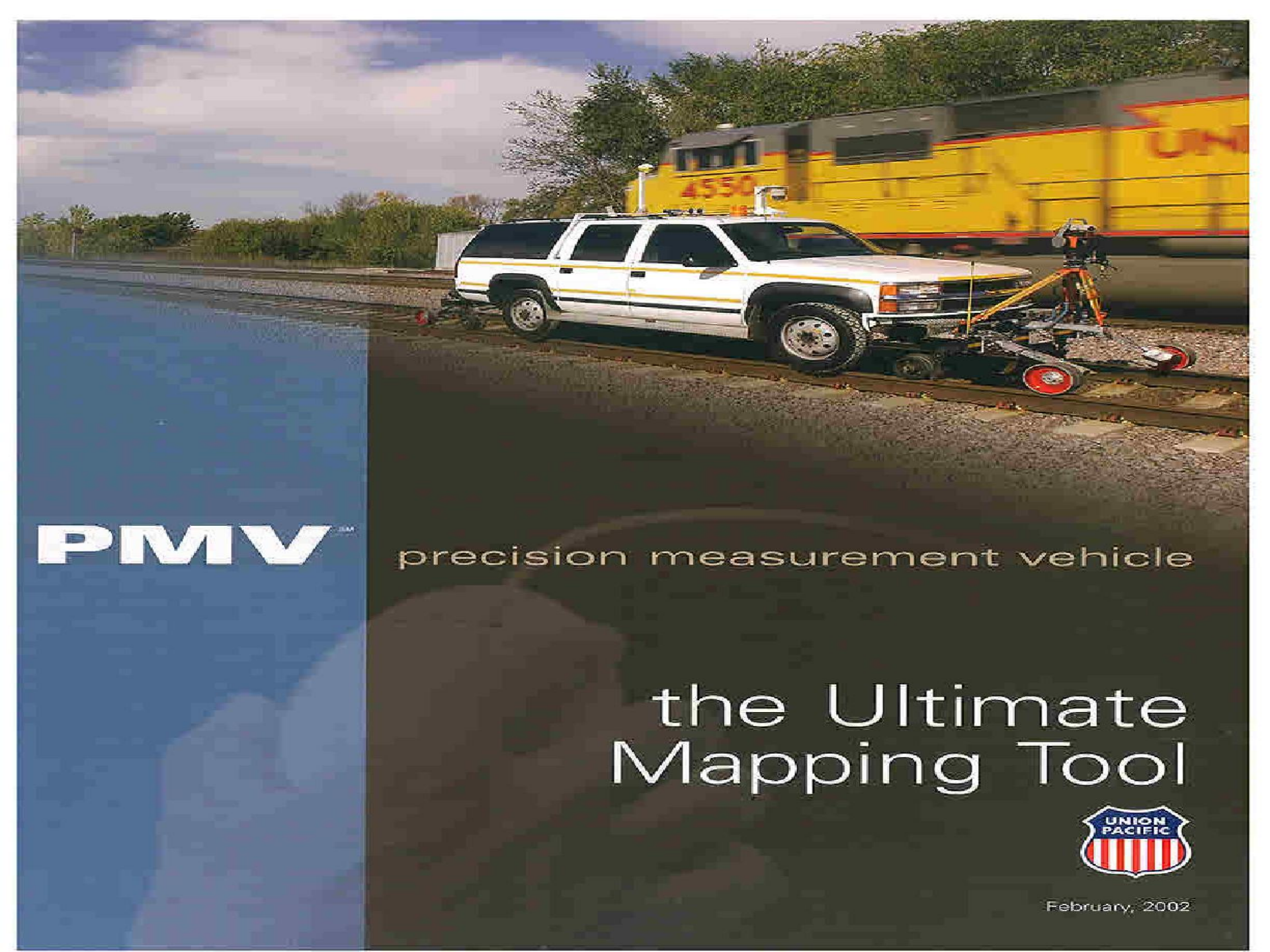


CSX and the Geographical Information System (GIS)

- Digitization of all railroad maps
- Scanning of all deed records
- Precision Measuring Vehicle (PMV)
- Fly-Mapping
- Positive Train Control (PTC)

Precision Measuring Vehicle (PMV)

- Mounted 180° digital camera
- Two GPS units , 1 tracking 5 military satellites and 1 tracking 9 commercial satellites that we pay a user fee
- Laser ranger finder
- 4 encoder wheels
- Optical range finder



PMV

precision measurement vehicle

the Ultimate
Mapping Tool



February, 2002



THE ULTIMATE MAPPING TOOL

*"The PMV is one of
the most powerful,
efficient, and
cost-effective
tools available."*

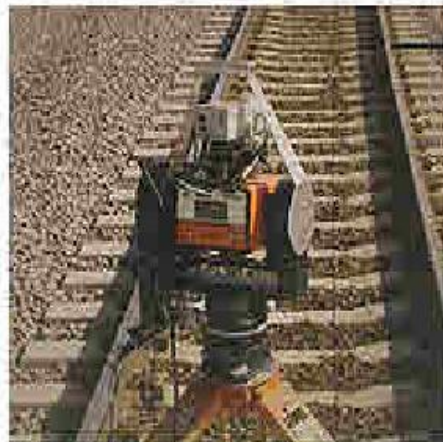
The Precision Measurement Vehicle brings various components together into one system. Together these technologies produce facility information ready for the digital world.



Encoder Wheels



*Video Camera (left)
GPS Receiver (right)*



Laser Rangefinder



Optical Rangefinder

***"Combine all the technologically
advanced features... and the
PMV stands true to its name."***





FLI-MAP SURVEYING USING HELICOPTER PLATFORM



*Uses GPS,
LiDAR and Video
Imaging
Technologies*

What can FLIMAP do?

- ◆ Provide terrain modeling to high accuracy
- ◆ Provides relative accuracy 0.15' or 1.8"
- ◆ Tied into USGS monumentation via ground beacons.

How Does FLIMAP work?

LiDAR, kinematic GPS receivers, and VHS-S video mounted to helicopter platform.



How Does FLIMAP work?



How Does FLIMAP work?





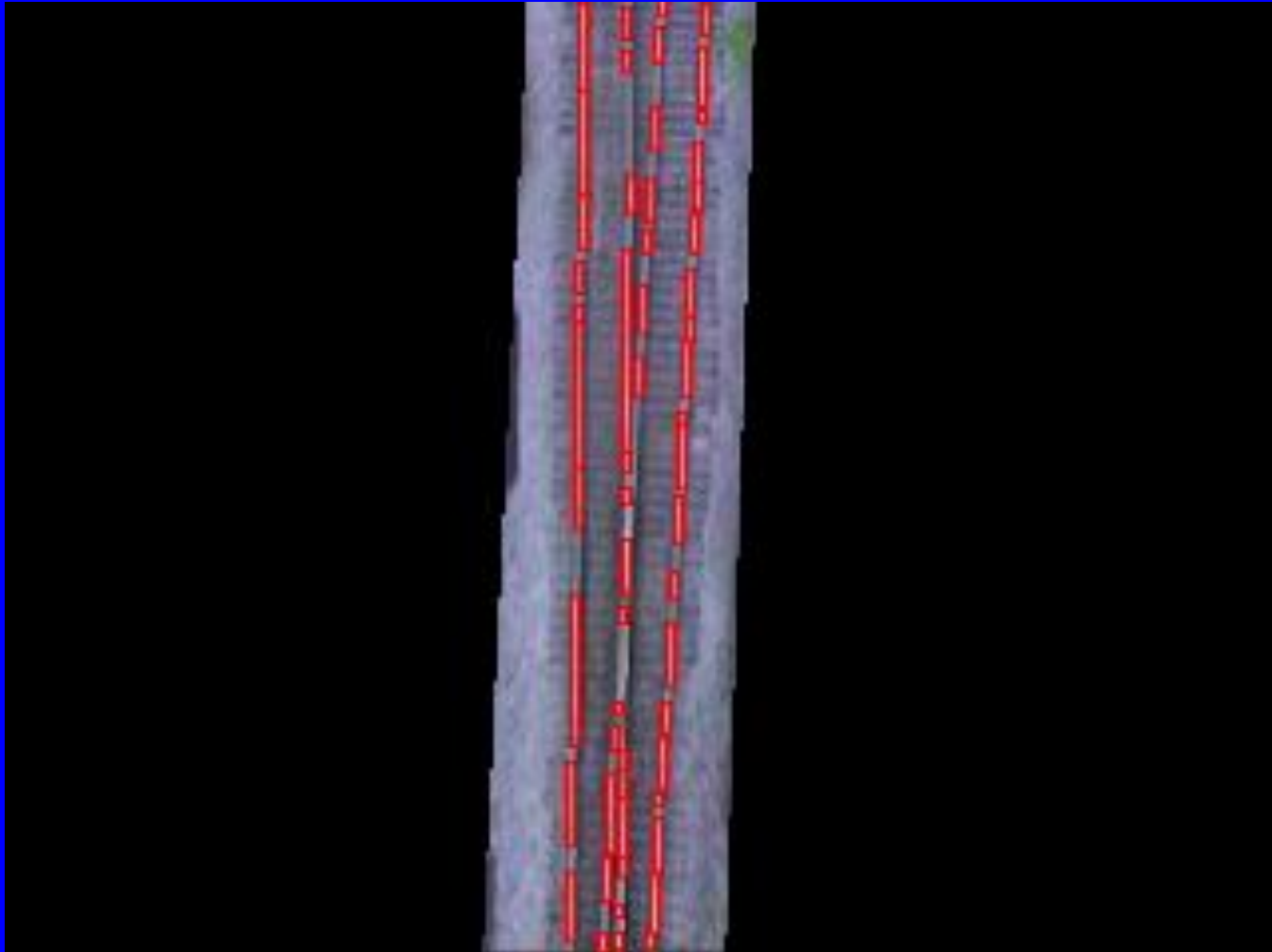


Mobile Airborne Platform
a.k.a. “helicopter”

Video Image from Down-Looking Camera



Lines Detected by Intensity within Region



Rails Computed by Extending Line Segments



Positive Train Control (PTC)

- The Ability to Stop a Train
- Onboard Computers
- Field Assets with Radio/Transceivers
- Locations of Assets to Within 2 Meters

**PTC = Opportunities For
Surveyors**