

Design, Implementation, and Impact of the KAITS Queue Warning System



Presentors



- ▶ **Taylor McHenry, KDOT/HDR**
 - ▶ Location, Design, Installation

- ▶ **Tucker Brown, ATMS/SwRI**
 - ▶ Software Implementation



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Content



- ▶ **Site Justification**
- ▶ **Design**
- ▶ **ITS Components**
- ▶ **Software Concepts**
- ▶ **Software Implementation**
- ▶ **Status/Future Plans**

Site Justification



- ▶ Only signalized intersection at K-10 & 27th St. / Wakarusa Dr.
- ▶ Traffic doubled when by-pass was built.
- ▶ Major queuing at K-10 & 27th St. / Wakarusa Dr. intersection, increased crashes



Design



-  Dynamic Message Sign
-  Radar Detector
-  Geometric Improvements/
Intersection Warning Beacons
-  Camera



▶ Radar Detection - 6

- ▶ Placed strategically along K-10.
- ▶ Solar powered.



▶ Dynamic Message Signs (DMS) - 4

- ▶ 800' from other DMS and guide signs.
- ▶ Spaced for diversion.



- ▶ **Pan Tilt Zoom Cameras - 4**
 - ▶ Placed cameras upstream of DMS attached to cabinets.

- ▶ **Flashing Beacon - 4**
 - ▶ Placed 1,300' upstream of the intersection in both directions.



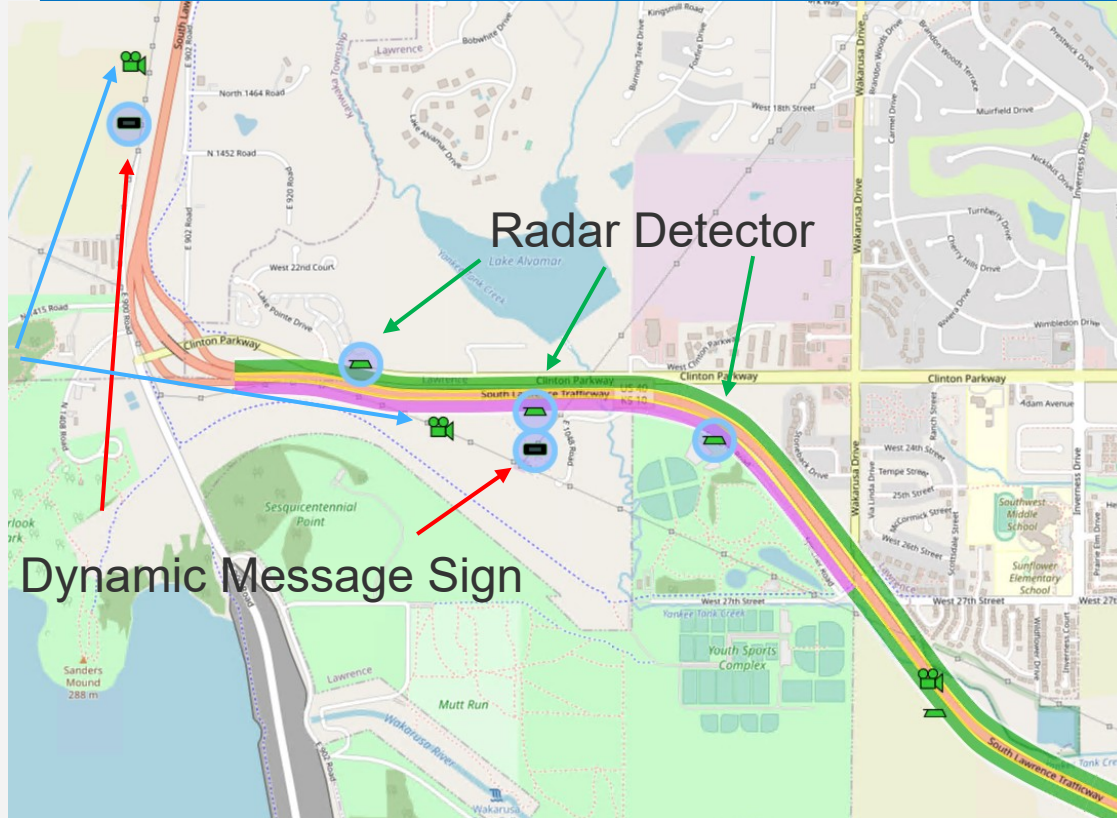
- ▶ **KAITS (Kansas ITS)**
ATMS was deployed in mid 2020
 - ▷ CCTV
 - ▷ DMS
 - ▷ Traffic Sensors
 - ▷ Events
- ▶ **Queue Warning System was added in mid-2021**





- ▶ **Allow for a generic “Corridor”**
 - ▷ Thresholds for “Slow” and “Stopped” Traffic
 - ▷ Associate a DMS
 - ▷ Message for “Slow” and “Stopped” Traffic
 - ▷ Associate Traffic Detection to the DMS to evaluate speed OR speed and volume
- ▶ **Post Messaging based on traffic conditions**

Software Implementation

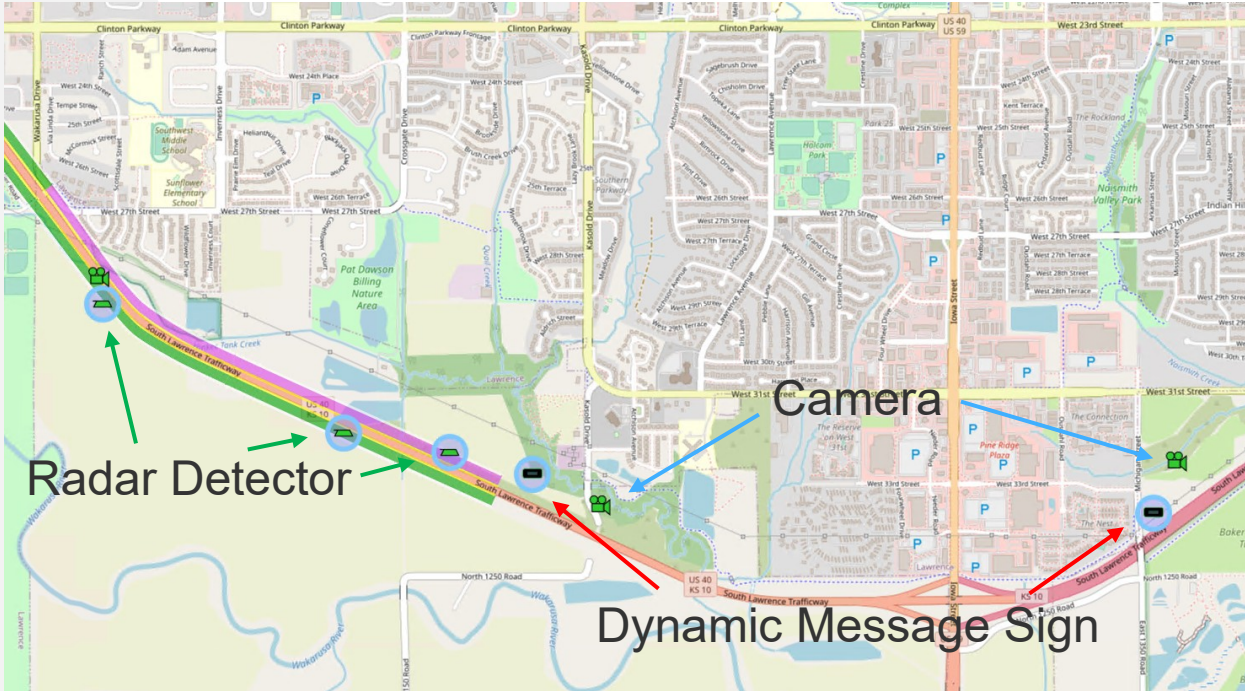


US - 40 Eastbound

Camera

Dynamic Message Sign

Software Implementation



US - 40 Westbound

Software Implementation



Corridor Configuration

Corridors DMS Links Device Location

Name	Description	Slow Speed	Stopped Speed	Min Volume	Use Volume?	Enabled on Startup?	# of DMSes	# of Links
US-40 EB	US - 40 EB Queue Warning Sys...	48	28	5	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	2	3
US-40 WB	US-40/K-10 Queue Warning S...	48	28	5	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	2	3

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DMS	Roadway	Description	Slow Message	Stopped Message	# of Links
<input type="checkbox"/> US-40 EB East of Clinton Pk...	US-40 Eastbound	1-040-3820-1			1
			Until Canceled	20 Until Canceled	15
Link	Roadway	Detector	Detector Description		
US-40 W. of Wakarusa Dr EB	US-40 Eastbound	US-40 W. of Wakarusa Dr	1-040-3842-3		
<input type="checkbox"/> US-40 EB North of Clinton Pkwy	US-40 Eastbound	1-040-3800-1			2
			Until Canceled	20 Until Canceled	15
Link	Roadway	Detector	Detector Description		
US-40 E. of Clinton Pkwy MM...	US-40 Westbound	US-40 E. of Clinton Pkwa...	1-040-3810-3		
US-40 E. of Clinton Pkwy MM...	US-40 Eastbound	US-40 E. of Clinton Pkwa...	1-040-3820-3		

No changes are unsaved.

0
 0
 0
 No status messages reported.

Software Implementation



Corridor Status

Enable Corridor
Disable Corridor
Find on Map
Reset View
Expand All
Collapse All
Corridors
Configure

Name	Description	Queue Status	Op Status	Expected Message	Speed	Volume	Timestamp	Enabled
US-40 EB	US - 40 EB Queue Warning System in...	Stopped	Active				4/21/2022 11:21:46 AM	Yes
US-40 EB East of Clinton Pkwy	1-040-3820-1	Stopped	Active	<div style="border: 2px solid green; padding: 5px; display: inline-block;">STOPPED TRAFFIC AHEAD</div> <div style="border: 2px solid green; padding: 5px; display: inline-block; margin-left: 10px;">BE PREPARED TO STOP</div>				
				Until Canceled	15			
US-40 W. of Wakarusa Dr EB	1-040-3842-3	Stopped	Active		20	20		
US-40 EB North of Clinton Pkwy	1-040-3800-1	Slow	Active	<div style="border: 2px solid green; padding: 5px; display: inline-block;">SLOW TRAFFIC AHEAD</div> <div style="border: 2px solid green; padding: 5px; display: inline-block; margin-left: 10px;">USE CAUTION</div>				
				Until Canceled	20			
US-40 E. of Clinton Pkwy MM 381 EB	1-040-3810-3	Slow	Active		40	20		
US-40 E. of Clinton Pkwy MM 382 EB	1-040-3820-3	Normal	Active					
US-40 WB	US-40/K-10 Queue Warning System WB	Normal	Active					
K-10 WB East of Michigan	1-010-0095-1	Normal	Active					
				0:00:00				
US-40 E. of Wakarusa Dr MM 384.3 WB	1-040-3843-3	Normal	Active					
US-40 WB at Kasold Drive	1-040-3845-1	Normal	Active					
				0:00:00				
US-40 E. of Wakarusa Dr MM 383.8 WB	1-040-3838-3	Normal	Active					
US-40 E. of Wakarusa Dr WB	1-040-3832-3	Normal	Active					

0 0 0 No status messages reported.

Status/Future Plans



- ▶ **Fully operational at this time**
- ▶ **Still in the “adjustment” phase**
 - ▷ Working out thresholds for maximum
- ▶ **Future Plans**
 - ▷ Potential integration with RWIS
 - ▷ Potential to include diversion routes in the messaging



THANKS!

Any questions?

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