

Improving the Wire Harness Manufacturing Process



To reach increased production goals, Boeing has identified wire harness manufacturing as an area of opportunity to minimize cost, time, and error.

Background:



Each month, 52 Boeing 737 planes are manufactured. Each is made with over 150 miles of wires, a significant percentage of production complexity and time.

Motivation:



Output



Cost



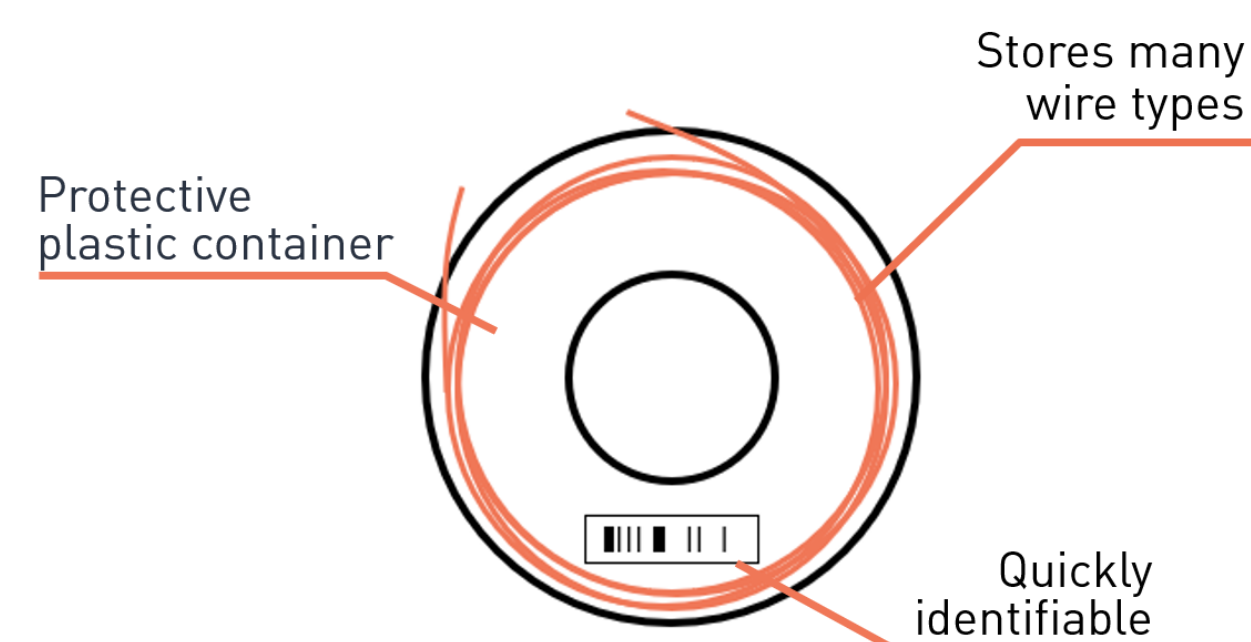
Accuracy



Productivity

Human operators are well-suited to the delicacy of handling wires but introduce inaccuracy and inefficiency at key points. Re-thinking the process would help operators to work more productively so that Boeing can produce more planes at a lower cost.

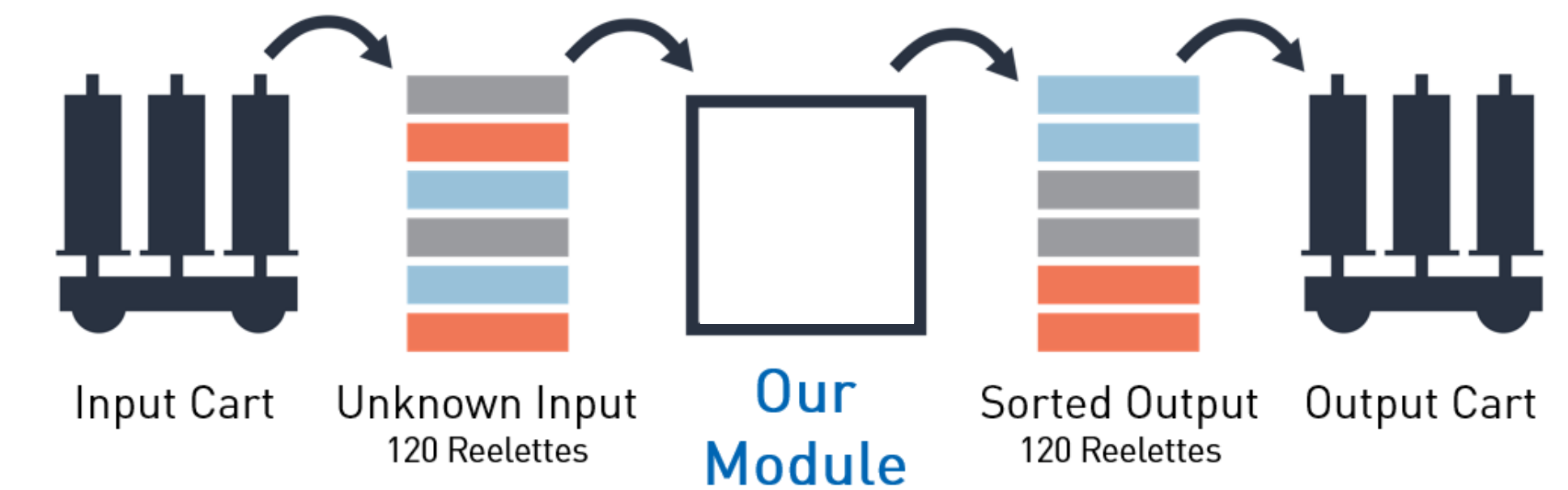
The Reelette Strategy:



The new process uses reelettes, disc-shaped plastic containers for storing, identifying, and transporting wires. Boeing has developed an entirely new workflow for manufacturing wire harnesses centralized around reelettes.

Our Task:

Build a module that receives reelettes and reorders them into the proper sequence for assembly.



Our Solution:

The final design possesses each of the following capabilities which we integrated into a standalone, functional machine.

Identify



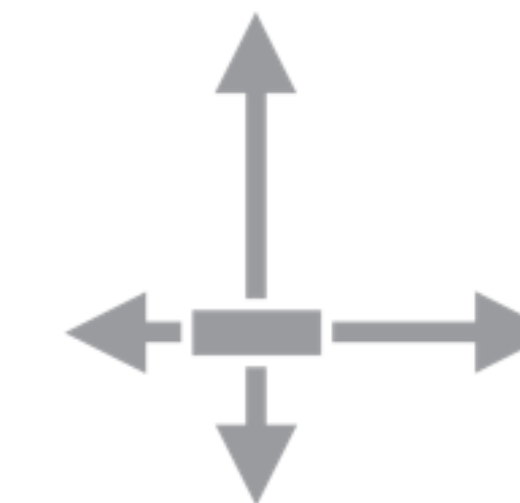
Scan the barcode of each reelette

Compute

- > step 1
- > step 2
- > step 3
- > step 4
- > step 5

Determine required sorting steps

Move



Rearrange reelettes into correct order

Store



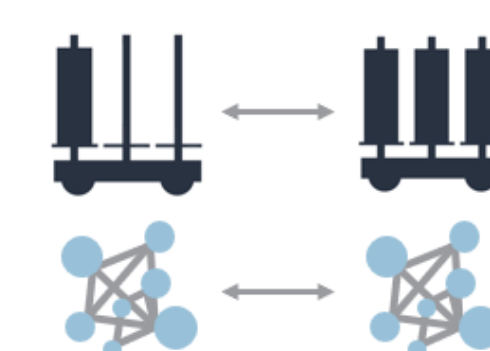
Hold reelettes during sorting

Transfer



Interface with input and output carts

Evaluation:



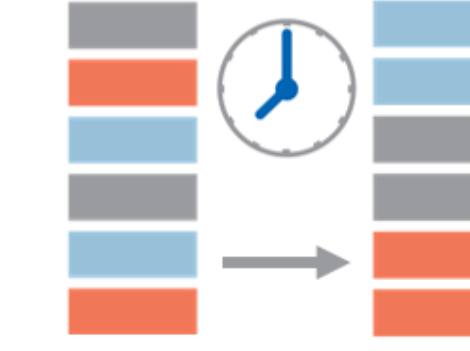
Scalable



Precise



Accurate



Efficient

Using simulation, analysis, and testing we characterized the effectiveness of our system. Based on our results, Boeing will move forward with fabricating our final design and work towards formally integrating it into the new wire harness workflow.



Student Team:

Paul Nadan, Katya Donovan, Diego Alvarez, Anika Payano, Anil Patel

Faculty Advisor:

Alisha Sarang-Sieminski

Liaisons:

Grace Duncan, Bradley Mitchell

Subject Matter Experts

Daniela Faas, Chris Lee, Dave Barrett