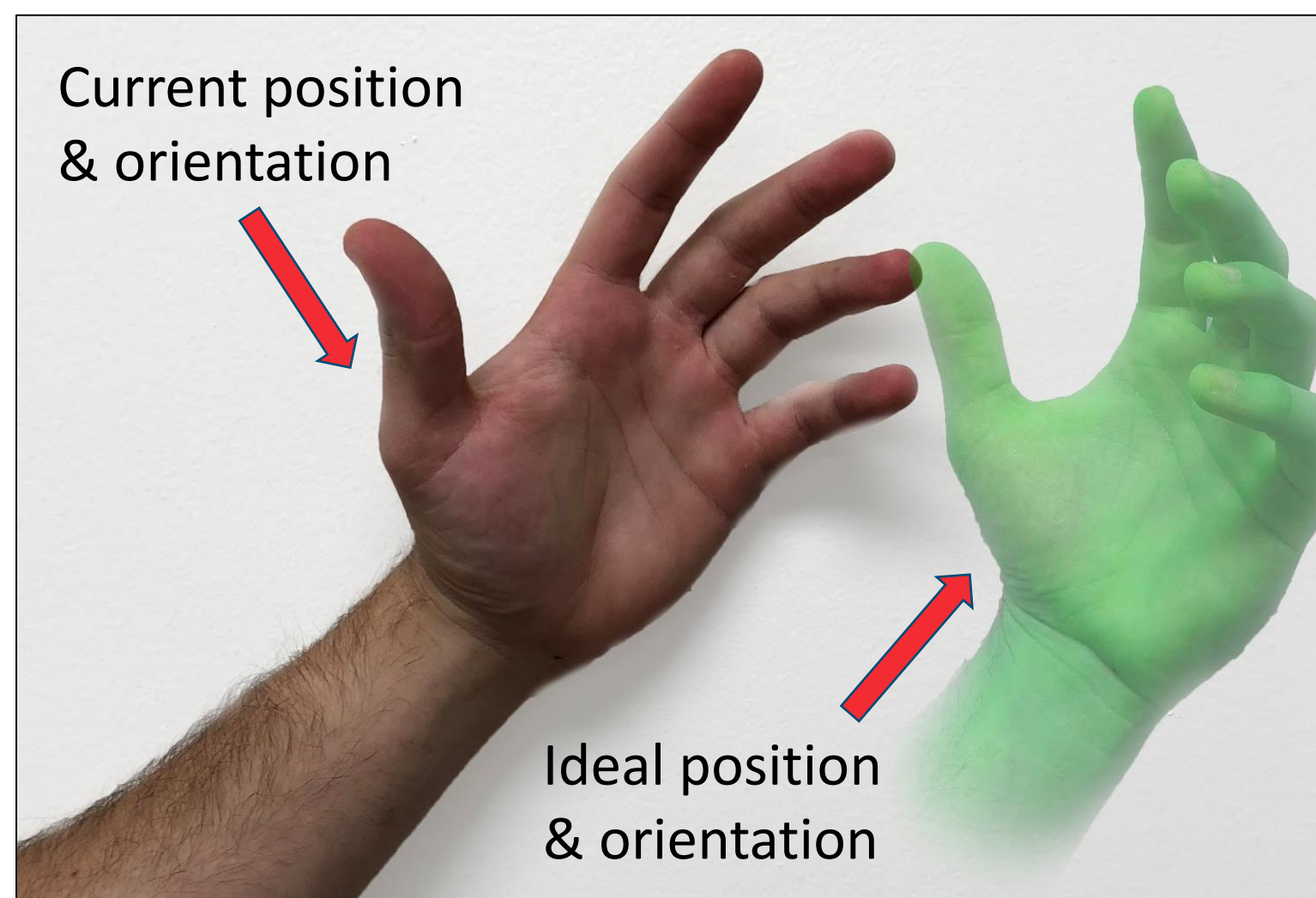


Background

- ❖ Anthropometry is the measurement of the size and proportions of the human body
- ❖ Anthropometric scans typically output a 3D figure that can be used for body measurements and for Engineering design
- ❖ Currently, scan participants are given verbal instructions on where and how to position and orient themselves for an anthropometric scan
- ❖ This process is tedious and time consuming for the scan technician



Objectives

Key objective: Reduce the amount of time spent on positioning/orienting a participant to a desired pose

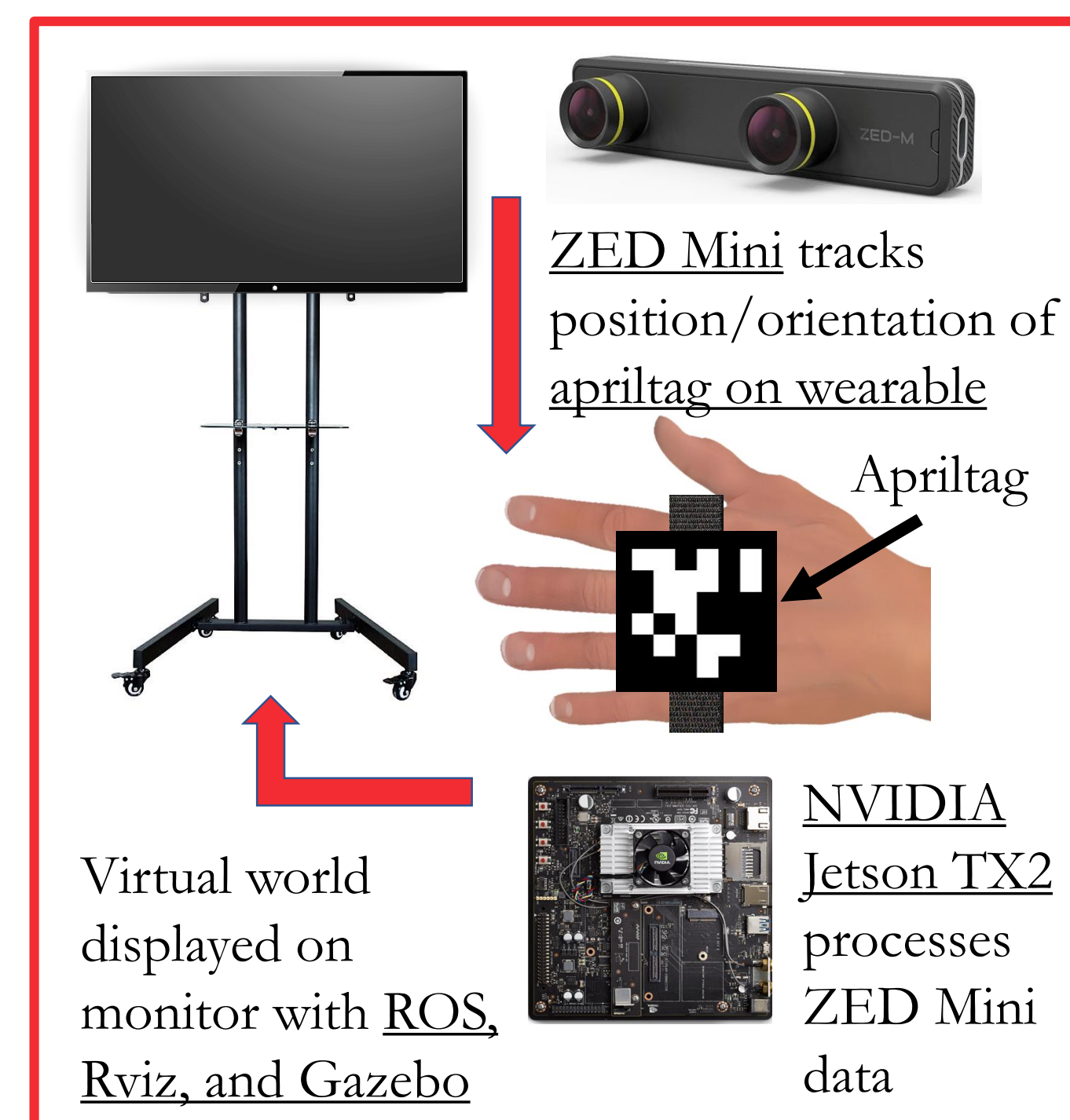
- ❖ Develop a Mixed Reality Wearable
 - Track the user's 3D position and orientation
- ❖ Create an intuitive user interface
 - Display a live 3D image of the scanned body part in a virtual world
 - Display a translucent 3D image of an ideal position/orientation of the scanned body part

Major Targets

- ❖ The targets and metrics, outlined in the table below, specify the minimum performance requirements to successfully satisfy the customer's needs and meet our objectives

Max. Time in Designated Location	10 m
Max. Volume of Device	16 ft ³
Max. Weight of Device	25 lb
Min. Distance from Scanner	1 m
Tolerance of Depth Measurement	4 cm

Big picture Design



Acknowledgements

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Project Design

Cameras and Sensors

ZED Mini (Stereoscopic camera):

- ❖ What: A camera that captures 3D images instead of 2D image
- ❖ How: It has 2 lenses each with their own image processor where both images can then be triangulated to determine the 3D position of a point
- ❖ Why: It's necessary to track a 3D position/orientation of a desired object

For our project, the ZED Mini will be stationed to the back left of the participant so that the virtual image of the apritag can be seen on a monitor.

Wearable Design

Wearable Focus: Apritag

What is an Apritag?

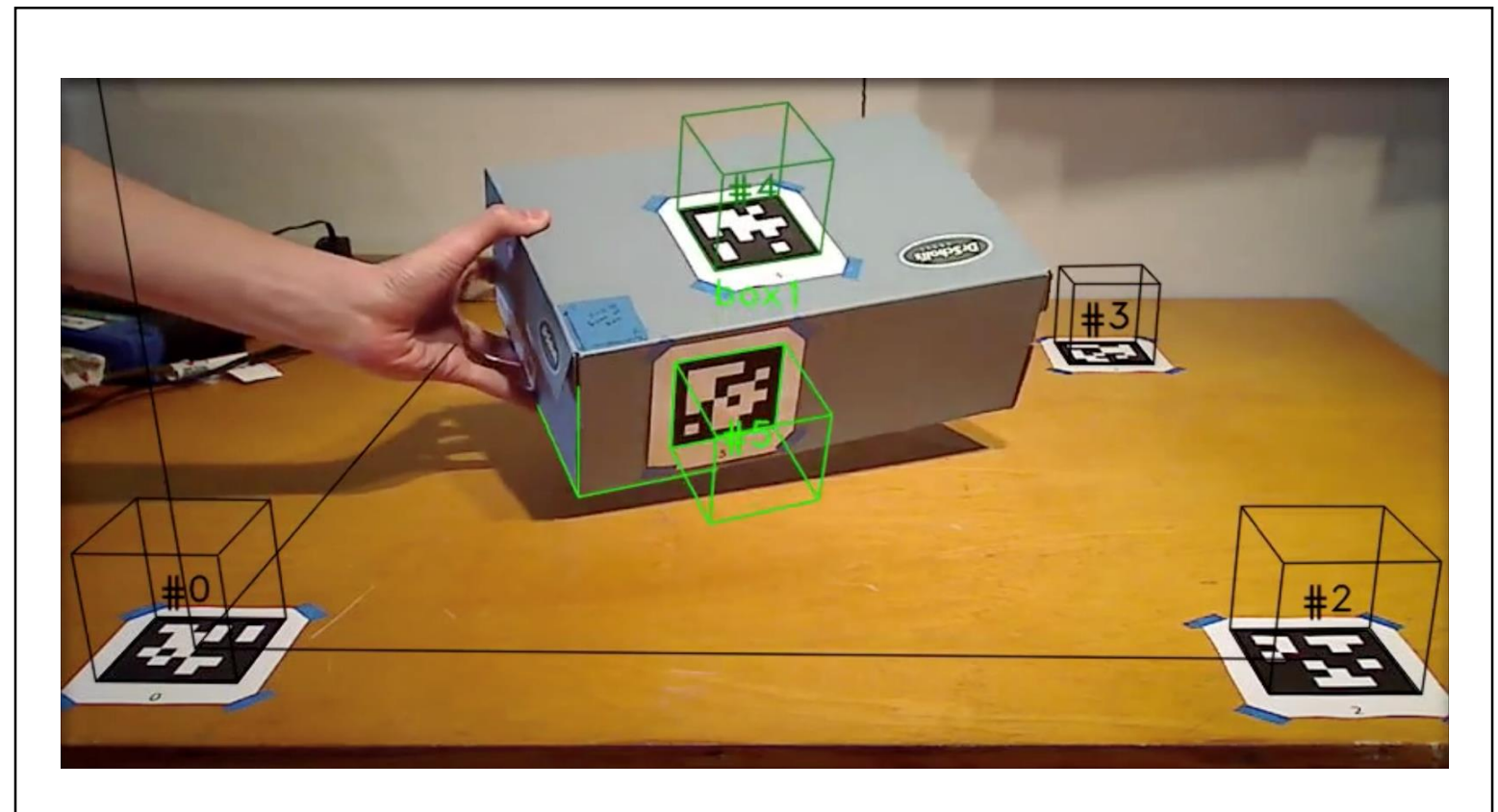


- This is an Apritag
 - ❖ Similar to QR codes
 - ❖ Scan this QR to learn more
 - ❖ Replace a watch face with this QR code to effortlessly track the location and orientation of the participant wearing it

Software Concepts

Robot Operating System(ROS):

- ❖ We will be utilizing ROS to manipulate the data output from the ZED Mini in order to represent this data within a virtual world created by a simulation tool (i.e. Rviz and Gazebo)
- ❖ ROS has a database of successful pre-written code that will be utilized to track the 3D position and orientation of an apritag



Future Work

December	January-February
<ul style="list-style-type: none"> ❖ Order design components ❖ Complete spring plan ❖ Begin software coding 	<ul style="list-style-type: none"> ❖ Complete fabrication of the wearable design ❖ Complete code and begin design testing
March	April
<ul style="list-style-type: none"> ❖ Troubleshoot issues in software code as well as compatibility of wearable device with the software and cameras 	<ul style="list-style-type: none"> ❖ Finalize project content ❖ Rehearse presenting content ❖ Engineering Day