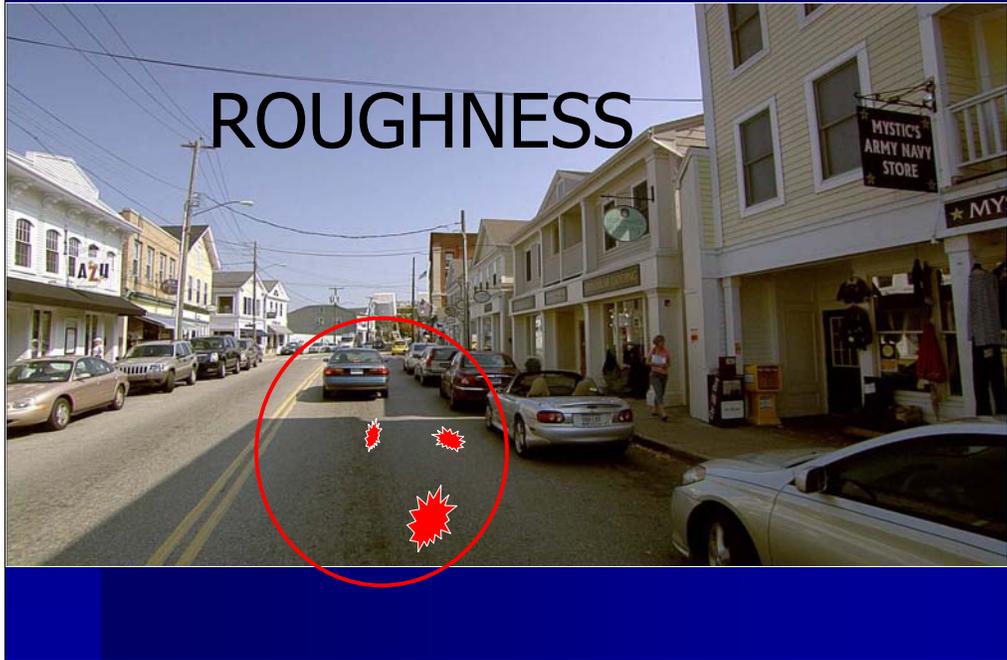






In recent years, the collection of data such as condition roughness,

ROUGHNESS



RUTTING





RUTTING

RUTTING





, global positioning,



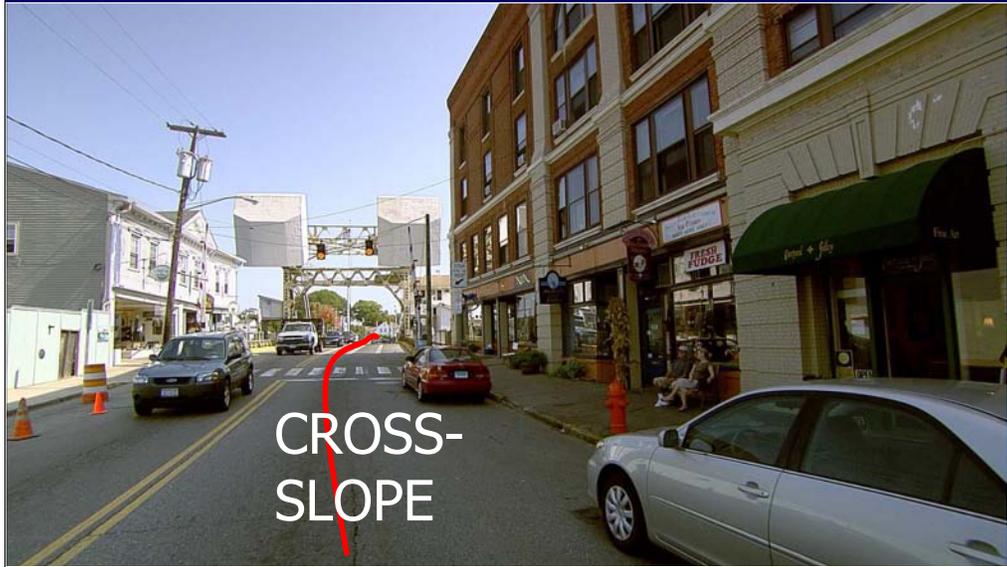
Global Positioning

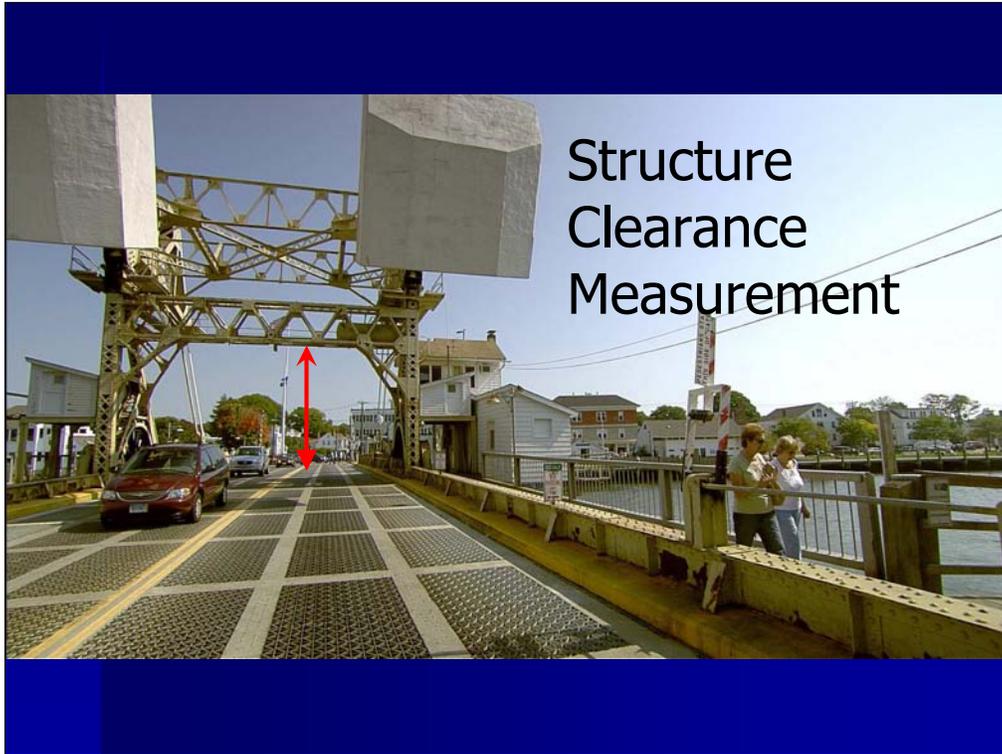




curvature



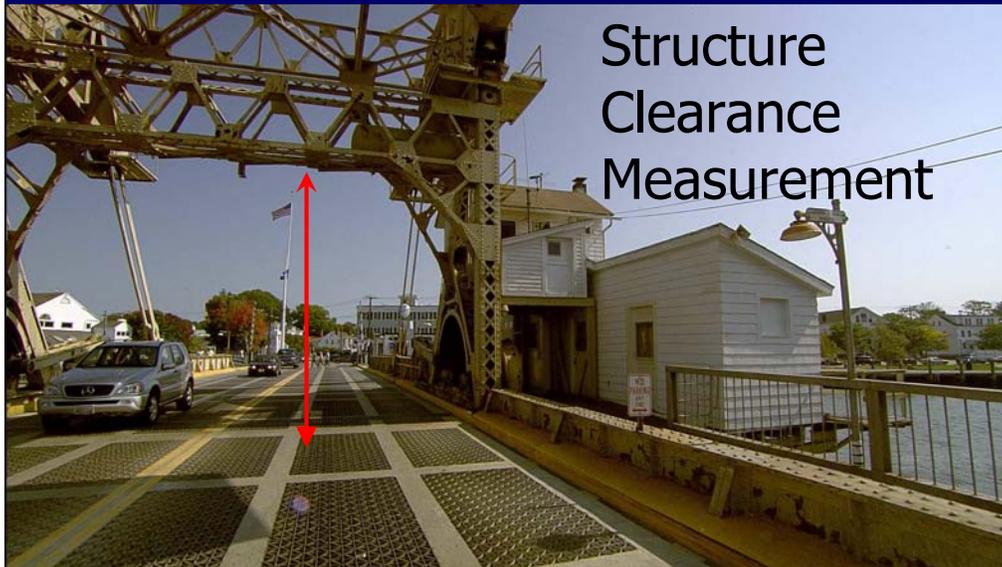




Structure Clearance Measurement

...and structure clearance measurement are inherent in the term as well.

Structure Clearance Measurement



Data Collection History



FIGURE 3 FHWA photolog demonstration with cameras mounted on roof of vehicle.

1960's



1973-1979



1979-1995



1985-1995

Customized vehicles are used to capture the images and data. Here's a little bit of history. You can see the evolution of the collection platform, from the earliest FHWA demonstration through the first 3 generations of photolog vehicles here at ConnDOT.

Photolog Vehicle / Automatic Road Analyzer



This is a typical photolog van. It's equipped with cameras, a gyroscope, sensors, and computer hardware and software to collect all the data previously mentioned. This is one of ours and it is called an Automatic Road Analyzer or ARAN for short.

Photolog Today The Basics: Staffing & Vans



Any research project or ongoing program such as photolog can't exist without proper staffing levels and dedicated resources. We are lucky to have the outstanding dedicated staff that you see here. We own and operate the two vehicles shown, and are also fortunate to have a dedicated office and garage space to the conduct operations.

Photolog Collection Basics

- 12,300 Kilometers (State-Maintained)
- 3.6 Million Images Per Year
- 2.5 Terabytes of Data
- May-October Annual Collection
- In-house Collection and Distribution

These are some basic ConnDOT photolog facts.

We collect all 12,300 kilometers of the state maintained roadway network – that's both directions.

In 2008 we'll be capturing over three-and-a-half million images

Or about 2.5 terabytes of data

We photolog from May through October

All of our collection and distribution is done in-house

DISTRIBUTING PHOTOLOG

Keys to Program Success

- Collect High Quality Data
- Make Distribution Method High Quality
- Spread the Word
- Consider Everyone a Potential User
- Give 'em what they want!

HOW YOU DISTRIBUTE PHOTOLOG DATA IS AS IMPORTANT AS COLLECTING IT. Quality remains key.

The traditional assumption is if you collect high quality data then you're done—you've accomplished a great deal. That is true enough; but if you don't have a good method of getting the data to your users, it doesn't really matter what the quality is. So we strive to give the method a good deal of attention and that has paid off for us. I'll describe our software method in the next slide.

We spread the word about photolog pictures, data, and how we can make it accessible.

New users are surprised at the quality and depth of info available

We tell potential users that it's useful

It saves money

It saves time

My office will help every step of the way

AND It's free!

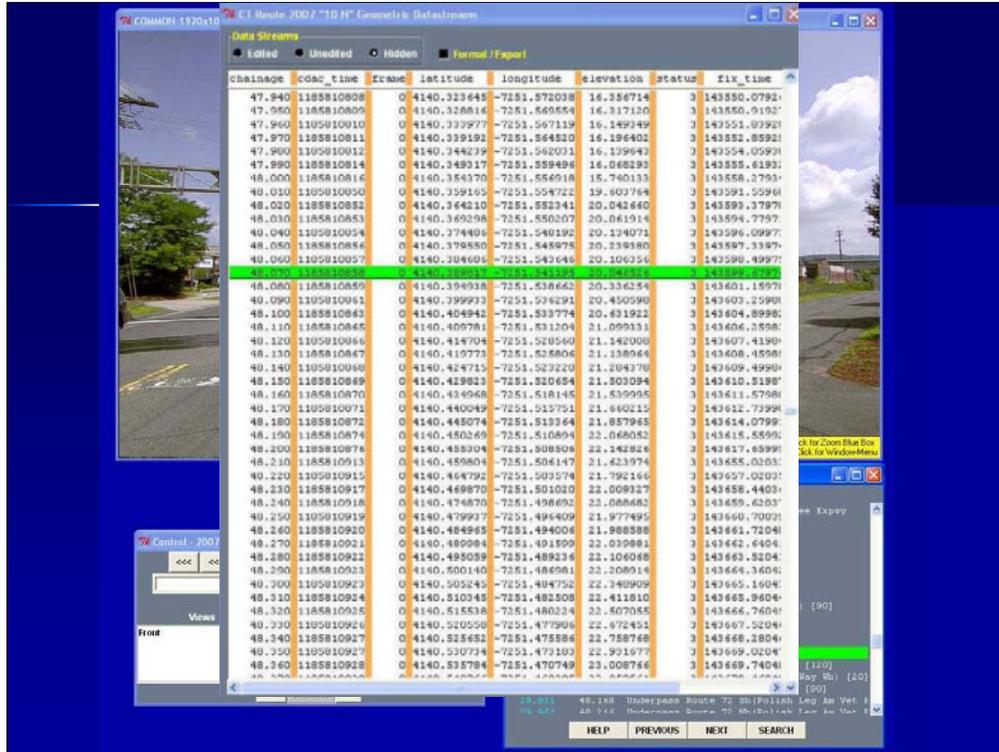
All this makes everyone in the department and lots of other people potential users

Once we have them using it. We don't just acknowledge feedback, we act on it. Most of the changes we made last year to our viewing tools, came directly from user feedback.

DigitalHIWAY

- Incremental Indexing
- Server
- Control
- Client
- Big Disk
- Free Roadpeek

The software we use to distribute photolog information to the Department, other state agencies, and the private sector is called The DigitalHIWAY system.



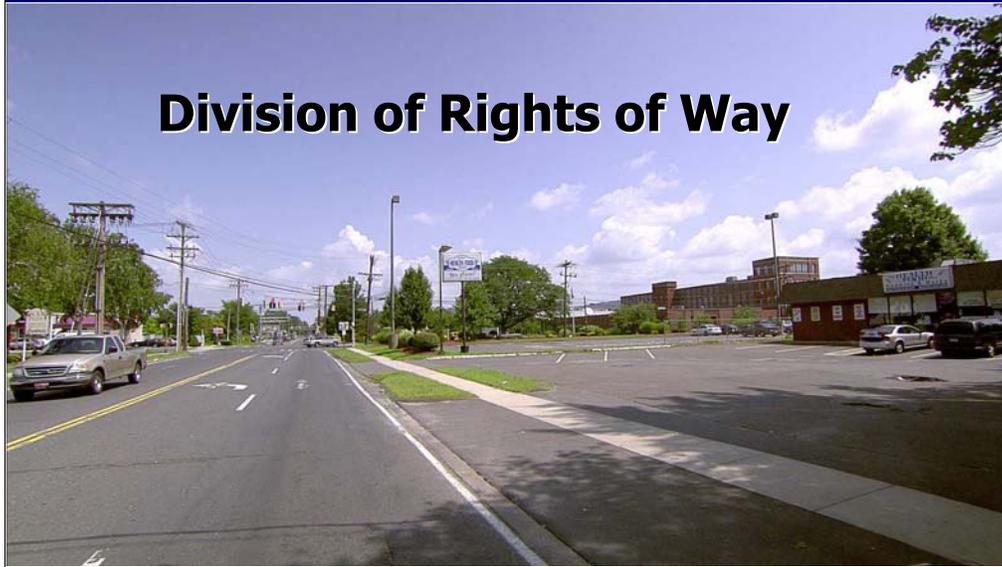
You'll be seeing it soon enough so I won't go into great detail. BUT if it looks simple, that's because it is simple and has been for a long time. AND it works! **DigitalHIWAY allows us to make the images and data we collect daily available to our users, usually within a week.** We're like fishermen. We catch a lot of data and don't want it to rot on the boat (van in this case!). So we collect it, process it efficiently and distribute it rapidly all with the DigitalHIWAY system. DigitalHIWAY provides users with the images, an image controller that rapidly accesses both route directions, links to locations along the road, and access to all of that engineering data I mentioned before.

Look closely at the following sequence of images and think about the users and applications mentioned. You'll begin to understand how and why photolog is used as often as it is.

Maintenance & Pavement Management



Division of Rights of Way



Maintenance Planning



Landscape Design



Permits



Office of Highway Safety



Traffic Signal Lab and Maintenance





Maintenance Garages and District Sign Shops



State Police



Municipalities and Regional Planning Organizations



Department of Environmental Protection



GIS Councils



Rail Operations



University of Connecticut and State University System



FHWA Field Office



Commissioner and Chief Engineer's Offices



Un-metered Utility Audits



Rail Crossing Inventory



Drainage Inventory



Lane Widths



Sign Detail



Sign Location



Accident Litigation and Investigation



ALL ConnDOT Bureaus



Those are just some of the offices, uses, and examples of actual mandated inventories that have been performed using the photolog.



There are now 500 desktops throughout Connecticut viewing our data.



Quarterly DigitalHIWAY usage tracking and analysis has demonstrated a substantial savings to the State from reduced fleet vehicle use and its related costs and man hours spent in the field. While the field trip remains an integral and necessary job function for much of the Department, Photolog both complements the fieldwork and acts as a replacement for it when the work requires mere location review, site confirmation, documenting recent conditions. Consider also the occasion of photolog use when no field trip was deemed necessary. Without photolog determinations may be made based on memory or hearsay. In this case photolog has improved the quality of work being done.

Collection: 2009 and Beyond

- "Greener" Van
- Higher Resolution Forward Facing Images
- Scanning Lasers
- Line Scan Cameras

You probably get the idea that we are always looking to improve the operation. These are a few technologies we're looking to invest in in the next year or two.

A van that gets better gas mileage

Higher resolution, cinematography cameras are becoming available

Scanning laser to improve rut collection

Line scan cameras will replace our existing pavement-view cameras. From these, coupled with software, cracks can be automatically detected down to 1mm in width

Next Generation Van



This a new collection platform manufactured by the company that makes our existing vans. It is simply a more efficient vehicle that contains all the existing data modules in our current vans.

Future Photolog Image Quality

5000 Horizontal Pixel Resolution

4000 Horizontal Pixel Resolution

**1900 Horizontal Pixel Resolution
Current HD Image**



We are expecting that computer storage technology will continue to improve and become cheaper, so we can increase our image resolution in a year or two. Digital Cinematography at 4000 horizontal pixels is now available with even higher pixel counts potentially available in the near future.

Distribution: 2009 and Beyond

- GPS/Image Linking “Roads to Ramps to Roads” (Seamless Viewing)
- Google/Microsoft/Mapping Mainstream meets DigitalHIWAY (and visa versa)
- Internet Distribution: Streaming Photolog
- Archive Film Library to HD or higher (1973-1996)

We are working with our DigitalHIWAY developer on a number of projects that we expect will continue to fulfill the state-of-the-art expectations of a modern userbase.

We are hoping to give DigitalHIWAY more of a virtual driving “feel” by using the already georeferenced images to tie roadways such as interstates to ramps to roads together.

Likewise we hope to incorporate a mainstream mapping component to DigitalHIWAY.

We are working on a new proposal to take advantage of our streaming media experience to provide Internet access to photologged routes.

We are working on another proposal to tap our High Definition experience to archive our older film library (1973-1996)

These last two items are good examples of how one successful Research project can lead to another.

Photolog Staff TRB Participation

- Member/Friend of Committee AFB80 "Geospatial Data Acquisition Technologies"
- SHRP2 Committee Participation (S03, S04, S07)
- Recent Feature Article in TRNews Magazine (Direct Result of TRB State Visit)

Photolog has been active in TRB for many years. Currently, ConnDOT is represented by us on AFB80, Geospatial Data Acquisition Technologies.

SHRP2 Expert Task Groups

And most recently we had a feature article published about our project in TRNews Magazine

THANK YOU!

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Thank you.