Automated Material Transfer

Benchmark Electronics

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PROJECT OVERVIEW

The purpose of this project was to cut down on labor costs by automatically transferring palletized materials between three separate warehouses on a job site.

The constraints of the project included:

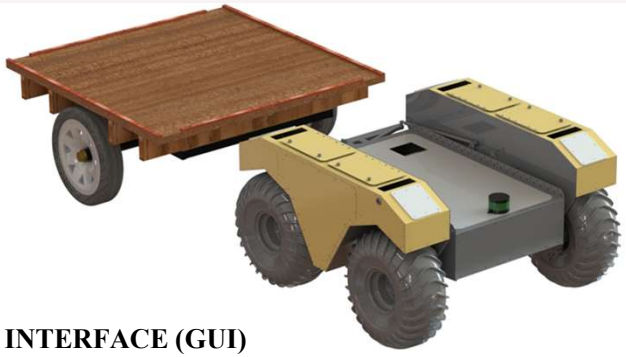
- Design must transport loads of up to 500 pounds
- Must accommodate all pallet sizes up to 4’ x 4’
- Must work in an outdoor environment
- Must be able to overcome a 10-degree grade
- Must be rechargeable

The objectives of the project included:

- Transfer at least 20 pallets in 10 hours
- Implement a Graphical User Interface for each of the warehouses complete with a signal / call system and a Global Positioning System to monitor the machine's location and pick ups / drop offs

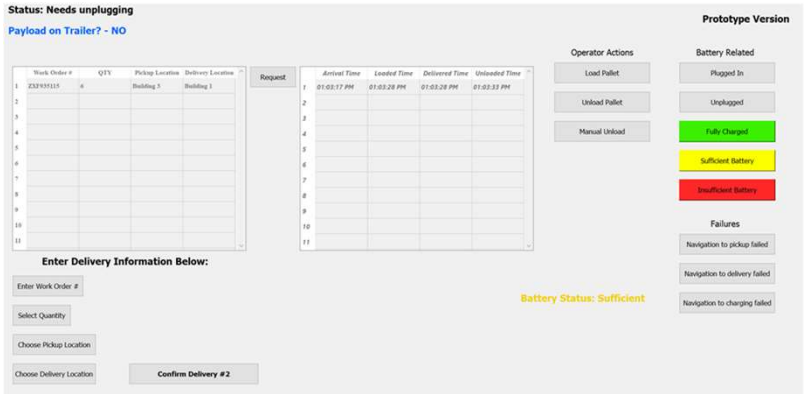
PROJECT OUTLOOK

The Automated Material Transfer Unit will reduce labor costs and improve efficiency by hauling materials to and from preset locations.



GRAPHICAL USER INTERFACE (GUI)

The GUI serves as the signal / call system for the operators in each warehouse to tell the Warthog that a delivery has been requested. The Warthog is informed of the pickup and drop off locations that were entered by an operator. When the Warthog arrives at the pickup location, the GUI logs the current time and stores it in the SQL database. Timestamps are recorded anytime the Warthog reaches a pickup / delivery location or is loaded / unloaded by an operator. The operator then loads the material and indicates said action to the GUI. The Warthog navigates to the drop off location where the unloading process takes place, and a worker confirms the delivery is complete. The Warthog then continues onto its next delivery or returns to its charging station if no more deliveries are in the queue.



HOW IT WORKS

The project consists of a few main parts. One is an Unmanned Guided Vehicle called the Warthog made by Clearpath Robotics. This autonomous vehicle can be called to a warehouse using the Graphical User Interface. It is then manually loaded and told which warehouse to deliver the palletized materials to. Then the material is manually unloaded, and the Warthog continues onto its next delivery.

Benefits of the product:

- Cuts labor costs via automation
- Completely weatherproof
- Accommodates any pallet size below 5’ by 5’
- Withstands loads of up to 500 pounds
- Combination of tracking and signal / call system consisting of a GPS locator, and GUI interface

STRUCTURED QUERY LANGUAGE (SQL) DATABASE

The SQL database stores all the data related to the pickup and delivery of each work order. It is a continuous log of the product codes, times and locations of each delivery that takes place. This ensures that no product is ever lost or unaccounted for.