



### **Company Information**

<b>Company Name</b>	<i>Daimler Truck North America- Cleveland, NC</i>	<b>Date Submitted</b>	<i>09/21/2022</i>
<b>Project Title</b>	<i>Visual Capture of Attributes for Chassis Air Line and Harness Subassembly (DAIM_VIS)</i>	<b>Planned Starting Semester</b>	<i>Spring 2023</i>

### **Senior Design Project Description**

#### **Personnel**

Typical teams will have 4-6 students, with engineering disciplines assigned based on the anticipated Scope of the Project.

Please provide your estimate of staffing in the below table. The Senior Design Committee will adjust as appropriate based on scope and discipline skills.

<b>Discipline</b>	<b>Number</b>	<b>Discipline</b>	<b>Number</b>
Mechanical	2	Electrical	1
Computer	2	Systems	1

#### **Company and Project Overview:**

Daimler Truck North America LLC is an automotive industry manufacturer and is a leader of commercial vehicles headquartered in Portland, Oregon, and LLC of the German multinational Daimler Truck AG. This project is with the DTNA facility in Cleveland, NC which manufactures Class 8 over-the-road trucks.



This project will use pictures/visuals of the chassis to create a visual layout/platform to facilitate pre-cut air lines to the required specification, which can then be bundled together with the electrical harness. The finished bundle will be ready for installation on the chassis.

### **Project Requirements:**

#### **Design Problem:**

Due to the nature of the model mix for class 8 trucks, routing and clipping can be a time consuming, tedious and wasteful process. Production errors sometimes occur due to drawing information being out of date or an incorrect configuration compared to the as-built vehicle. Thus, a solution is required to sub-assemble/layout the air line and harness bundles based on the chassis configuration to allow for an easier installation and reduction in material waste. The idea of this project is to change the source information for the air line/electric harness production from drawings to what is actually coming down the assembly line and then translate this into production methods and instructions for the operators on the line.

#### **Project Objective:**

To create a visual layout, platform or other technique, which helps the operator to create a pre-cut bundle of air lines, based on the chassis length and other required specifications resulting in easy installation. The visual will be based on the current build in process on the assembly line. The idea is to create the visual and capture the pertinent data at the earliest possible point in the assembly process, once the configuration and physical layout has progressed to the point where it contains the information to be able to build an air line and harness bundle. The visual will then be captured (with the information needed to build these assemblies). This capture then would need to be electronically relayed to the downstream air line and harness subassembly area where they will have approximately 10 minutes (the takt time for the assembly line) to prepare the air line and harness bundle using the information provided. There are 6 assembly stations between where the picture/visual is captured to where the air line/harness bundle will be installed in the chassis (~60 minutes). The sub-assembly personnel will build the bundles as they do now, they will just use the dynamically captured build data in place of the traditional methods (drawings) to work from. See the photos below of the process:





Chassis without air line bundle and electrical harness (prior to entering chassis paint process)



Chassis with air lines and electrical harness installed (6 stations after previous picture)



**Expected Deliverables/Results:**

- Visual Layout platform that meets the requirements mentioned above, which can facilitate pre-cut air lines and electrical harness bundle, based on chassis specification. The system developed will support the pre-building of an accurate sub-assembly product that is ready for further integration into the truck when the target vehicle enters the workcell. Result is a subassembly that is 100% accurate to the as-built vehicle, made just in time.
- From the image capture, generated the instructions and methods for the production operators. Prepare training for all parties on how to use the developed system.

**Disposition of Deliverables at the End of the Project:**

Students are graded based on their display and presentation of their team's work product. It is mandatory that they exhibit at the Expo, so if the work product was tested at the supporter's location, it must be returned to campus for the Expo. After the expo, the team and supporter should arrange the handover of the work product to the industry supporter. This handover must be concluded within 7 days of the Expo.

**List here any specific skills, requirements, specific courses, knowledge needed or suggested (If none please state none):**

- Programming knowledge
- Mechanical aptitude
- Image recognition and capture