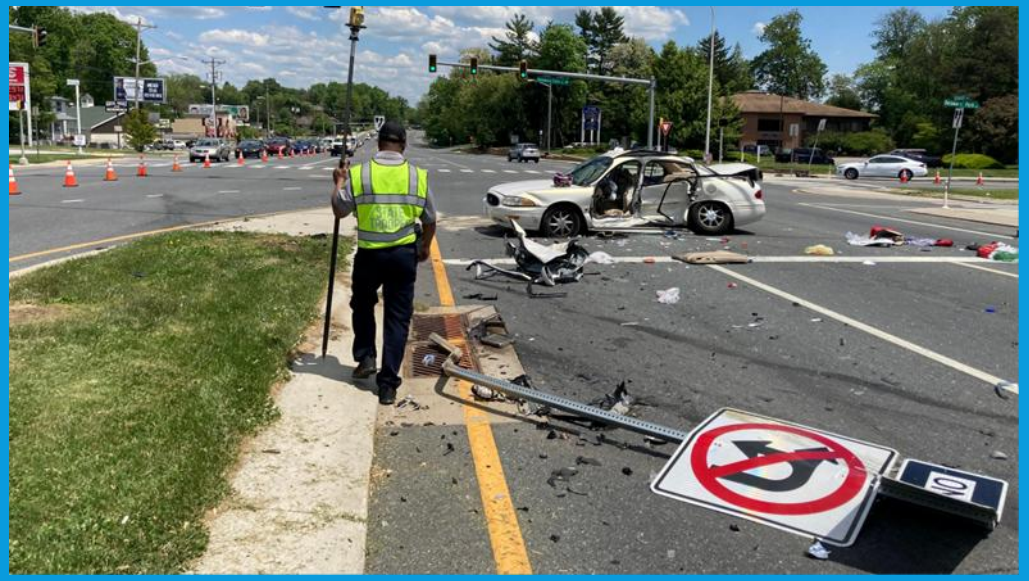
DELAWARE STATE POLICE
COLLISION RECONSTRUCTION UNIT

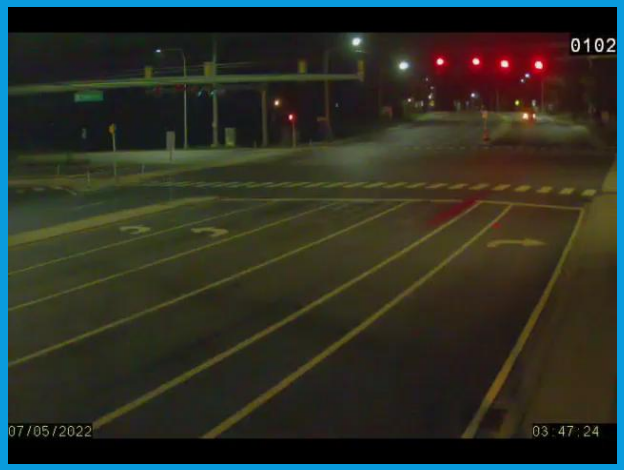
WHO ARE WE?

The Delaware State Police Collision Reconstruction Unit (C.R.U.) consists of 11 troopers throughout the state. Those troopers receive extensive training in the investigation and reconstruction of motor vehicle collisions.



WHO ARE WE?

Our primary responsibilities are the investigation of fatal crashes; however, we also investigate crashes that involve emergency vehicles, such as other police cars, fire trucks, and ambulances. We also teach both crash investigation to other police officers and talk to students in schools about roadway safety.



TRAINING

- 6 weeks of initial reconstruction training
  - Institute of Police Technology and Management (IPTM, Jacksonville FL)

  1) At Scene Traffic Crash / Traffic Homicide Investigation

  2) Advanced Traffic Crash Investigation

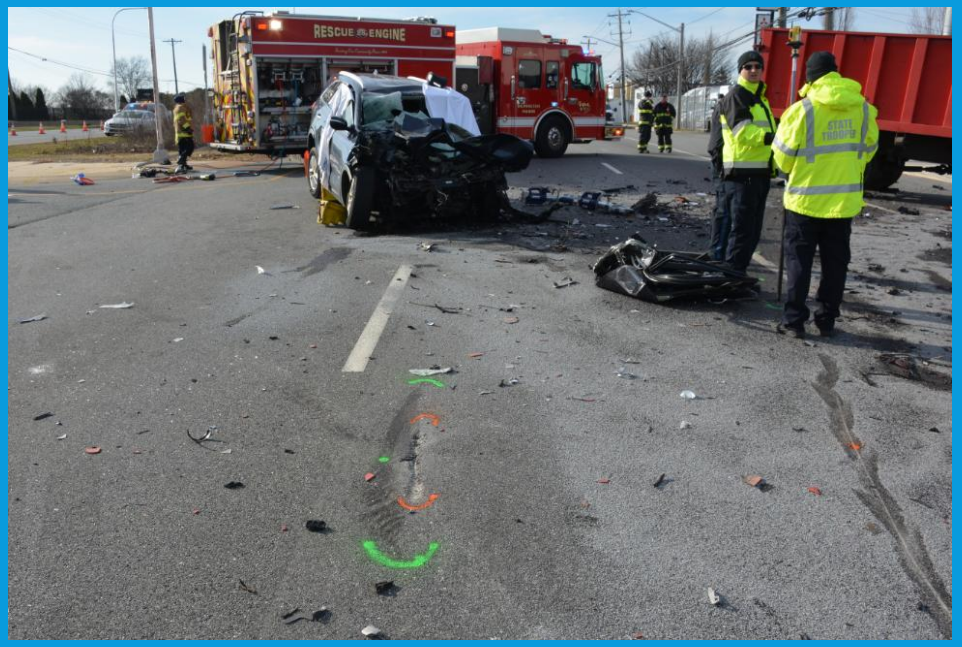
  3) Traffic Crash Reconstruction

- Continuous training afterwards

- All CRU investigators have drone pilot licenses

HOW DOES IT WORK?

When a serious crash occurs a trooper that is working the road responds to the scene of the crash. If it is very serious, or a confirmed fatality, that officer notifies their supervisor, and that supervisor notifies the "On-call" C.R.U. Team members. We then respond to the scene.



HOW DOES IT WORK?

The scene of a crash is considered a crime scene until it is determined otherwise. The roadway is closed, and access to the area of the collision is limited, preserving the physical evidence at the scene. Depending on the investigation, there could be several different results…

HOW DOES IT WORK?

1) If the investigation reveals the crash was a true "accident" or the at fault operator dies, then there are no charges filed.

(True accident = force of nature or mechanical issue)

2) If the investigation reveals the crash was the result of someone committing a traffic violation, at a minimum, the person could be charged with Operation of a Vehicle Causing Death, a misdemeanor charge in the traffic code.

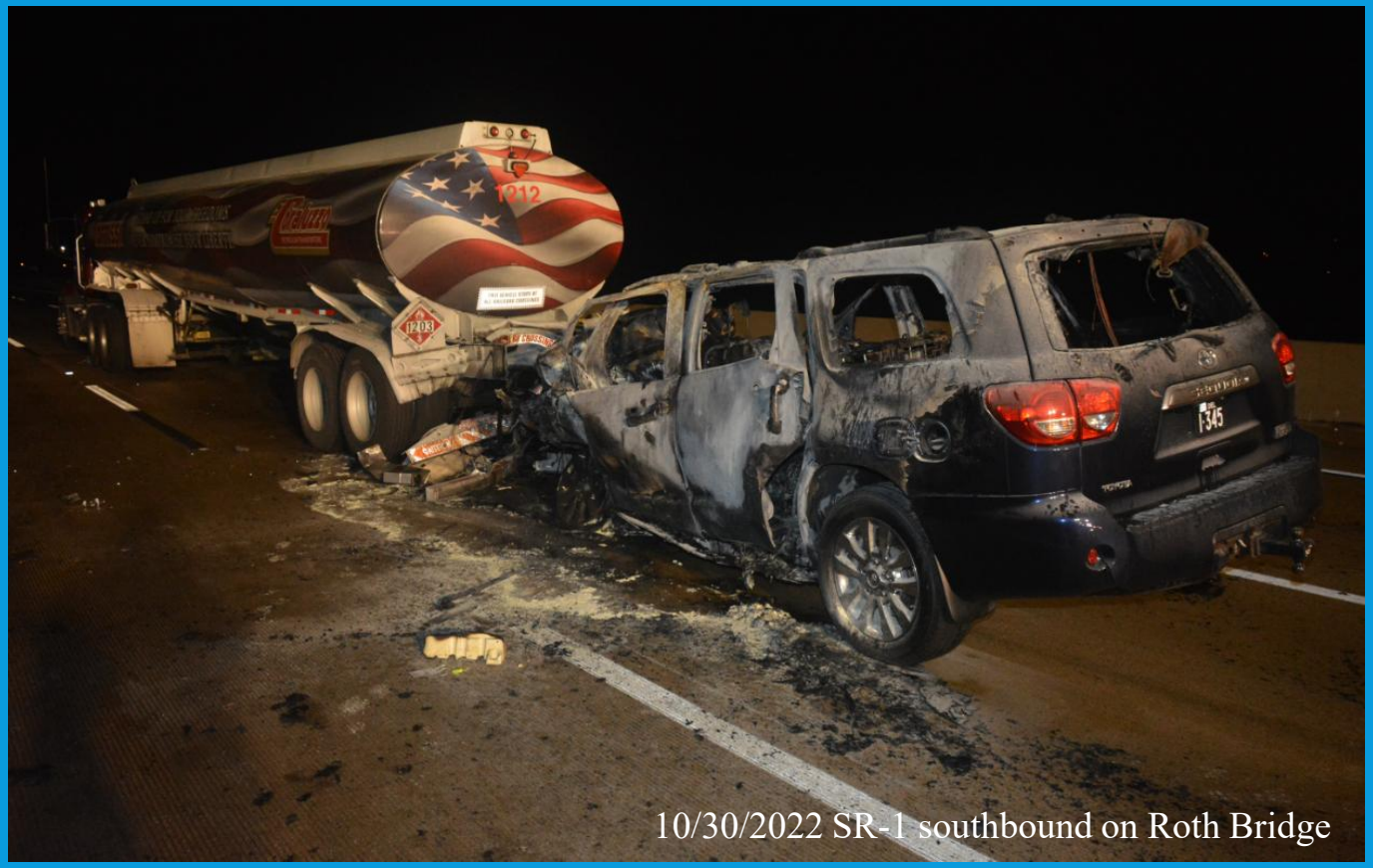
3) If the investigation reveals criminal elements, such as excessive speed, alcohol, drugs, or recklessness, then an operator can be charged criminally.

- Vehicular Homicide
- Manslaughter
- Murder

HOW CAN YOU TELL?

1) Examination of the roadway evidence
2) Examination of the vehicles involved
3) Airbag Control Module data
4) Video surveillance
5) Statements from operators involved and witnesses to the crash.
    - 911 callers
    - Witnesses still at the scene
    - Canvass the area for extra witnesses

ARRIVAL AT THE SCENE



10/30/2022 SR-1 southbound on Roth Bridge

EXAMINING THE SCENE…

April 22, 2025, Clayton Delaney Rd at Alley Mill Rd, Clayton

EXAMPLE:

AT THE SCENE…

- INTERVIEWS
- SCENE PHOTOGRAPHS
- SCENE MAPPING
  - SURVEYING EQUIPMENT
  - DRONES
- COLLECTING EVIDENCE
  - DEBRIS (HIT AND RUN)
  - DUI / DRUG PARAPHERNALIA
  - VEHICLE HOLDS
    - TOW YARD EXAMINATIONS
    - AIRBAG CONTROL MODULES

EXAMINING THE SCENE / PHYSICAL EVIDENCE

PHYSICAL EVIDENCE

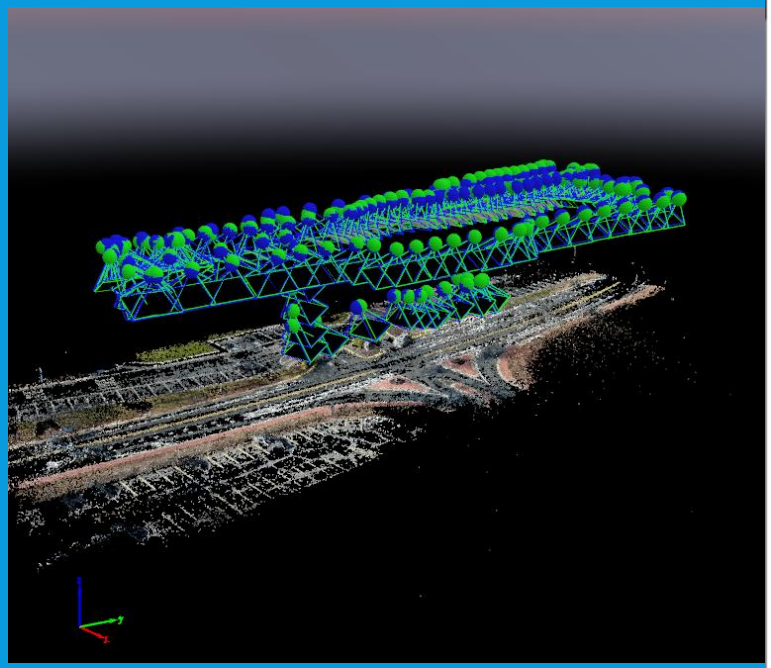
PHYSICAL EVIDENCE

MAPPING THE SCENE

- Measuring wheel / grid coordinate method
- Robotic total station
- Drone photographs / Pix4D software

MAPPING THE SCENE (DRONE)

- Pix4D software

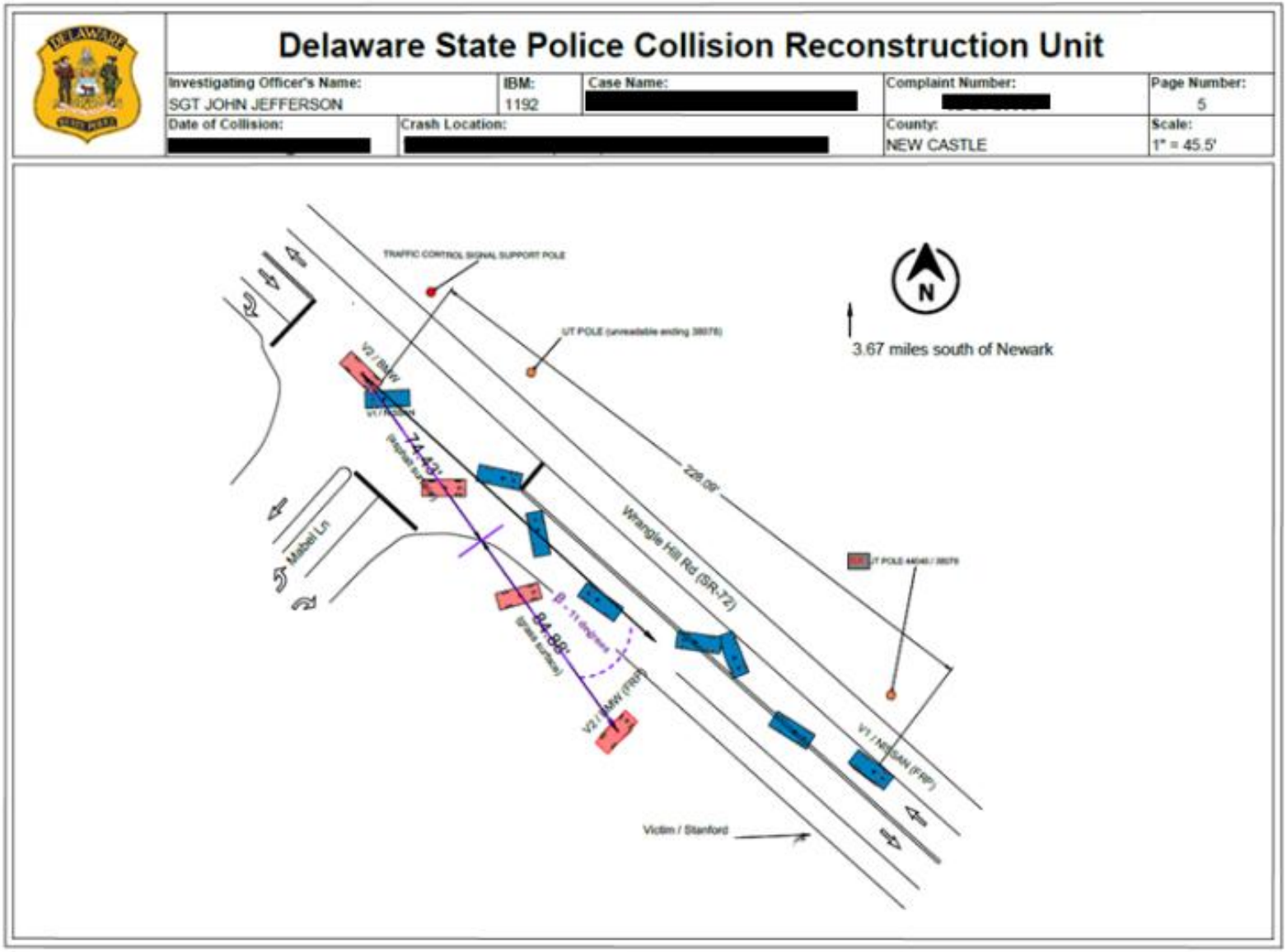


Delaware State Police
Collision Reconstruction Unit

Complaint Number:	Date of Collision:	Crash Location:	County:	Page Number:
01-24-102271	12/5/2024	E. LEA BLVD & COLONY BLVD, WILMINGTON	NEW CASTLE	3

Investigating Officer's Name:	IBM:	Victim's Name:	Scale:
SGT JOHN JEFFERSON	1192	SHAMAR BACKUS FATAL MVC	1" = 62.5'

MAPPING THE SCENE…



INVESTIGATION PHASE

- DISPATCH REPORTS & 911 CALLS
- INTERVIEWS
- REVIEW VIDEO EVIDENCE
  - DASH CAMERA (CIVILIAN AND POLICE)
  - BODY WORN CAMERA FOOTAGE
  - DELDOT CAMERAS
  - PRIVATE SURVEILLANCE
- RECONSTRUCTION

VIDEO TO DETERMINE SPEED:

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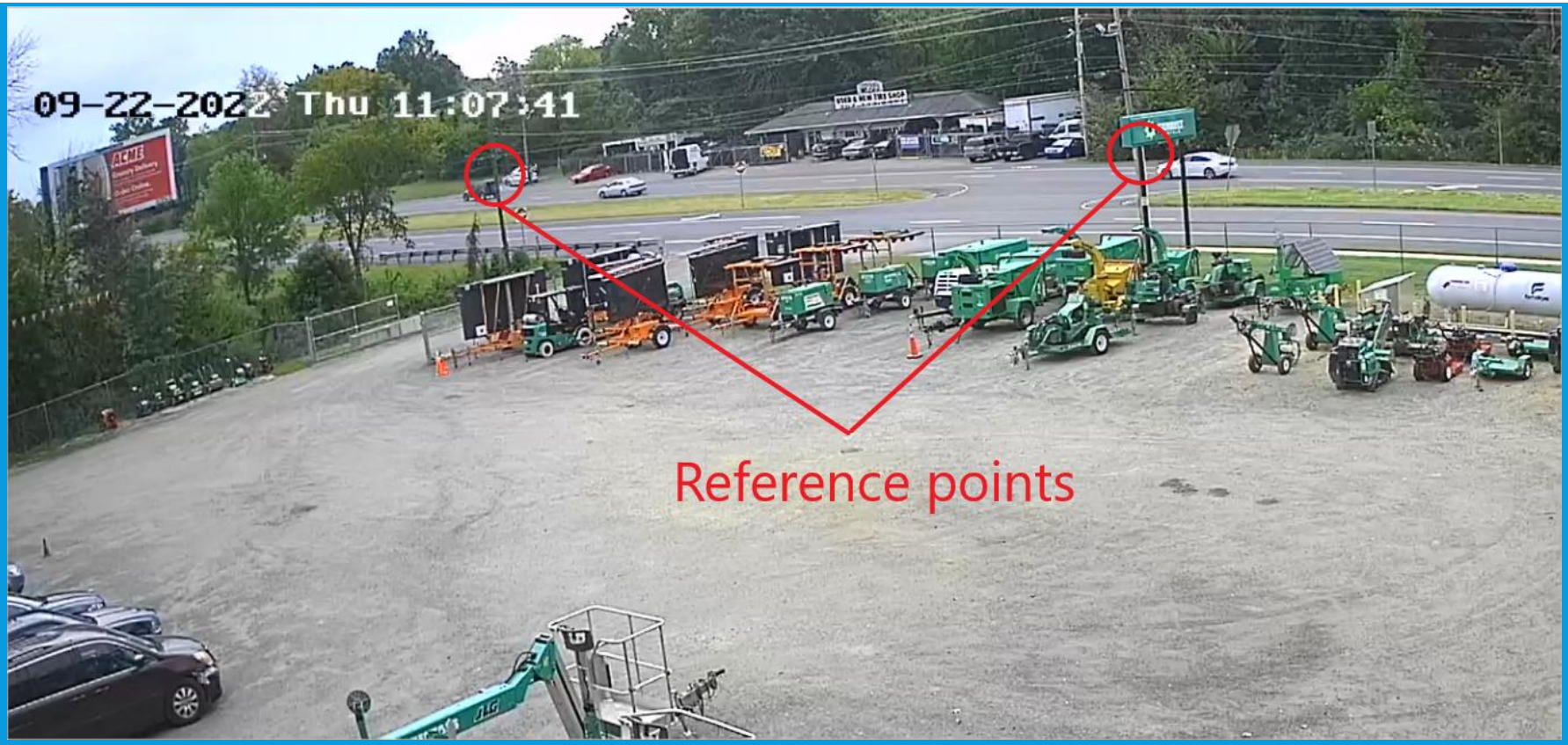


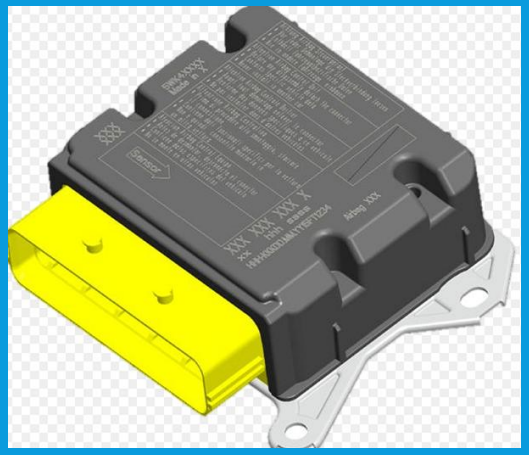
RECONSTRUCTION

- PHYSICS / MATHEMATICAL FORMULAS

$$S = \sqrt{30df}$$

$$W_1V_1 + W_2V_2 = W_1V_3 + W_2V_4$$

- EVENT DATA RECORDERS



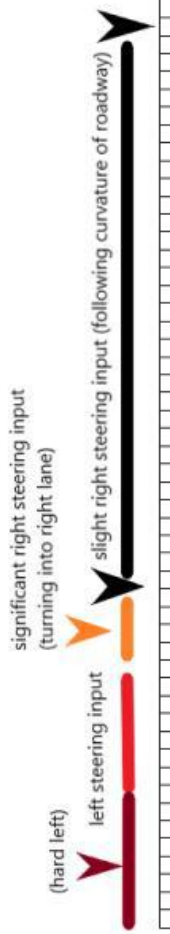
RECONSTRUCTION
(AIRBAG CONTROL MODULE DATA)

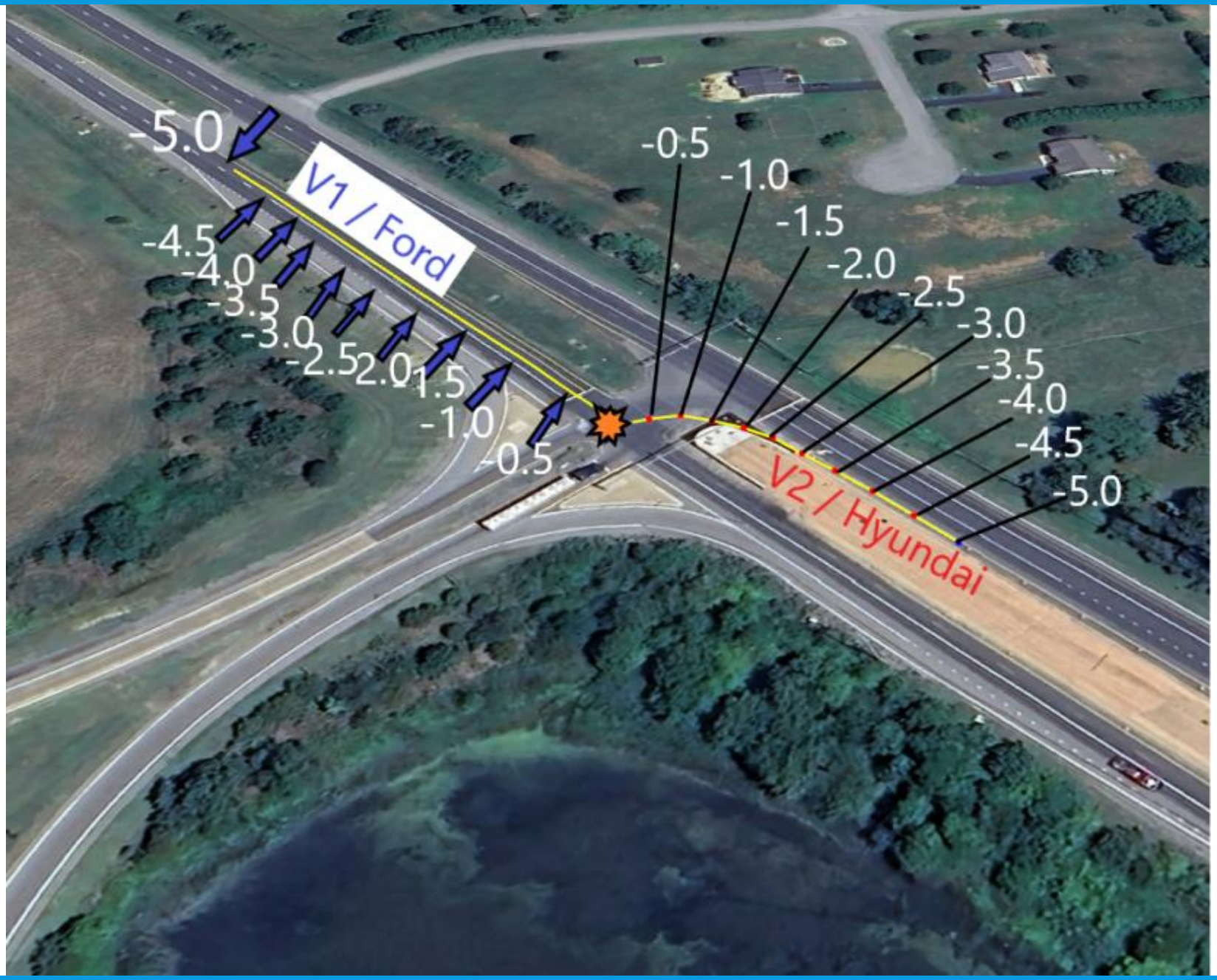
Pre-Crash Data -5 to 0 sec [2 samples/sec] (First Record)

Times (sec)	Speed vehicle indicated MPH [km/h]	Accelerator pedal, % full	Service brake, on/off	Engine RPM	ABS activity (engaged, non-engaged)	Stability control (engaged, non-engaged)	Traction Control via Brakes (engaged, non-engaged)	Traction Control via Engine (engaged, non-engaged)
- 5.0	97.6 [157.0]	57	Off	3,600	non-engaged	non-engaged	non-engaged	non-engaged
- 4.5	99.4 [160.0]	57	Off	3,700	non-engaged	non-engaged	non-engaged	non-engaged
- 4.0	101.9 [164.0]	58	Off	3,800	non-engaged	non-engaged	non-engaged	non-engaged
- 3.5	103.8 [167.0]	58	Off	3,800	non-engaged	non-engaged	non-engaged	non-engaged
- 3.0	105.6 [170.0]	58	Off	3,900	non-engaged	non-engaged	non-engaged	non-engaged
- 2.5	108.1 [174.0]	57	Off	4,000	non-engaged	non-engaged	non-engaged	non-engaged
- 2.0	110.0 [177.0]	0	Off	4,100	non-engaged	non-engaged	non-engaged	non-engaged
- 1.5	108.1 [174.0]	0	On	3,900	non-engaged	engaged	non-engaged	non-engaged
- 1.0	105.6 [170.0]	0	On	3,000	non-engaged	non-engaged	non-engaged	non-engaged
- 0.5	96.3 [155.0]	0	On	2,100	non-engaged	non-engaged	non-engaged	non-engaged
0.0	86.4 [139.0]	0	On	1,400	non-engaged	non-engaged	non-engaged	non-engaged

Pre-Crash Data -5 to 0 sec [10 samples/sec] (First Record)

Times (sec)	Steering Wheel Angle (degrees)	Stability Control Lateral Acceleration (g)	Stability Control Longitudinal Acceleration (g)	Stability Control Yaw Rate (deg/sec)
-5.0	-3.5	-0.01	0.166	-0.36
-4.9	-3.2	0.024	0.128	-0.61
-4.8	-3.2	0.016	0.143	-0.36
-4.7	-3.0	-0.003	0.168	-0.11
-4.6	-3.0	0.029	0.166	-0.74
-4.5	-3.0	-0.009	0.15	-0.36
-4.4	-3.0	-0.074	0.198	-0.86
-4.3	-2.7	0.028	0.189	-0.86
-4.2	-2.7	-0.012	0.177	-0.36
-4.1	-2.7	0.03	0.147	-0.11
-4.0	-2.7	0.005	0.153	-0.61
-3.9	-2.7	0.063	0.124	-0.11
-3.8	-2.7	0.0	0.147	0.01
-3.7	-2.7	0.016	0.138	-0.49
-3.6	-2.7	0.006	0.107	-0.36
-3.5	-2.7	-0.009	0.127	-0.36
-3.4	-2.7	-0.054	0.134	-0.74
-3.3	-2.5	0.01	0.154	-0.61
-3.2	-1.7	0.023	0.139	-0.99
-3.1	-1.0	0.024	0.126	0.26
-3.0	-1.2	0.065	0.188	0.13
-2.9	-1.0	0.034	0.148	0.01
-2.8	-1.0	0.061	0.166	0.13
-2.7	-1.0	0.072	0.205	0.38
-2.6	-1.2	0.059	0.154	-0.36
-2.5	-2.0	0.022	0.133	-0.11
-2.4	-3.2	0.061	0.142	0.01
-2.3	-4.2	-0.009	0.16	-0.61
-2.2	-3.7	-0.022	0.13	-1.36
-2.1	-4.5	-0.013	-0.084	-0.86
-2.0	-4.0	-0.068	-0.129	-1.74
-1.9	-8.0	-0.109	-0.129	-2.61
-1.8	-28.7	-0.284	-0.172	-6.61
-1.7	-39.7	-0.512	-0.174	-14.49
-1.6	-33.5	-0.646	-0.136	-17.24
-1.5	-25.5	-0.954	-0.155	-16.99
-1.4	-1.7	-0.966	-0.257	-11.49
-1.3	10.7	-0.712	-0.252	-2.86
-1.2	9.2	-0.57	-0.196	2.01
-1.1	10.5	-0.232	-0.455	7.88
-1.0	3.2	0.162	-0.667	8.76
-0.9	-6.2	0.211	-0.718	4.26
-0.8	1.0	0.318	-0.773	1.88
-0.7	15.7	0.394	-0.828	3.63
-0.6	39.2	0.424	-0.822	8.51
-0.5	41.5	0.546	-0.746	13.63
-0.4	38.0	0.736	-0.602	15.01
-0.3	43.0	0.729	-0.713	11.26
-0.2	64.7	0.706	-0.692	9.01
-0.1	86.7	0.651	-0.711	8.13
0.0	88.5	0.652	-0.765	8.76

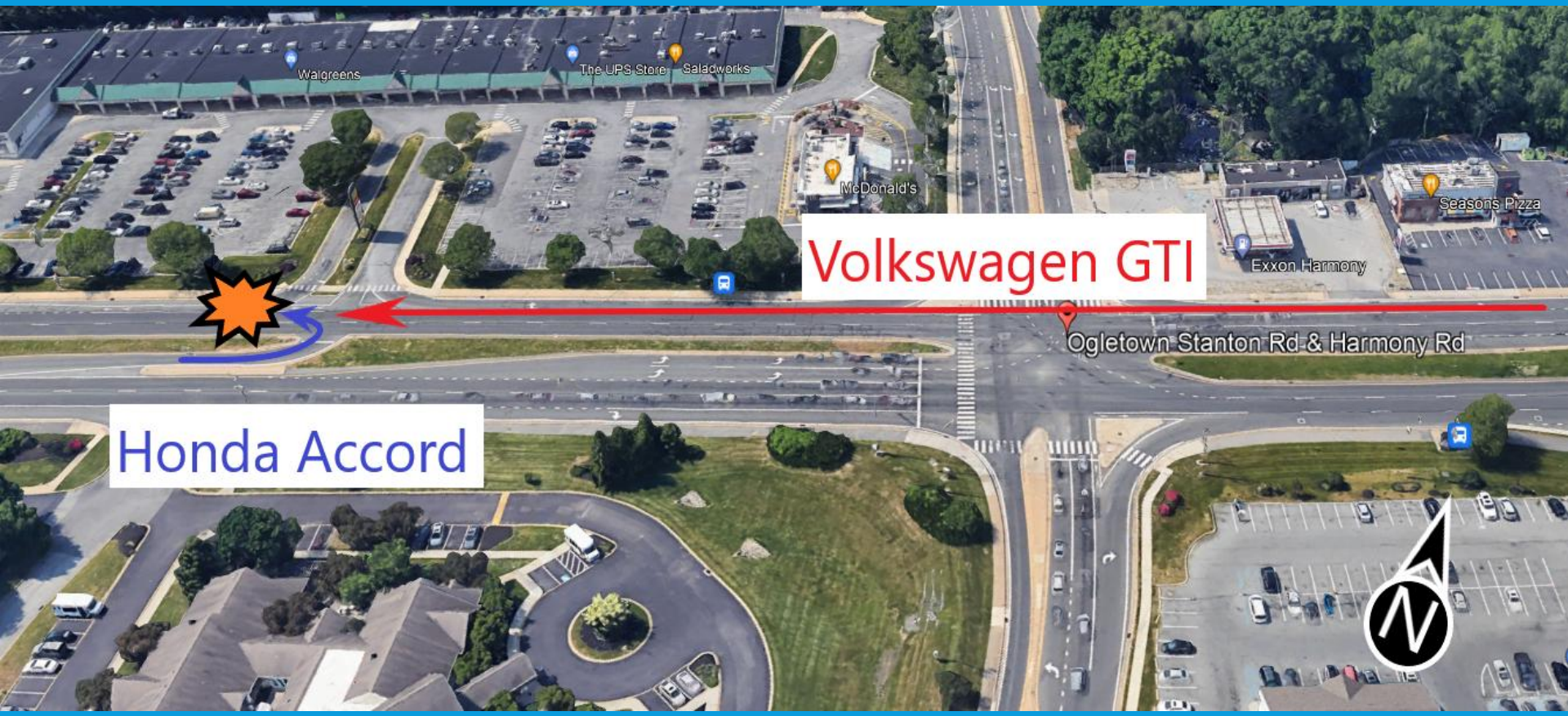



-5.0
V1 / Ford
-4.5
-4.0
-3.5
-3.0
-2.5
-2.0
-1.5
-1.0
-0.5
-0.5
-1.0
-1.5
-2.0
-2.5
-3.0
-3.5
-4.0
-4.5
-5.0
V2 / Hyundai

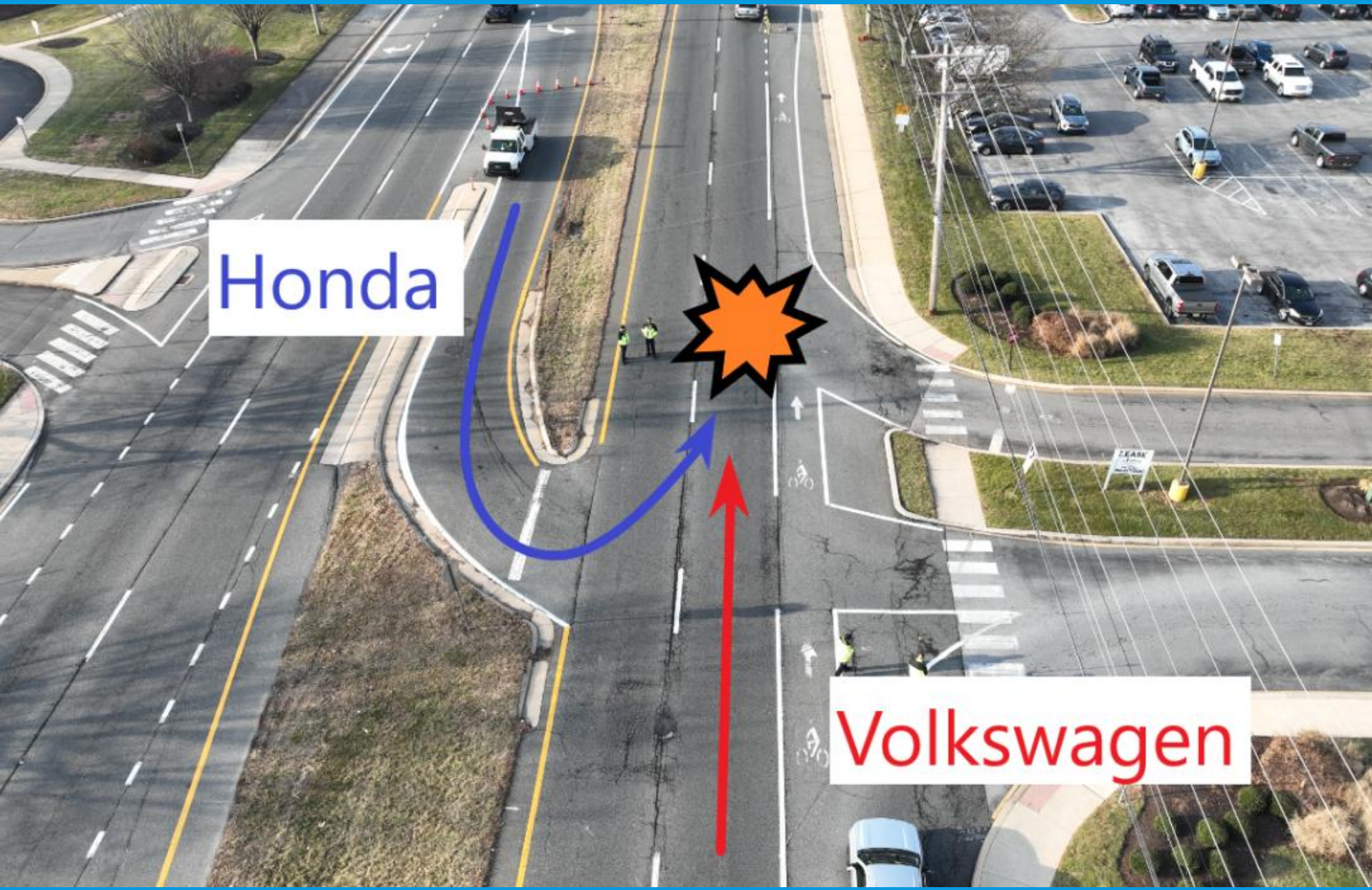
LET'S LOOK AT A CASE…

- Tuesday December 27, 2022
  8:54 PM

- DE SR 4 (Ogletown Stanton Rd) west of Harmony Rd, Newark DE



Ogletown Stanton Rd (DE SR 4) westbound west of Harmony Rd, Newark DE


Honda
Volkswagen

VOLKSWAGEN GTI
(DEFENDANT)

HONDA ACCORD
(VICTIM)

RECONSTRUCTION PROCESS

AIRBAG CONTROL MODULE : VOLKSWAGEN GTI

Pre-Crash Data -5 to 0 sec (Record 3)

Time (sec)	Engine RPM (Combustion Engine) (RPM)	Speed, Vehicle Indicated (MPH [km/h])	Accelerator Pedal (%)	Service Brake Activation
-5.0	5,248	137 [221]	100	Off
-4.5	5,312	139 [224]	100	Off
-4.0	5,376	140 [226]	100	Off
-3.5	5,440	142 [228]	100	Off
-3.0	5,440	143 [230]	100	Off
-2.5	4,288	144 [231]	100	Off
-2.0	4,288	144 [232]	100	Off
-1.5	4,352	145 [233]	46	Off
-1.0	4,160	140 [225]	0	On
-0.5	3,968	133 [214]	0	On
0.0	3,712	124 [200]	0	On

TIME AND DISTANCE ANALYSIS

		5 sec prior	4.5 sec prior	4 sec prior	3.5 sec prior	3 sec prior	2.5 sec prior	2 sec prior	1.5 sec prior	1 sec prior	0.5 s prior
Vehicle #1	**Speed**	137 mph	139 mph	140 mph	142 mph	143 mph	144 mph	144 mph	145 mph	140 mph	133 mph
	Distance	100.44 ft	101.89 ft	102.64 ft	104.09 ft	104.83 ft	105.55 ft	105.56 ft	106.22 ft	102.54 ft	97.33 ft

CONCLUSION

- DEFENDANT PLEAD GUILTY TO:
  - MURDER 2ND DEGREE (*and related charges*)
  - SERVING 18 YEARS IN PRISON