INTRODUCTION TO INDUCTIVE LOOPS

SCRIPT	COMMENTARY
1: Welcome to the Traffic Sensing Technologies Program. My name is [Insert Name] and I will be instructing today's program.	1: Feel free to include your hobbies, where you work, why you're interested in transportation and technology, etc.
2: Historically, there have been three types of traffic light operational strategies. Manual Traffic Control is the oldest strategy but is sometimes still used today. This is where a human is physically present instructing who in traffic has the right-of-way. Fixed-Time Control is a strategy that allows traffic lights to run on their own according to a pre-determined amount of time before changing. Finally, the most recent development is an Actuated Signal. Actuated Signals use a variety of technologies to detect the presence of vehicles to change according to traffic demand.	2: Include questions for the audience to engage them. Consider asking if anyone can think of a time that they have seen manual traffic control. Some situations might include after a big sporting event, concert, or show, or through a construction zone.
3: One type of actuated signal is in the form of an inductive loop. Inductive loops are fancy words to describe a loop of copper coil buried beneath the roadway that can detect large amounts of metal above it. While it sounds very simple, they can do more than just detect the presence of a vehicle. When inductive loops are strategically placed, they can be used to determine the *type* of vehicle that is present, the *speed* a vehicle is traveling, and even narrow down *what types of goods* might be moving through the road network.	3: Other technologies offering signal actuation capabilities are stoplight cameras and LiDAR sensors. Inductive Loops might be implemented over these other actuation options because it is not weather-dependent and is more reliable given various environmental conditions. Inductive loops also involve more standard installation procedures.
4: We are going to watch a brief video clip that explains the applications of traffic sensing technologies when it comes to traffic signals on the roadways.	4: This video should run from 6:33-8:17

5: The inductive loop is constantly detecting and starts at a base frequency, even when it is buried in the roadway.

5: No commentary

6: When a large amount of metal (like a car) passes over it, the frequency changes. This change in frequency can be graphed and highlight the parts of the car with the most metal present. These graphs are what we refer to as "signatures".

6: The loop has a sampling speed which is the number of detections it makes in a given amount of time (i.e. 40,000 detections per second). Since it can detect so quickly, it is able to detect parts of the vehicle that have more metal than other parts (i.e. axles).

7: Vehicles' signatures are unique for each type of vehicle. When compared, conclusions can be drawn such as how many of each vehicle type are on a road, how many tractor-trailers are present, and what types of commodities these trucks are carrying.

Additionally, if there are trucks present on the road that we know are carrying a certain commodity needed by a community (for example, toilet paper during the coronavirus) we may be able to estimate how much of the commodity is being transported and where it is headed.

7: Consider asking the students how they travel to school each day. Maybe some of them are driven by their parents in a car or truck while others take the bus. Explain how these vehicle types have different characteristics like axle spacing and would generate different signatures when the inductive loop detection is graphed.