

Use arrow keys to navigate this presentation.

# HIGH SPEED BRIDGE UNDERCLEARANCE MEASUREMENT SYSTEM

# HIGH SPEED BRIDGE UNDERCLEARANCE MEASUREMENT SYSTEM

- The system can mount on any vehicle with a 2 inch trailer hitch receiver.
- The system measures the under clearance of a bridge at normal highway speeds.
- Along with the bridge under clearance data, GPS information is gathered.

# Center Sensor Mount



## Right Sensor Mount



## Left Sensor Mount



# HIGH SPEED BRIDGE UNDERCLEARANCE MEASUREMENT SYSTEM

- DasyLab software is used for the data acquisition, display and analysis.

# Data Acquisition Screen

**Lane**

Switch 0  
Left Edge [Red bar] OFF

Switch 1  
Center [Red bar] OFF

Switch 2  
Right Edge [Green bar] ON

**Status Lam00**  
Status Lamp 0 [Red dot]

**Status Lam01**  
Status Lamp 0 [Red dot]

**Status Lam02**  
Status Lamp 0 [Green dot] Right Edge

**Total feet** [Black screen with green dash]

**Total inches** [Black screen with green dash]

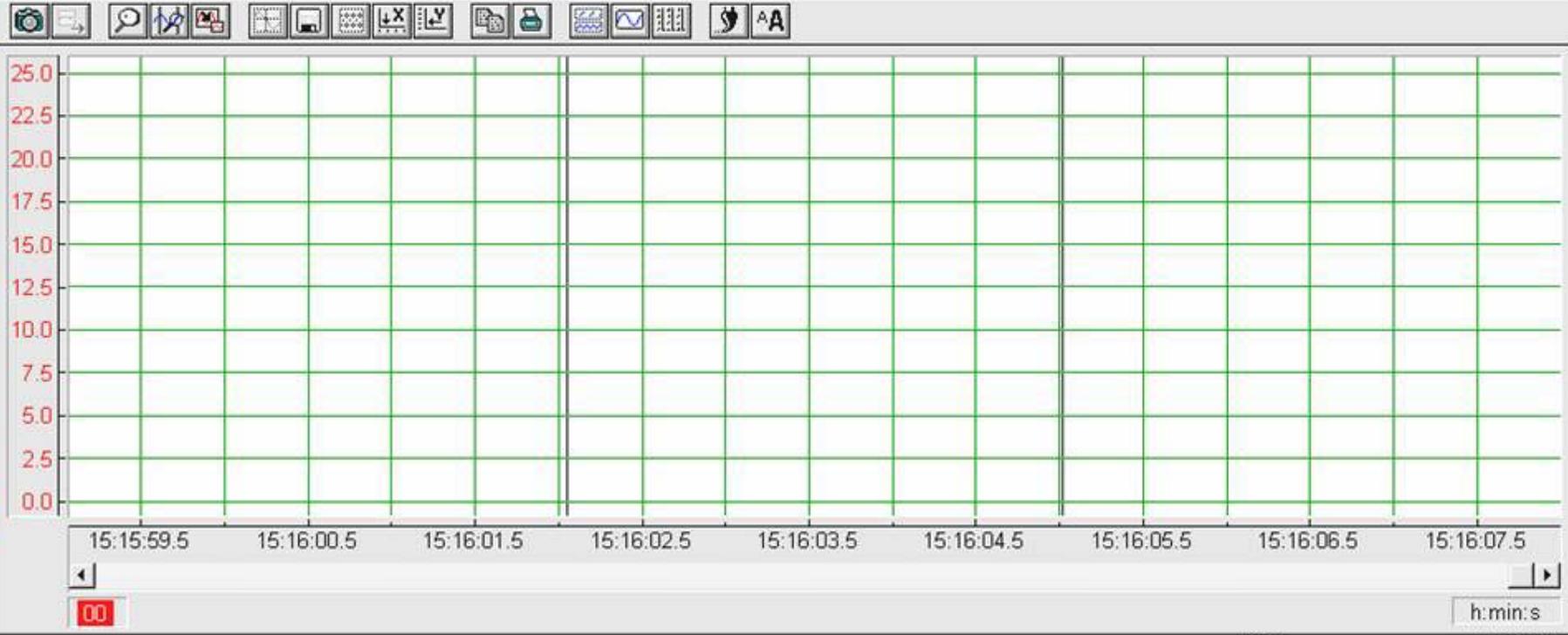
**Roll** [Black screen with green dash]

**Pitch** [Black screen with green dash]

**Write00**

0  
1  
2  
3  
4

GPS information will appear in this location



# Data Analysis Screen

The screenshot displays the DASYLab32 software interface for data analysis. At the top, there are status windows for 'Status Lam00', 'Status Lam01', and 'Status Lam02', each showing a red indicator light and the text 'Status Lamp 0'. The 'Status Lam02' window also shows a green indicator light and the text 'Right Edge'. To the right, there are windows for 'Roll' and 'Pitch', displaying numerical values: '-0.52' and '0.41' respectively.

The main area is a 'Recorder01' window with a graph. The graph has a vertical axis from 0 to 30 and a horizontal axis with time markers from 10:04:15 to 10:05:10. The graph shows two profiles: a red profile labeled 'Uncorrected Bridge Profile' and a blue profile labeled 'Corrected Bridge Profile'. The red profile shows a sharp peak around 10:05:08, while the blue profile shows a much smaller peak at the same time. The graph is overlaid on a green grid.

Annotations with arrows point to various elements:

- 'Lane Location' points to the 'Right Edge' indicator in the Status Lam02 window.
- 'Transverse Angle of the Vehicle' points to the 'Roll' window.
- 'Longitudinal Angle of the Vehicle' points to the 'Pitch' window.
- 'Uncorrected Bridge Profile' points to the red profile on the graph.
- 'Corrected Bridge Profile' points to the blue profile on the graph.
- 'GPS Information' points to the time axis of the graph.

At the bottom, there is a 'Message00' window with the following text:

```
Source: Action00,  
@021113154007N4236059W08428078D002+00276E0000N0000U0000
```

# Data Analysis Screen With Expanded Bridge Area

The screenshot displays the DASYLab32 software interface for bridge data analysis. At the top, there are status windows for 'Status Lam00', 'Status Lam01', and 'Status Lam02', each showing a red indicator light and the text 'Status Lamp 0'. To the right, 'Roll' is displayed as -0.52 and 'Pitch' as 0.41. The main area is a plot window titled 'Recorder01' with a toolbar and a grid. Two waveforms are plotted: a red one at the top and a blue one at the bottom. The y-axis ranges from 0 to 30. The x-axis shows time from 10:05:07.90 to 10:05:08.30. A yellow box labeled 'Uncorrected Data' is positioned above the red waveform. Two arrows point from the text 'Bridge Beam Height Read To The Nearest Tenths of a Foot' to the red and blue waveforms. A 'Recorder01' cursor window is open, showing Channel: Recorder 0, and two cursors with the following data:

Cursor	Y	t1	dt
Cursor 1	14.71 V	10:05:07.93	0.83 s
Cursor 2	14.90 V	10:05:08.76	1.21 Hz

At the bottom, a 'Message00' window shows the source: Action00, @021113154007N4236059W08428078D002+00278E0000N0000U0000. The Windows taskbar at the bottom shows 'Start', 'Microsoft Office Shortcut Bar', 'DASYLab32 - Bridge ...', 'Microsoft PowerPoint - [HI...', and the system clock at 10:14 AM.

# Data Analysis Screen With Expanded Bridge Area

**Status Windows:**

- Status Lam00: Status Lamp 0 (Red)
- Status Lam01: Status Lamp 0 (Red)
- Status Lam02: Status Lamp 0 (Green) Right Edge
- Roll: -0.52
- Pitch: 0.41

**Recorder01 Plot:**

Y-axis: 0 to 30 (Feet and Tenth of Feet)

X-axis: 10:05:07.90 to 10:05:08.80

**Cursor Window (Recorder01):**

Channel:	Recorder 1	
Cursor 1	Y: 14.71 V	Y: 14.89 V
	t1: 10:05:07.93	t2: 10:05:08.76
	dt: 0.83 s	t: 1.21 Hz

**Message00:**

Source: Action00,  
@021113154007N4236059W08428078D002+00278E0000N0000U0000

Bridge Beam Height Read out in Feet and Tenth of Feet

Corrected Data

@021113145428N4239657W08440956D007+00265E0002N0186D0028

Divided up in segments

@02-11-13-14-54-28-N4239657W08440956-D-007 + 00265-E-0002-N-0186-D-0028

02	year
11	month
13	day
14	hour
54	minute
28	second
N4239657W08440956	latitude / longitude
D	up/down vertical direction of travel
007	horizontal position error in meters
00265	altitude above mean sea level in meters
E	east/west direction of travel
0002	east/west velocity magnitude in meters per second.
N	north/south direction of travel
0186	north/south velocity magnitude in meters per second.
D	up/down vertical direction of travel
0028	vertical velocity in meters per second. 0028 = 2.8m/s

GPS Information



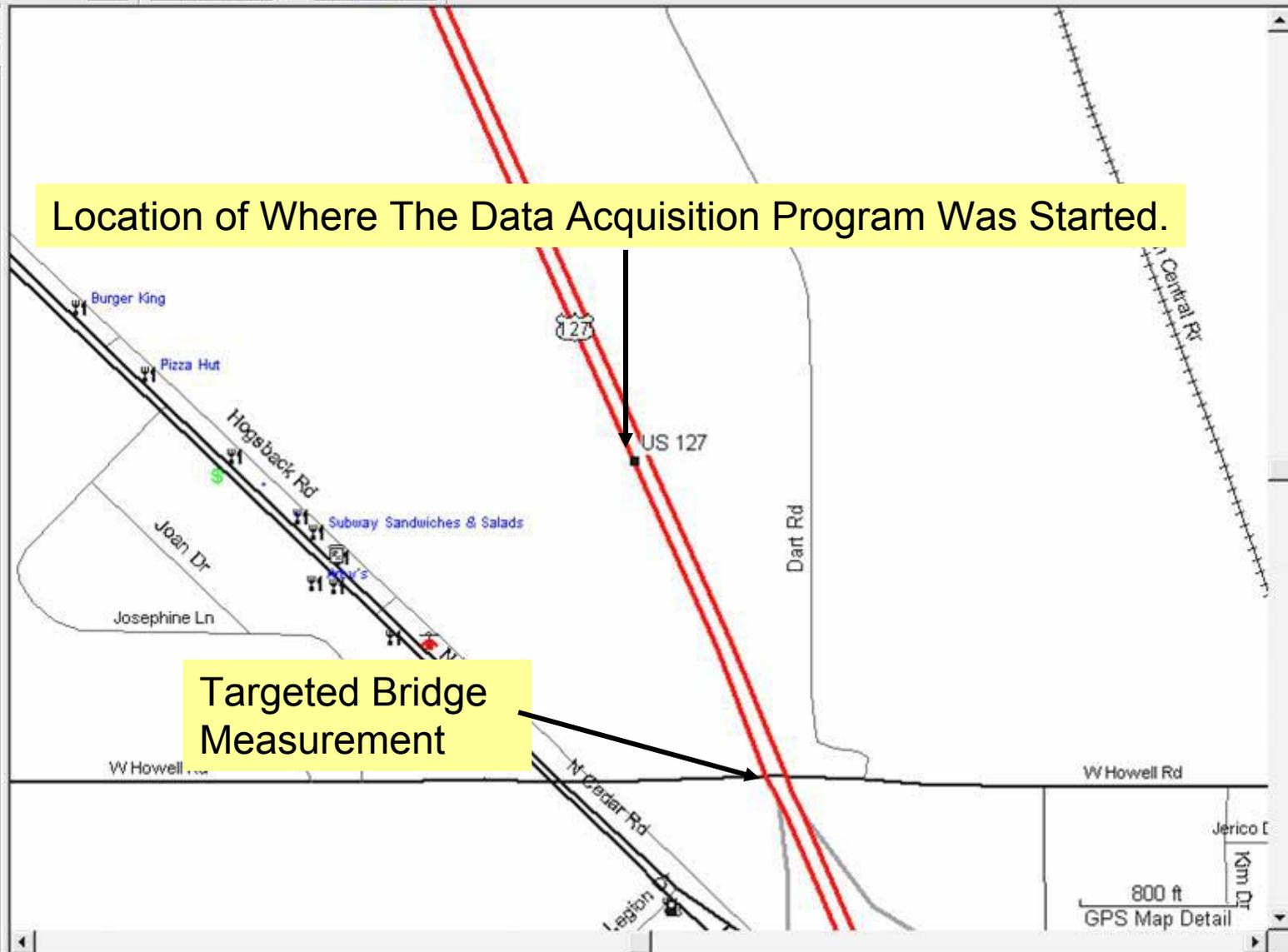
MapSource toolbar and navigation controls including icons for file operations, navigation, and map settings. The text "MetroGuide USA" is visible in the top left of the toolbar area.

MapSource sidebar containing navigation tabs: "Maps", "Waypoints (1)", "Routes", "Tracks", and "GPS". Below these tabs is a table with a "Name" column and an empty row.

Name

Location of Where The Data Acquisition Program Was Started.

Targeted Bridge Measurement



# End of Presentation

For further information about the High Speed Bridge Underclearance Measurement System contact:

Greg Palmer, Electrical Engineer  
Construction & Technology Support Area  
Testing & Research Section  
Systems Technology Unit  
Lansing, MI 48909

Ph. (517) 322-1030

E-mail: [PalmerG@Michigan.gov](mailto:PalmerG@Michigan.gov)