

Google Glass In-Service Road Safety Review Pilot Project

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Fireseeds North Infrastructure

Outline

- ▶ **Google Glass**
- ▶ **In-Service Road Safety Review (ISRSR)**
- ▶ **ISRSR using Google Glass Concept and the Application**
- ▶ **Pilot Project Overview: Yukon, Ottawa, Strathcona County**
- ▶ **Phase 1 Preliminary Results**



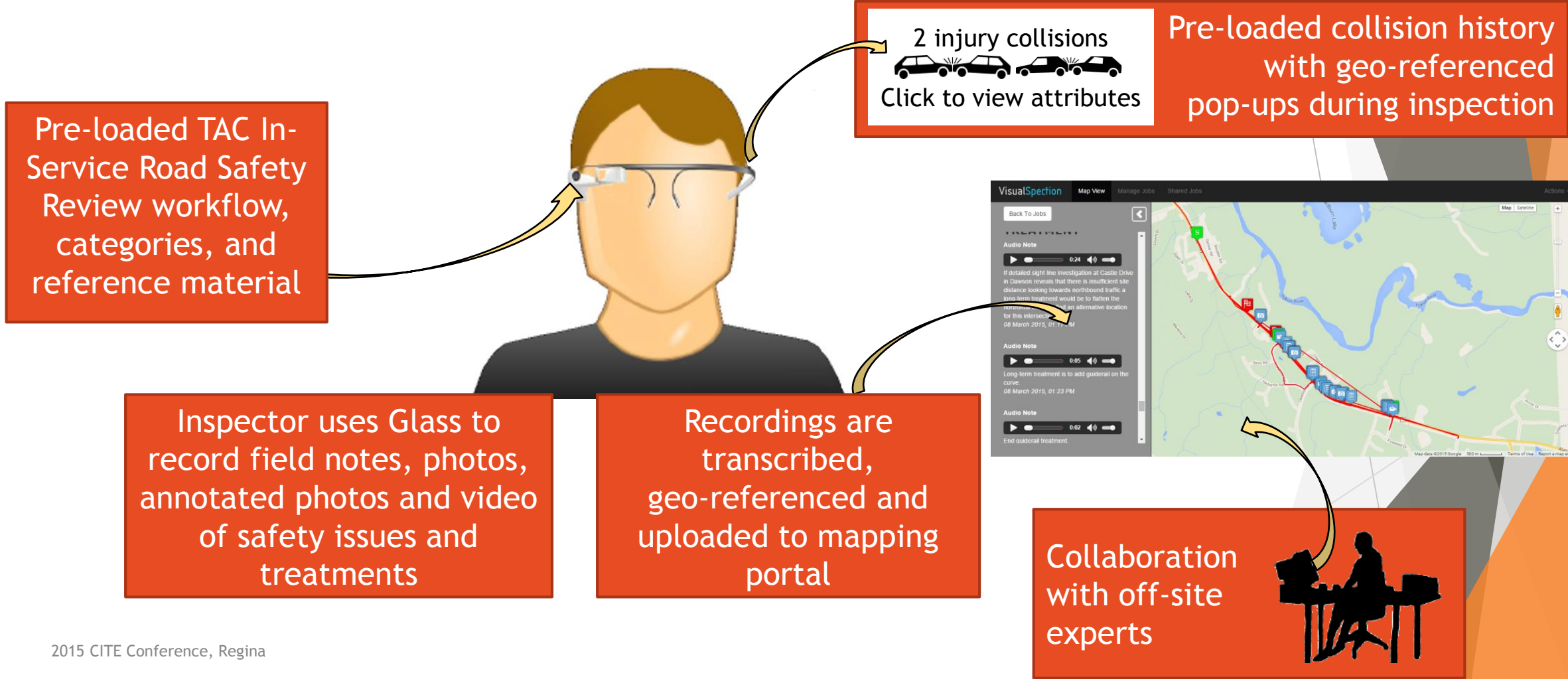
- ▶ **Smart eyewear with projected screen**
 - ▶ **GPS connectivity (Bluetooth)**
- ▶ **Audio, video, photo recording capability**
 - ▶ **Voice commands (hands-free)**
 - ▶ **Preload information**
 - ▶ **Link to online mapping portal**
 - ▶ **Customized applications**

In-Service Road Safety Review

- ▶ “An in-depth engineering study of an existing road using road safety principles with the purpose of identifying cost-effective countermeasures that would improve road safety and operations of all road users.” – Zein, S., (2004) *The Canadian Guide to In-Service Road Safety Reviews*, G.D. Hamilton Associates Consulting Ltd., Transportation Association of Canada.



ISRSR using Google Glass Concept





VISUAL SPECTION

☰ 45.42161, -75.69541

Tap for options



Start

VISUAL SPECTION

45.42161, -75.69541

Tap for options





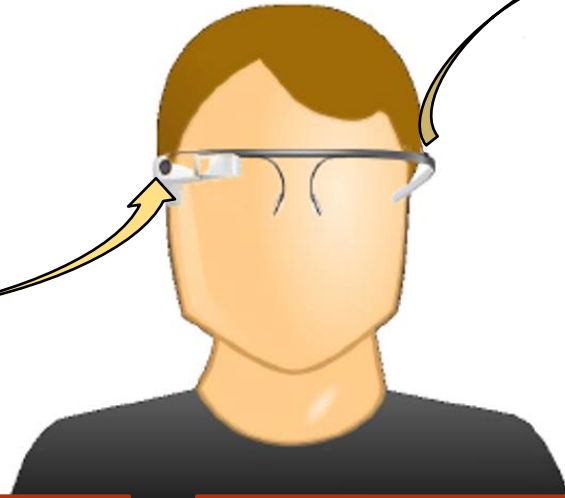
Tap to finish recording

Swipe down to cancel



ISRSR using Google Glass Concept

Pre-loaded TAC In-Service Road Safety Review workflow, categories, and reference material



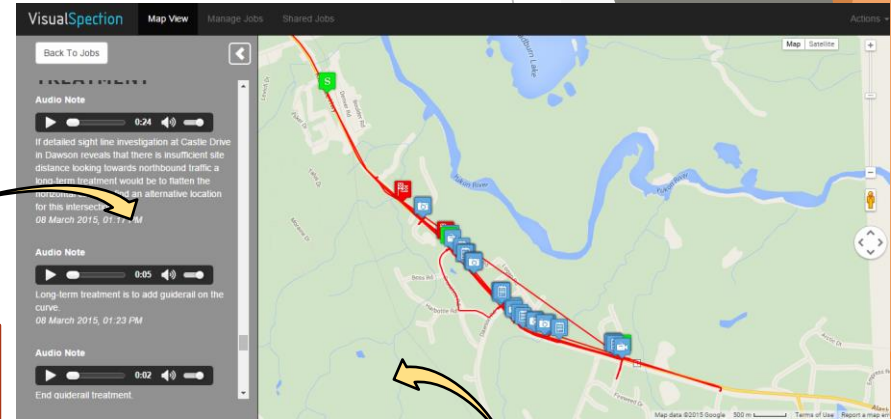
2 injury collisions
Click to view attributes



Pre-loaded collision history with geo-referenced pop-ups during inspection

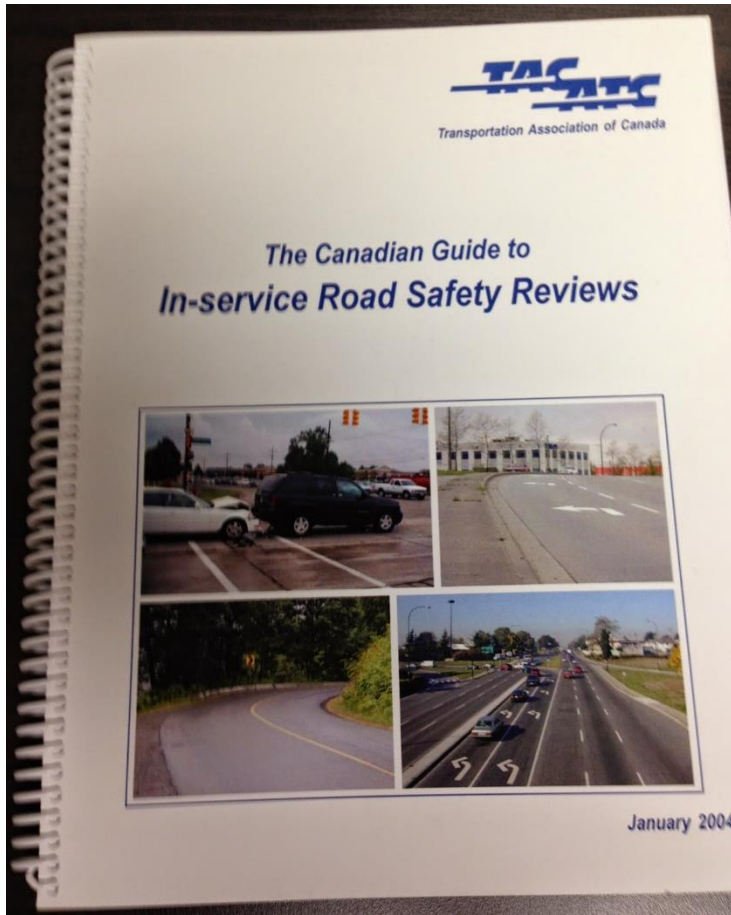
Inspector uses Glass to record field notes, photos, annotated photos and video of safety issues and treatments

Recordings are transcribed, geo-referenced and uploaded to mapping portal



Collaboration with off-site experts





Overview

Job: 2015-04-15 16:29:51

Tap for options

Geometric

Job: 2015-03-08 12:47:51

Tap for options

Operational

Job: 2015-03-08 12:47:51

Tap for options

Human Factor

Job: 2015-03-08 12:47:51

Tap for options

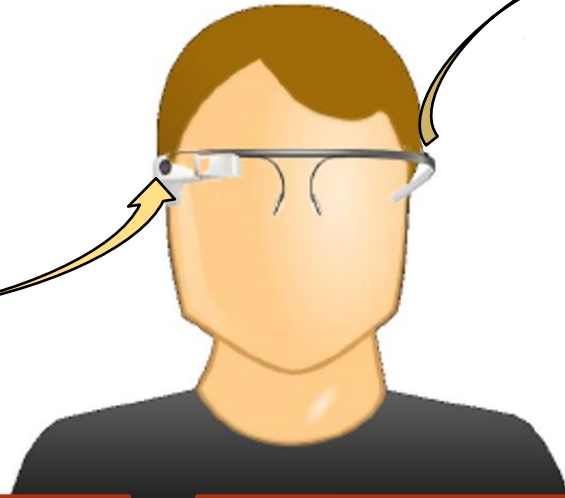
Miscellaneous

Job: 2015-04-15 16:29:51

Tap for options

ISRSR using Google Glass Concept

Pre-loaded TAC In-Service Road Safety Review workflow, categories, and reference material



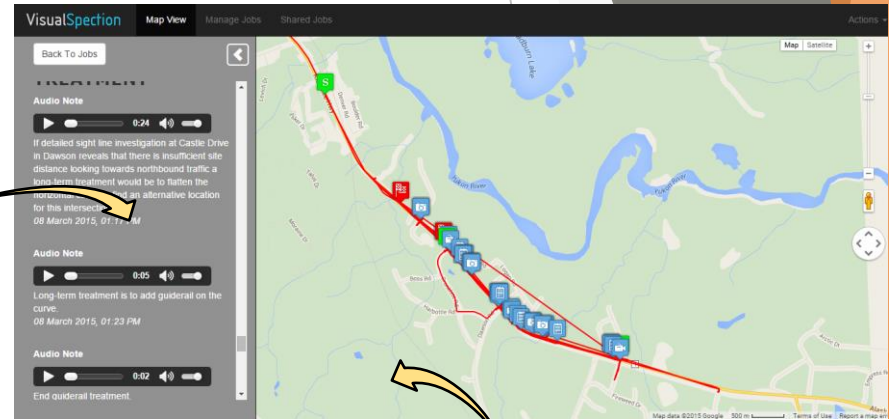
2 injury collisions
Click to view attributes



Pre-loaded collision history with geo-referenced pop-ups during inspection

Inspector uses Glass to record field notes, photos, annotated photos and video of safety issues and treatments

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Collaboration with off-site experts




 Options Turn OFF

Notifications are: **ENABLED**

Notes on device: 151

Radius set to: 500m

 20m 50m 100m 500m



6 Nearby Issues Detected

Tap for details



100XXXXX : FATAL:
DD-MMM-YYYY
Head On
No_Veh: 2
V1: Unknown, Weather Condition



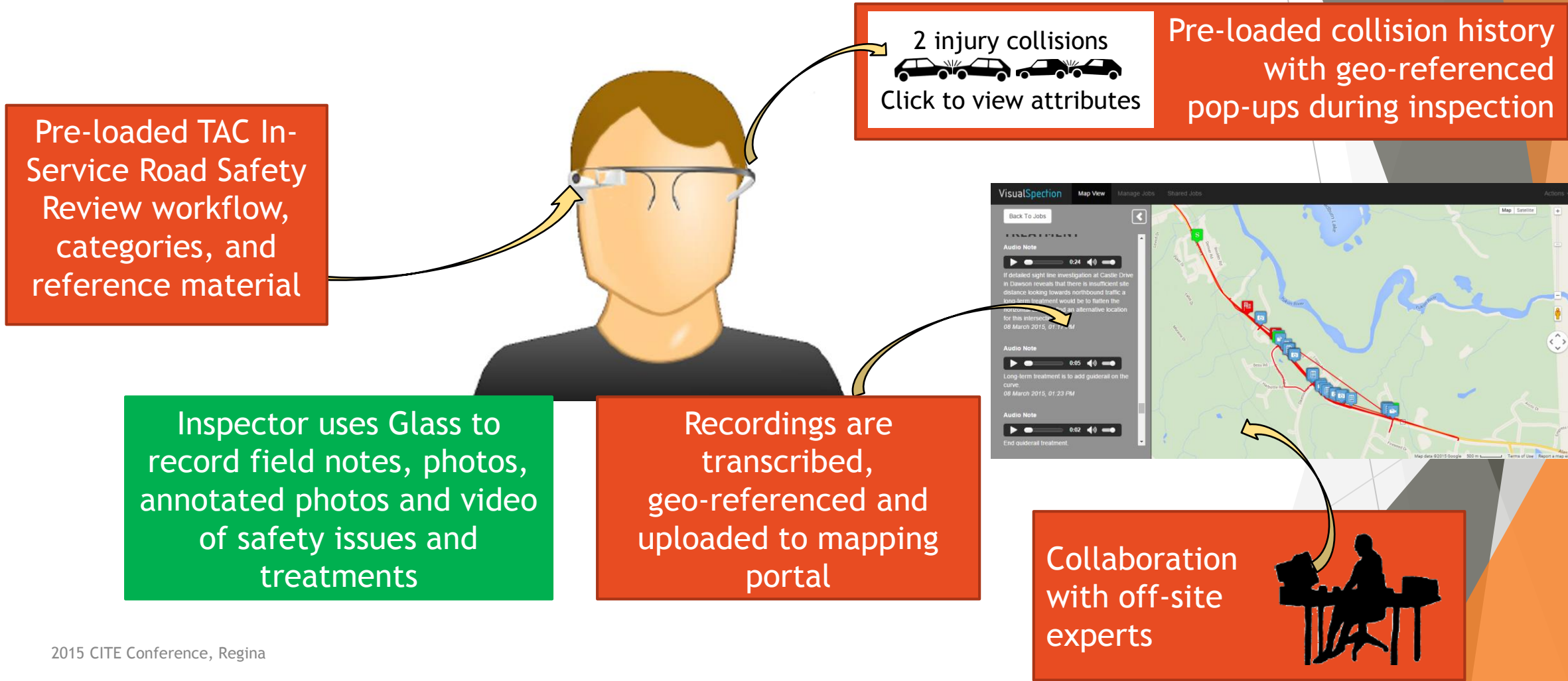
Tap for more


13XXX: PDO:
DD-MMM-YYYY
Off Road Left
No_Veh: 1
V1: Going Straight Ahead, Driving Too
Fast For Road Conditions




Tap for more


ISRSR using Google Glass Concept




 Field note
Geometric


Job: 2015-03-08 12:47:51 **Issue** Tap for options




 Photo
Geometric


Job: 2015-03-08 12:47:51 **Issue** Tap for options




 Annotated Photo
Operational

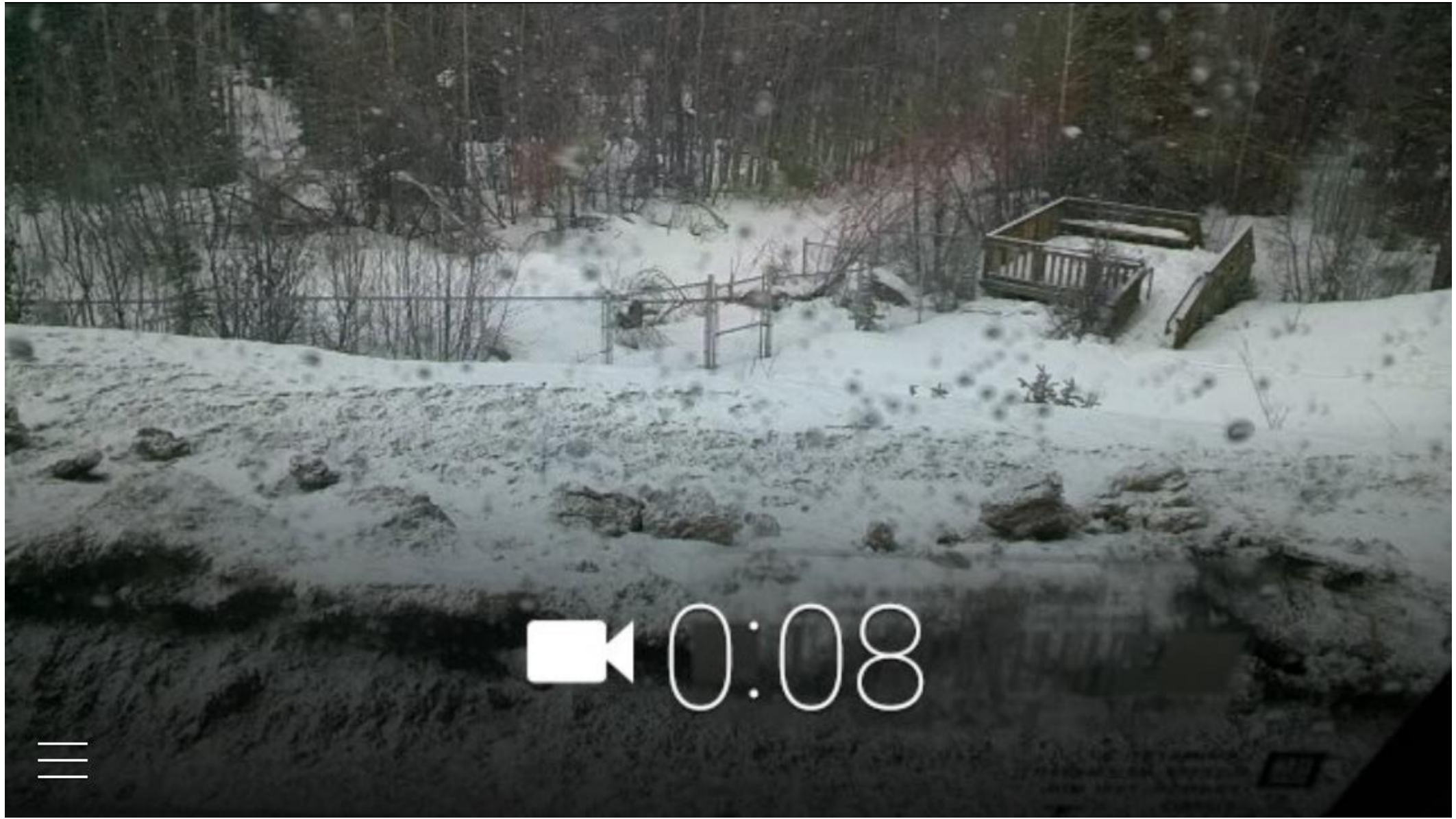
Job: 2015-04-15 16:29:51 **Issue** Tap for options



 Video
Geometric

Job: 2015-03-08 12:47:51 **Issue** Tap for options



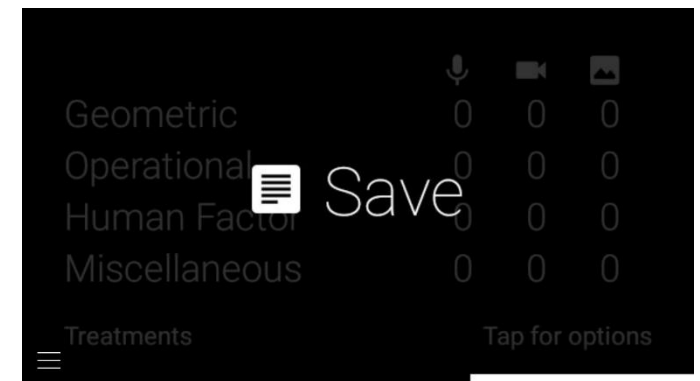
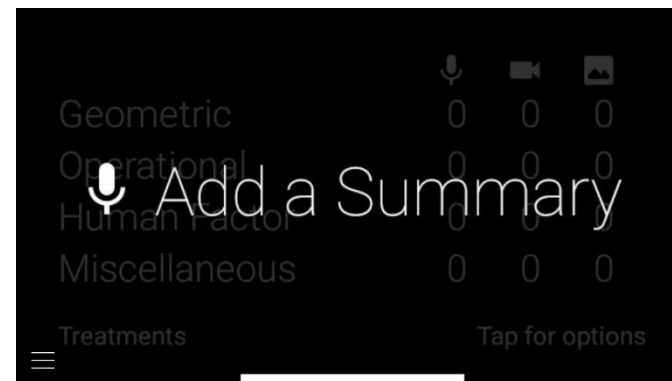
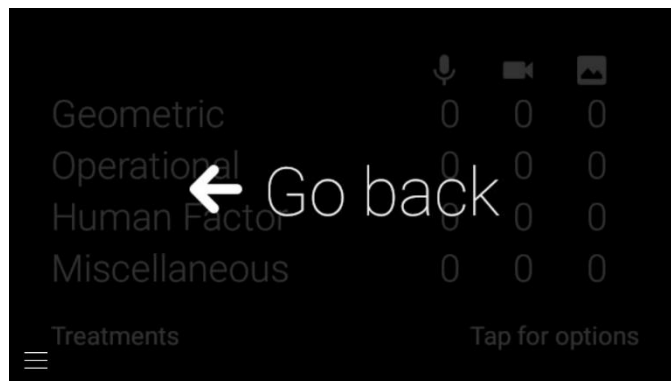
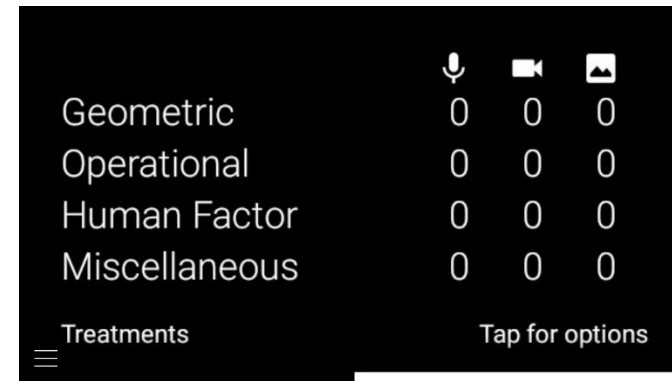
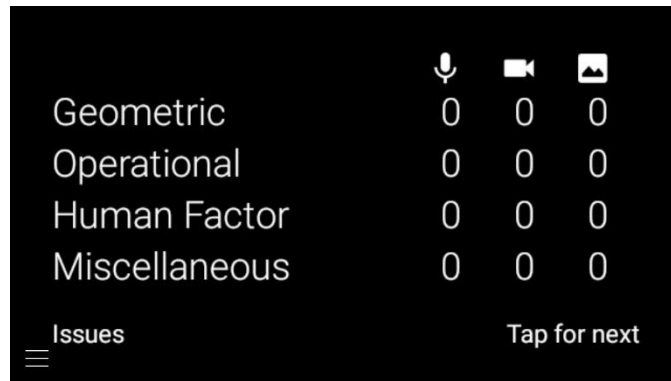
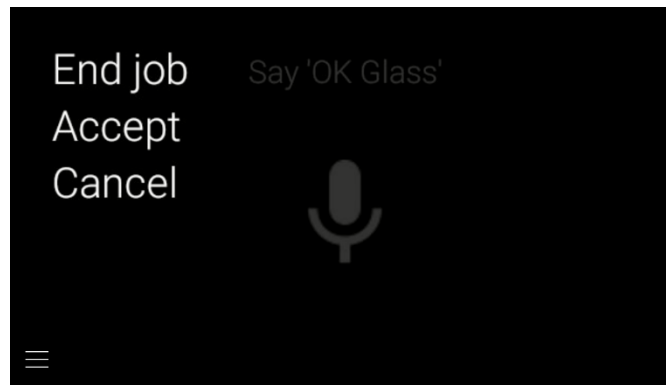




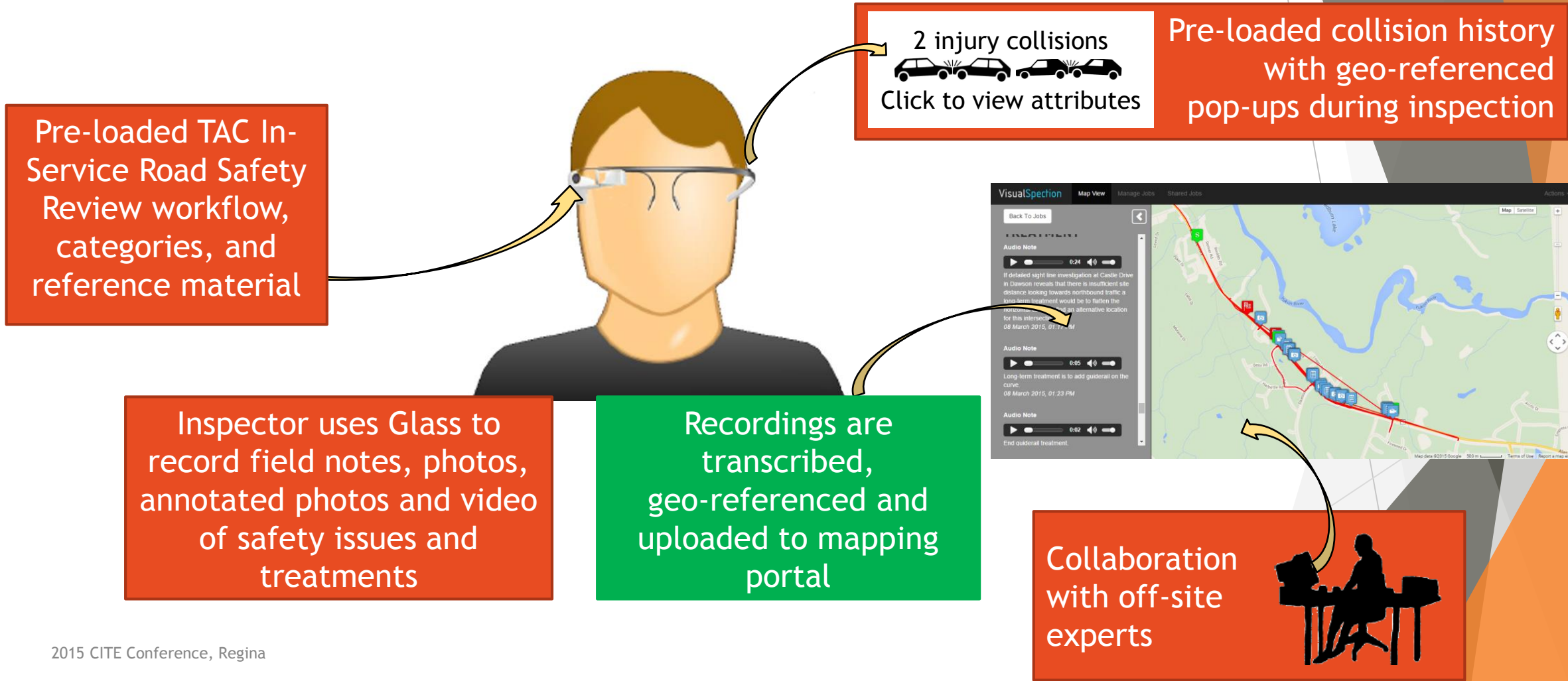
 Stop recording

 0:24





ISRSR using Google Glass Concept



Search terms

Search

Action ▾

No job selected.



Name	Latitude	Longitude	Videos	Notes	Photos	Created By	Start Time↓	End Time
Alaska Highway Kathleen Ave to 12th Ave Night Visit			15	17	9	fireseeds	30 March 2015, 09:59 PM	
Alaska Highway Kathleen Ave to 12th Ave Day Visit			26	25	10	fireseeds	30 March 2015, 09:58 PM	
RECEIVE COPY			3	4	3	fireseeds	30 March 2015, 04:40 PM	
2015-03-26 10:11:19	49.80283827059883	-97.14918371299017	1	2	1	fireseeds	26 March 2015, 10:11 AM	
2015-03-26 10:02:30	49.80280237740213	-97.14875219329271	2	1	5	fireseeds	26 March 2015, 10:02 AM	26 March 2015, 10:10 AM
2015-03-24 11:35:57	49.80286115319449	-97.14882379406797	2	2	2	fireseeds	24 March 2015, 11:35 AM	24 March 2015, 11:43 AM
Alaska Highway near Teslin km 1248 to 1258 night visit	60.168718560654824	-132.7318203729882	9	12	7	fireseeds	08 March 2015, 08:41 PM	08 March 2015, 09:26 PM
Alaska Highway Near Teslin km 1242-1252 Day visit 2015-03-08 18:46:32	60.16847158782184	-132.72919289767742	14	44	1	fireseeds	08 March 2015, 06:46 PM	08 March 2015, 08:02 PM
Alaska Highway breaker to Engelman	60.61850904492719	-134.97044222441966	11	36	7	fireseeds	08 March 2015, 12:47 PM	08 March 2015, 02:13 PM
Alaska Hwy., Weichert and Clemente visit	60.618564816950155	-134.97035316492796	0	0	0	fireseeds	08 March 2015, 12:47 PM	
Alaska Highway breaker to Engelman Davis at	60.6191146385729	-134.97132916712255	0	0	0	fireseeds	08 March 2015, 12:46 PM	08 March 2015, 12:46 PM
Alaska height weight Laker to Nichelmann visit	60.638546804287465	-135.00274671332897	0	0	0	fireseeds	08 March 2015, 12:44 PM	08 March 2015, 12:45 PM
Alaska Highway from 12th Ave. to Kathleen Davis visit Park for	60.774442995898426	-135.1540712825954	15	14	5	fireseeds	08 March 2015, 10:29 AM	08 March 2015, 11:40 AM
Alaska Highway 12 Avenue to Kathleen Davis at three	60.75998697895557	-135.13994702138007	6	9	5	fireseeds	08 March 2015, 09:53 AM	
Alaska Highway 12 Avenue to Kathleen the concert visit number two part two	60.77587114652691	-135.1553475951172	2	1	0	fireseeds	08 March 2015, 09:34 AM	
Alaska Highway from 12th Ave. to Kathleen daytime visit	60.76063443912264	-135.1391780540522	3	1	0	fireseeds	08 March 2015, 09:08 AM	08 March 2015, 09:33 AM
Alaska Highway might visit from Engelman to Blaker	60.60452790465206	-134.92434343323112	3	21	3	fireseeds	07 March 2015, 08:46 PM	07 March 2015, 09:51 PM
Testing video function	60.73381645604968	-135.07436432875693	1	0	0	fireseeds	07 March 2015, 04:20 PM	07 March 2015, 04:21 PM
2 mile Hill will update it to	60.72770546196096	-135.09194671188956	13	2	1	fireseeds	07 March 2015, 12:06 PM	07 March 2015, 12:57 PM
Two Mile Hill Day Visit	60.73423521593213	-135.09547633118927	25	17	13	fireseeds	07 March 2015, 10:35 AM	07 March 2015, 12:02 PM
Test	60.734079061076045	-135.09794077835977	0	0	0	fireseeds	07 March 2015, 10:31 AM	07 March 2015, 10:32 AM
Amanda tomorrow Hill	60.734027554281056	-135.09797774255276	1	0	2	fireseeds	07 March 2015, 10:13 AM	07 March 2015, 10:31 AM
Hope this test to	0.0	0.0	0	0	1	fireseeds	07 March 2015, 09:32 AM	07 March 2015, 10:11 AM
Opus test tomorrow Hill	60.72941666934639	-135.0994726549834	2	3	0	fireseeds	07 March 2015, 09:01 AM	

Back To Jobs

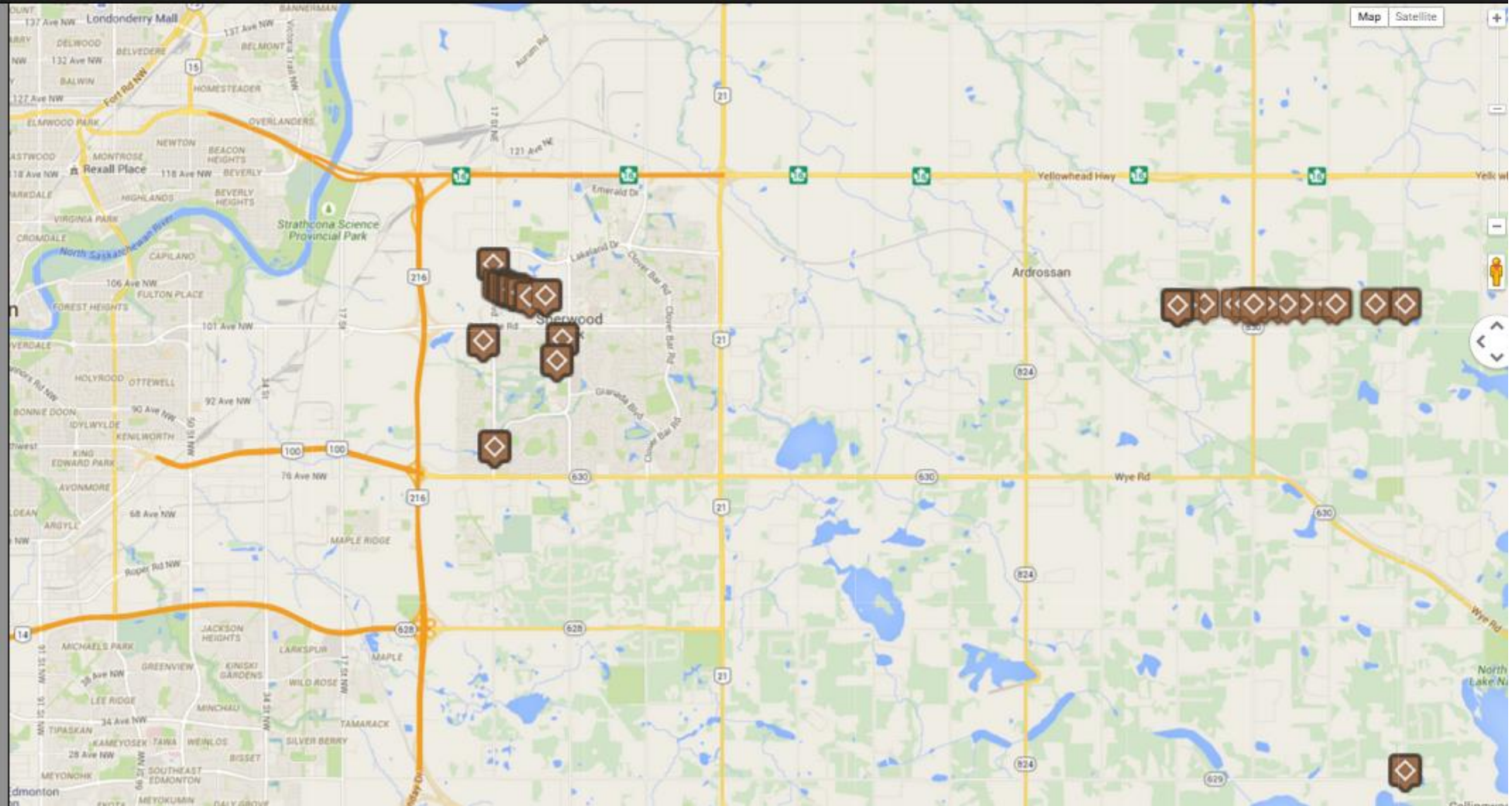
CONFIGURATION

Right angle collisions are overrepresented at the study site compared with the network average (PR 6.9). Failing to proceed in safety and failing to stop were the most common primary causes of right angle collisions.

Passing-left turn collisions are overrepresented at the study site compared with the network average (PR 6.4). Failing to stop was the primary cause of the passing-left turn collision.

Sideswipe-opposite direction collisions are overrepresented at the study site compared with the network average (PR 3.8). Failing to stop and losing control were the primary causes of sideswipe-opposite direction collisions.

Right angle collisions are overrepresented at the study site compared with the network average (PR 6.9). Failing to proceed in safety and failing to stop were the most common primary causes of right angle collisions.



Back To Jobs

About 100 m north of the study segment for maybe 600 or 700 m side slope looks steeper than 3 to 1 and it could be flattened.
08 March 2015, 01:02 PM

Audio Note

Play Audio

This is a access to someone's private driveway
08 March 2015, 01:18 PM

Audio Note

Play Audio

Approximate site distance limit for Dawson and Castle Drive intersection. (This point was used to estimate sight distance was about 360m, or sufficient, and is related to several other comments that the distance may be insufficient at this location).
08 March 2015, 01:18 PM

Audio Note

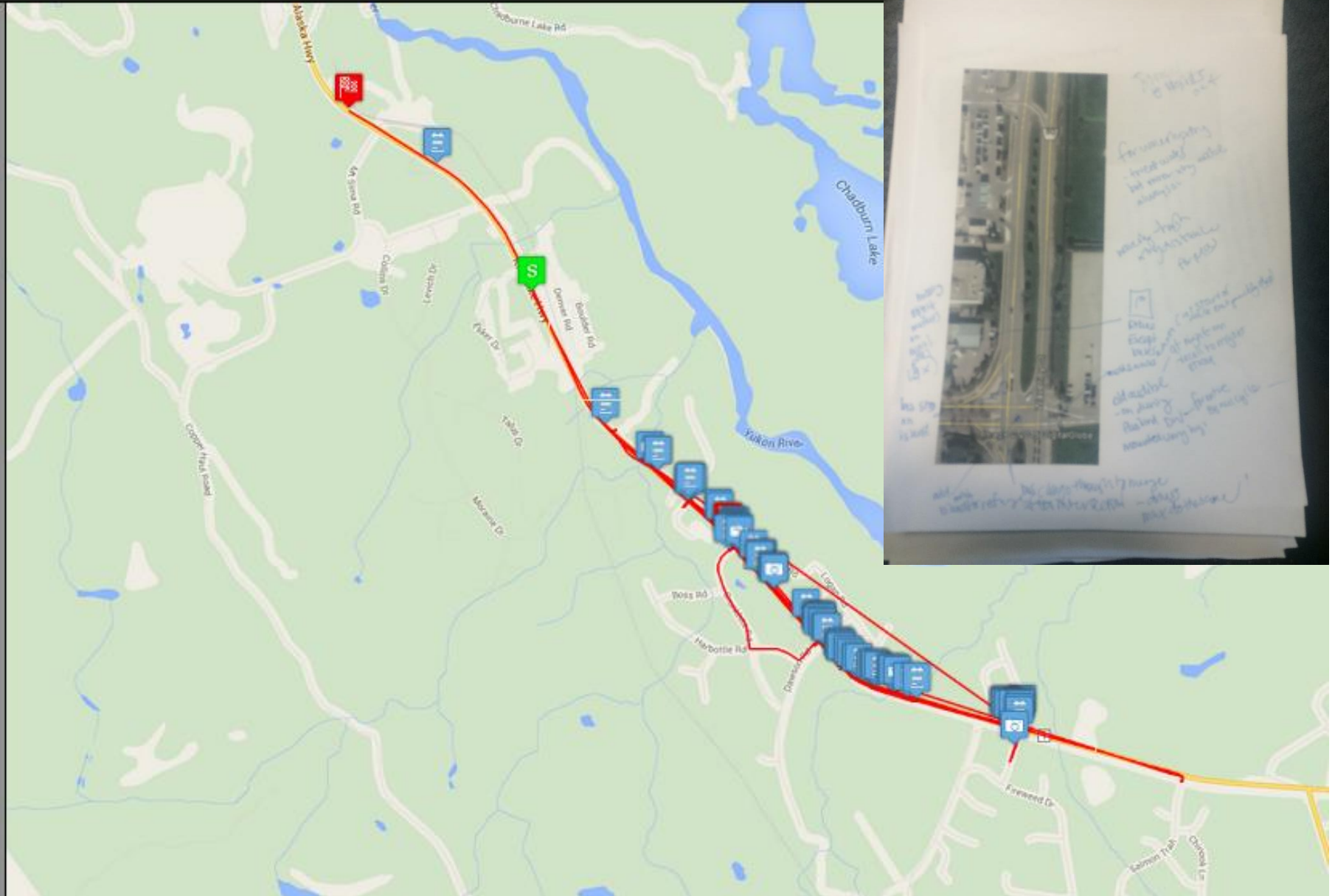
Play Audio

About 30 m of critical five flow on the east side of the highway.
08 March 2015, 01:29 PM

Audio Note

Play Audio

Approximately 30 m segment of critical side slope on the east side of the highway
08 March 2015, 01:30 PM



Back To Jobs

Alaska Highway breaker to Engelman

Start Time: 08 March 2015, 12:47 PM
Stop Time: 08 March 2015, 02:13 PM
Latitude: 60.61850904492719
Longitude: -134.9704422441966
Distance: 24,406 metres
Created By: fireseeds

Edit Delete

Filter... Filter

Hide route line

Captured Data

GEOMETRIC / ISSUE

Audio Note
0:22
About 100 m north of the study segment for maybe six or 700 m side smoke looks deeper than it looks like 3 to 1 and it could be flat
08 March 2015, 01:02 PM

Audio Note
0:24
Detailed site line investigation at Castle Drive in Dawson reveals that there is insufficient site distance looking towards northbound traffic a long-term treatment would be to flatten the horizontal curve or find an alternative location for this intersection
08 March 2015, 01:17 PM



VisualSpecion Map Job Log

Back To Jobs

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Latitude: 60.61850904492719
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08 March 2015, 01:02 PM

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0:24

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08 March 2015, 01:17 PM

Audio Note

Geometric / Issue - Field Note

0:08

GPS Coordinates:
60.60713559854776, -134.94506450369954

Transcript:
About 30 m of the critical five flow on the east side of the highway

Close



Annotation:



Transcript:

Poles on the east side of the highway are about 4 m or 4.5 m from the edge of the road.



GPS Coordinates:

Transcript:

Multiuse trail that is your adjacent to Alaska Highway appears to have a significant use

Pilot Project Overview

Phase	Timing	Jurisdictions	# of Reviews	Evaluation
1	Spring 2015	<ol style="list-style-type: none">1. Yukon Government2. City of Ottawa3. Strathcona County4. York Region5. MTO	25	Early testing, technical improvements, feedback from jurisdictions
2	Summer 2015	Up to 10 <ol style="list-style-type: none">1. City of Calgary2. City of Vancouver3. ICBC cost sharing for up to 3 more BC jurisdictions	50	test improvements from phase 1, new improvements, feedback from jurisdictions
3	Fall 2015	Up to 10	50	extend the app with community input, training use case, feedback from jurisdictions

Yukon



Ottawa



Strathcona County



2015 CITE Conference, Regina



Phase 1 Preliminary Results -1

▶ Benefits

- ▶ Collision data in field provides additional insight
- ▶ Save about 4 hours on site visits (2 ppl * 2 visits * 1 hr saved/visit)
- ▶ Save about 9.5 hours producing in-service review report
- ▶ Everything is retained
- ▶ No distractions in the field with writing or linking observation to locations
- ▶ Fast uploads for videos under 10s
- ▶ Update to fully voice-driven

Phase 1 Preliminary Results -2

▶ Drawbacks

- ▶ Bug fixes with portal and Glass application
- ▶ Glass battery limitations require use of 16000 mAh pack
- ▶ Transcription moderate but improving
- ▶ Uploads can be slow for videos over 10 s
- ▶ Frequent tap/touch in first version of application (voice-driven mode introduced)
- ▶ Voice-driven operates poorly in high wind conditions (working on filters)

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