

# Road AI

Computer vision enabled highway data collection

Vaisala and Louth County Council

Henry Brocklehurst and Declan Mac Mahon



**VAISALA**

VAISALA



Collect Geospatial video across your road network using a smartphone

# Collect video through the RoadAI app

- Deploy in any existing vehicle
- User friendly
- Flexibility and control



# Vaisala Road AI – Service Architecture

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## DATA COLLECTION



- Video Recording with RoadAI smartphone application

## DATA PROCESSING



- Cloud based data storage
- Processing through machine-learning software

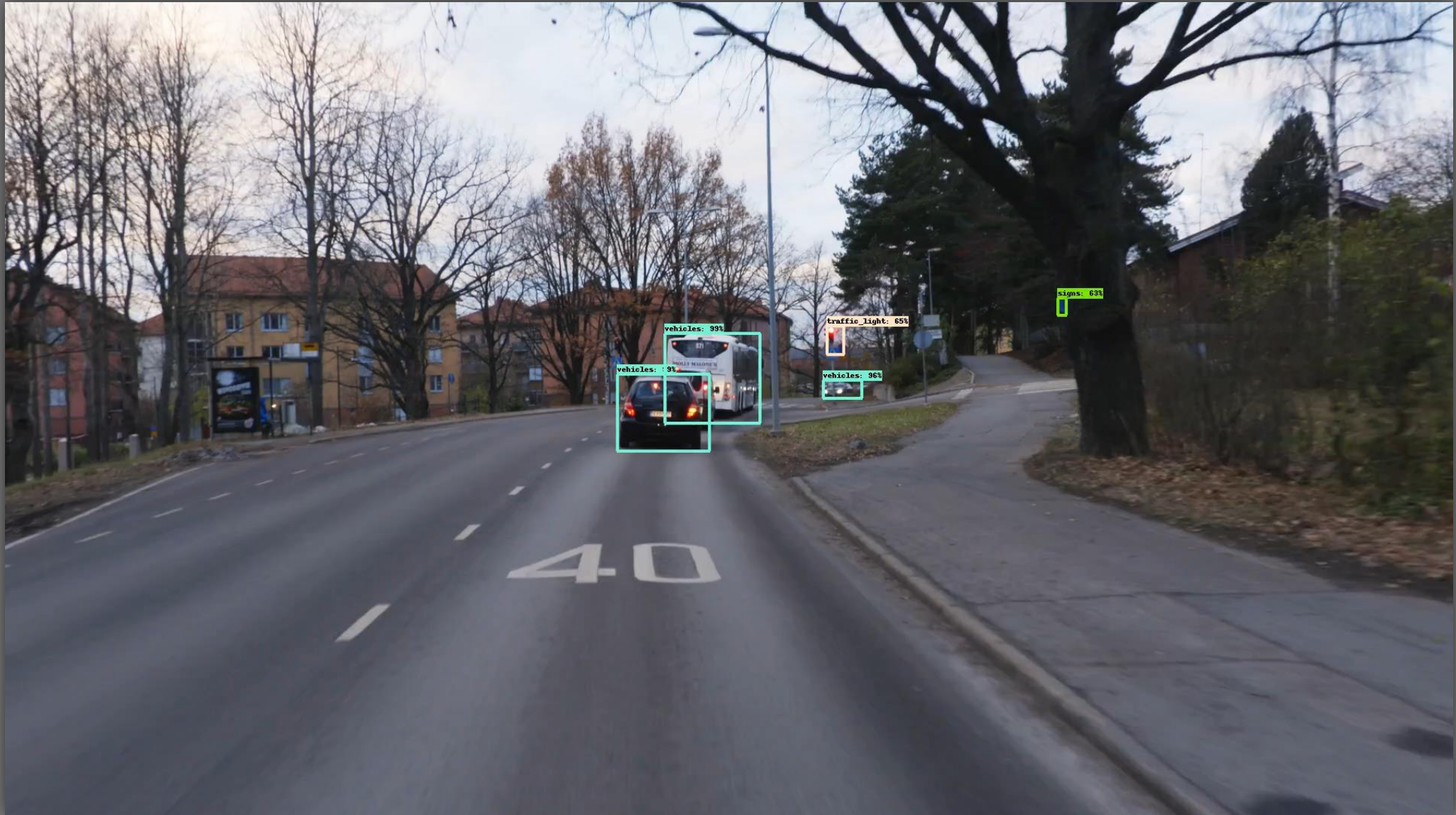
## DATA MANAGEMENT



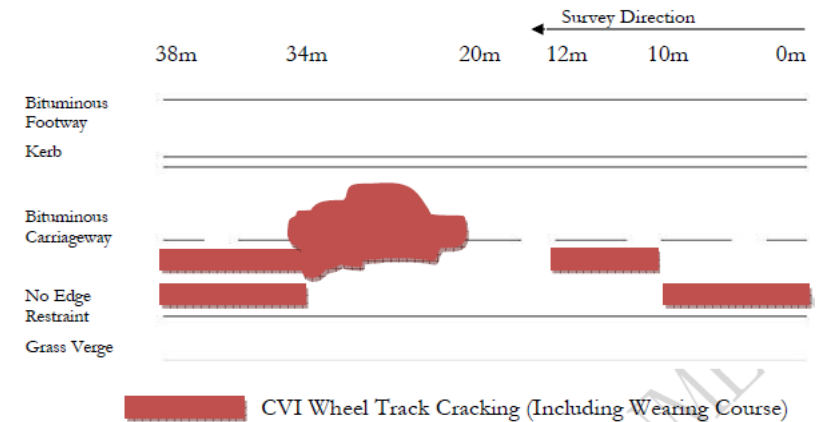
- Web based user interface
- Data transfer to other graph-based system (Excel/CSV file, GIS, HMDIF)



ENCRYPTED DATA TRANSFER



## Previous process





# Dynamic Digital Twin

VAISALA | Data

LOUTH COUNTY COU... LOUTH COUNTY COU...

ROAD SURFACE CONDI...

- 100.00 %
- 75.00 %
- 50.00 %
- 25.00 %
- 0.00 %

30/08/2023, 16:00:49 GMT+1

LON: -6.46953° LAT: 53.90721°

R-166 R-166-353 1835 m

- Light
- Light terrain
- Dark
- Streets
- Satellite
- Road network
- Videos
- Bumps
- Annotations
- Devices
- Potholes
- Traffic signs
- Surface markings

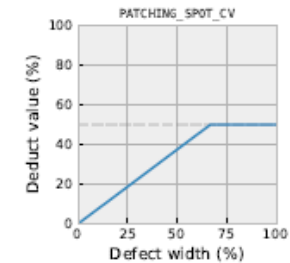
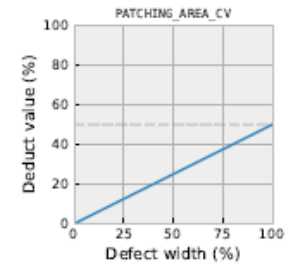
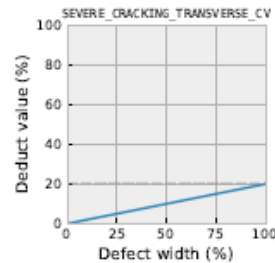
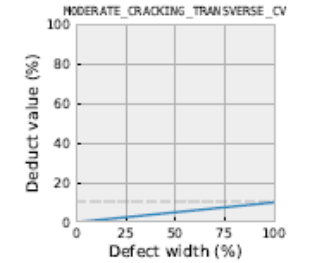
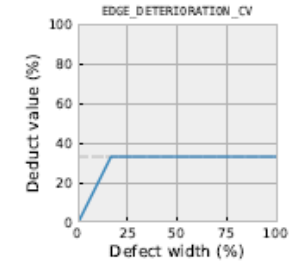
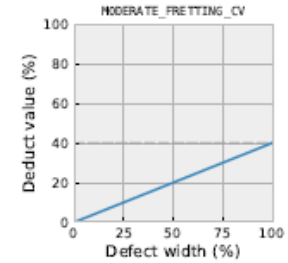
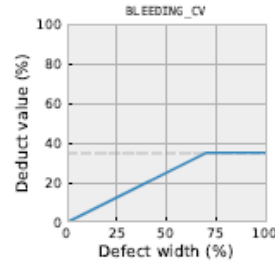
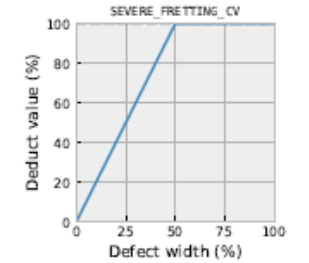
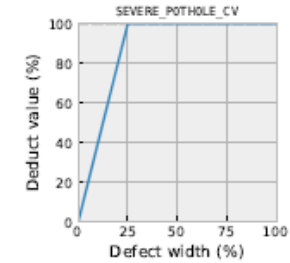
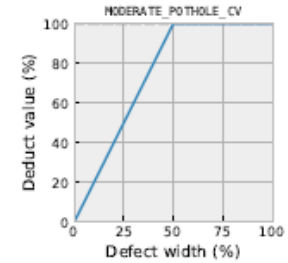
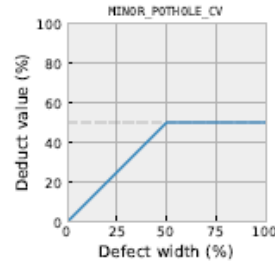
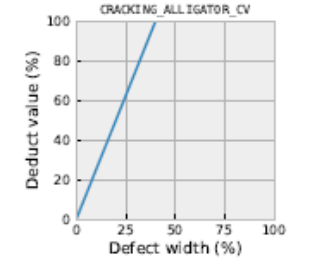
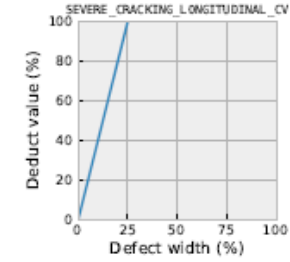
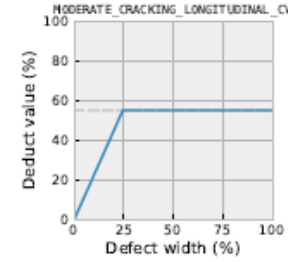
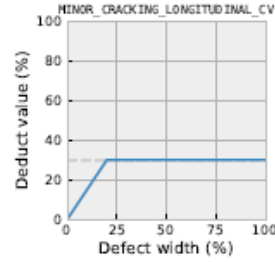
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# Pavement defects and appropriate maintenance strategies:

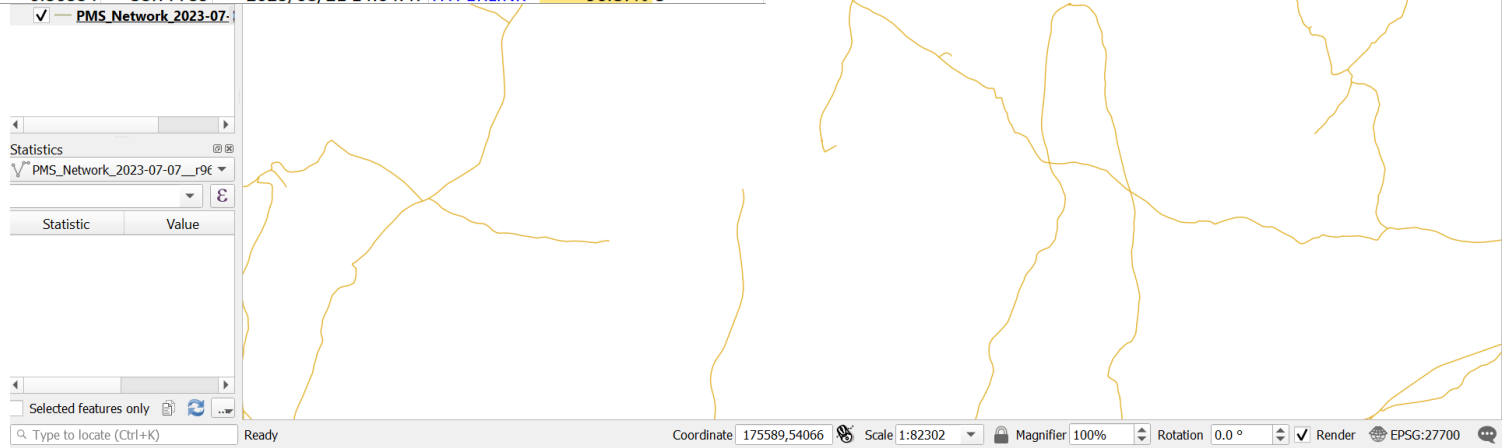
- Longitudinal cracking
- Transverse cracking
- Alligator cracking
- Wheel track cracking
- Fretting
- Binder bleeding
- Edge deterioration
- Potholes
- Settlement
- Subsidence
- Rutting
- Patching
- Sealing
- High Friction Surfaces

- Customisable condition scoring



## Versatile Reporting

1	SegmentCod	Route Numbe	RoadClass	From meters	To meters	Length	Longitude	Latitude	Time (UTC)	Map link	Pavement condition	Pavement con
2	L-2278-32	L-2278	LP	0.00	10.00	10.00	-6.30300	53.77862	2023/08/21 14:05:00	<a href="#">HYPERLINK</a>	91.22%	5
3	L-2278-32	L-2278	LP	10.00	20.00	10.00	-6.30300	53.77857	2023/08/21 14:05:00	<a href="#">HYPERLINK</a>	91.22%	5
4	L-2278-32	L-2278	LP	20.00	30.00	10.00	-6.30300	53.77848	2023/08/21 14:04:58	<a href="#">HYPERLINK</a>	74.36%	4
5	L-2278-32	L-2278	LP	30.00	40.00	10.00	-6.30299	53.77839	2023/08/21 14:04:57	<a href="#">HYPERLINK</a>	100.00%	5
6	L-2278-32	L-2278	LP	40.00	50.00	10.00	-6.30299	53.77830	2023/08/21 14:04:56	<a href="#">HYPERLINK</a>	100.00%	5
7	L-2278-32	L-2278	LP	50.00	60.00	10.00	-6.30298	53.77821	2023/08/21 14:04:56	<a href="#">HYPERLINK</a>	100.00%	5
8	L-2278-32	L-2278	LP	60.00	70.00	10.00	-6.30298	53.77812	2023/08/21 14:04:55	<a href="#">HYPERLINK</a>	96.35%	5
9	L-2278-32	L-2278	LP	70.00	80.00	10.00	-6.30297	53.77804	2023/08/21 14:04:54	<a href="#">HYPERLINK</a>	89.24%	5
10	L-2278-32	L-2278	LP	80.00	90.00	10.00	-6.30295	53.77793	2023/08/21 14:04:53	<a href="#">HYPERLINK</a>	85.80%	5
11	L-2278-32	L-2278	LP	90.00	100.00	10.00	-6.30295	53.77784	2023/08/21 14:04:52	<a href="#">HYPERLINK</a>	86.34%	5
12	L-2278-32	L-2278	LP	100.00	110.00	10.00	-6.30296	53.77775	2023/08/21 14:04:51	<a href="#">HYPERLINK</a>	95.63%	5
13	L-2278-32	L-2278	LP	110.00	120.00	10.00	-6.30300	53.77766	2023/08/21 14:04:50	<a href="#">HYPERLINK</a>	80.77%	5
14	L-2278-32	L-2278	LP	120.00	130.00	10.00	-6.30306	53.77759	2023/08/21 14:04:49	<a href="#">HYPERLINK</a>	83.90%	5
15	L-2278-32	L-2278	LP	130.00	140.00	10.00	-6.30314	53.77752	2023/08/21 14:04:48	<a href="#">HYPERLINK</a>	85.71%	5
16	L-2278-32	L-2278	LP	140.00	150.00	10.00	-6.30324	53.77745	2023/08/21 14:04:48	<a href="#">HYPERLINK</a>	85.23%	5
17	L-2278-32	L-2278	LP	150.00	160.00	10.00	-6.30334	53.77739	2023/08/21 14:04:47	<a href="#">HYPERLINK</a>	96.87%	5



100



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MK/REDWAY 2021 MILTON KEYNES

**SURFACE DEFECTS**

- No surface defects
- Moderate transverse cracking
- Severe transverse cracking
- Moderate longitudinal cracking
- Severe longitudinal cracking
- Bleeding
- Severe fretting

Light  
Light terrain  
Dark  
Streets  
Satellite

Road network  
Routes  
Traffic Signs  
Annotations  
Devices

15/10/2021, 14:37:57  
LON: -0.77007° LAT: 52.01000°

2:08 1X HD -10 -1 +1 +10

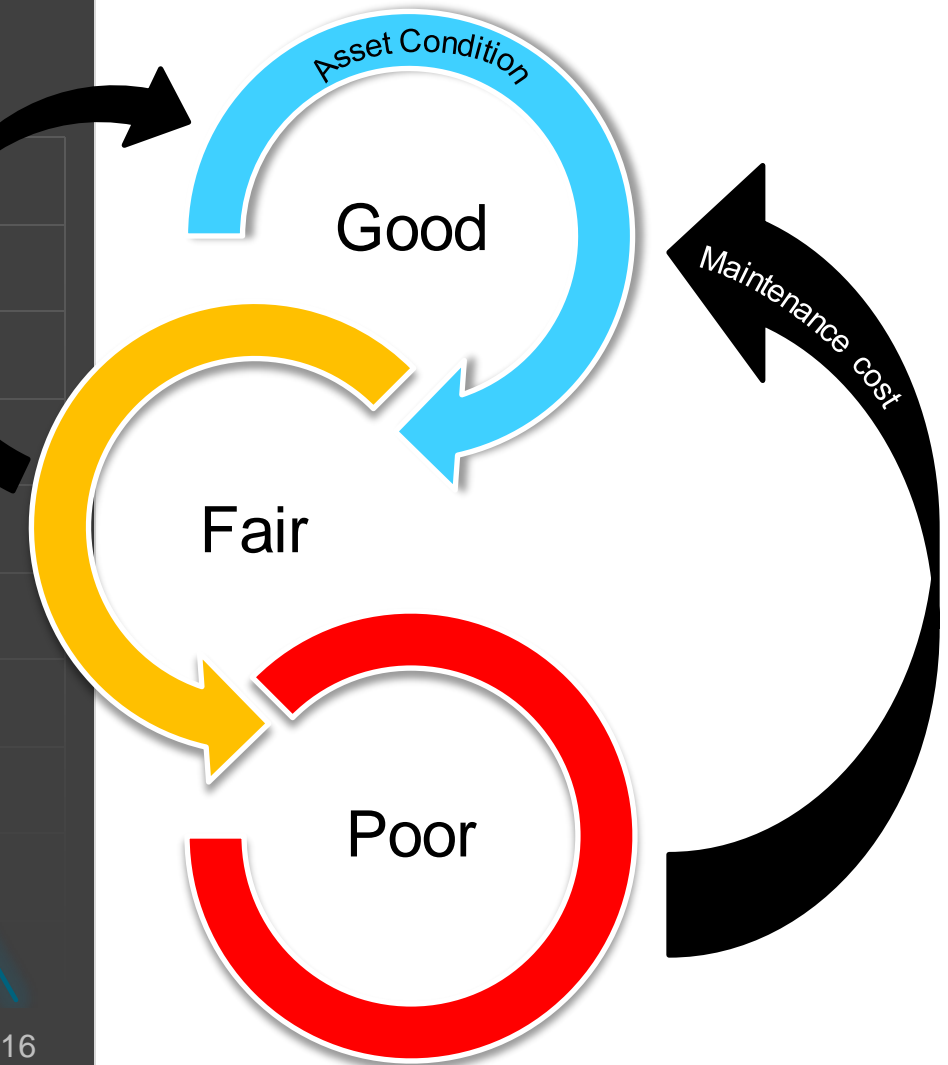
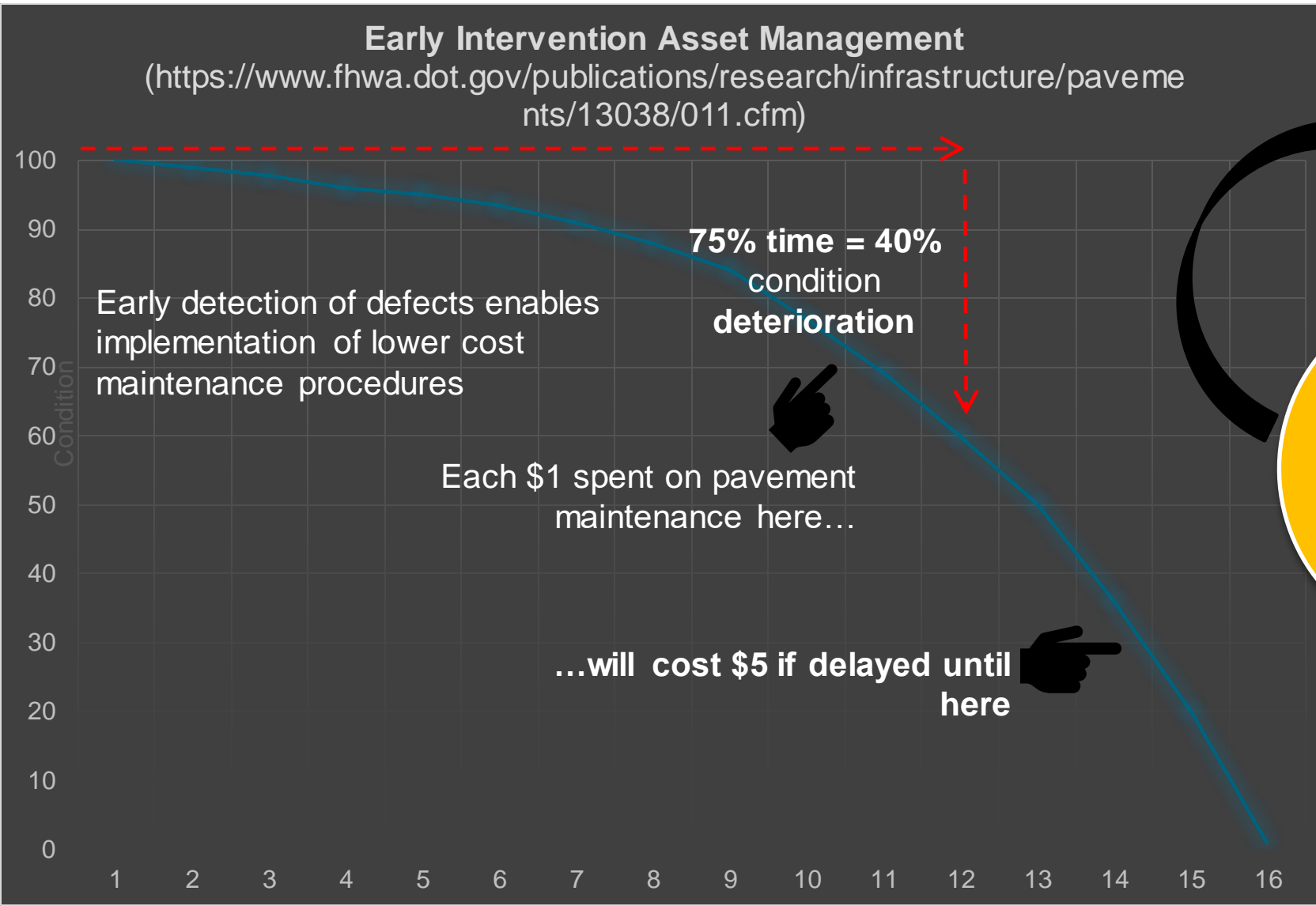
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## Early Intervention Asset Management

Early Intervention Asset Management  
 (https://www.fhwa.dot.gov/publications/research/infrastructure/pavements/13038/011.cfm)



## COMPUTER VISION



- Objective
- Transparent
- Reactive maintenance
- Planned maintenance
- Asset inventory management

# VAISALA

Henry Brocklehurst

Sales Manager – Road Asset Management

[henry.brocklehurst@vaisala.com](mailto:henry.brocklehurst@vaisala.com)

+44 7769 907925