

## Dual Positioning Engine for Trimble Layout Tool

### Problem

Modern building designs are created using advanced software, but often lack coordination between different trades, leading to conflicts and outdated blueprints on job sites. This results in time-consuming manual layout processes and frequent rework, causing delays and frustration.

### Purpose

Develop concepts for creative packaging alternatives for the Trimble Layout Tool head module that optimizes compactness, robustness and manufacturability while utilizing the existing part catalog when prudent.

### Approach

#### Requirements Gathering & Ideation

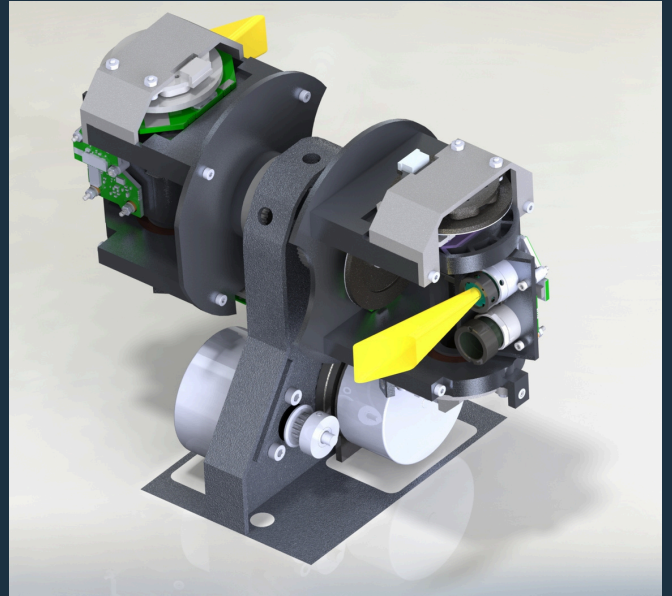
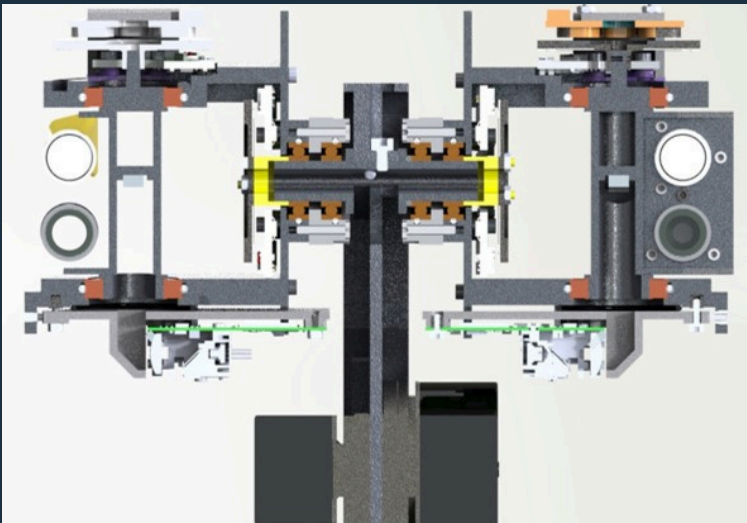
Define clear product requirements to establish the current state and target goals. Develop 15-20 ideation sketches, exploring a range of innovative design solutions aligned with these goals.

Requirement	Rating
Laser Distance Meter located on both yaw and pitch axes concurrently	Must Have
Detect distance to pertinent surface (with LDM)	Must Have
Rotate XXX° (±XXX°) in yaw	Must Have
Rotate 95° up and 45° down (mirror for opposite head)	Must Have
Transmit data via wire to main processor/board	Must Have
Detect location target in wide field of view	
Detect location target in narrow field of view	
Height of single head unit less than 4"	
Minimize weight	
Utilize proven components from other products	
Rotate down greater than 45°	
Rotate 270° (±135°) in yaw	

The ideation sketches are organized into a stack of pages, each representing a different design concept. The top page shows a top-down view of a circular head with internal components and a side view of a rectangular housing with a motor. Handwritten notes describe design goals like "WORK DESIGN TO ACQUIRE OF SYSTEM" and "BOTH HEADS OUT AT SAME LOCATION FOR BOUNDED TO AREA OF RANGE". The sketches are titled "ICT-PEP Head Module Packaging Brain Storming Session" and include fields for "Idea Name", "Idea Summary", "Sketch/Diagram", "Name", and "Date".

### Concept Development & Refinement

Select the top 4-6 concepts for in-depth CAD modeling. Refine each design's feasibility, conducting structural and functional analyses to ensure practicality for implementation.



### Alpha Prototype Build

Identify the most viable concept and advance to alpha prototyping, where intensive mechanical testing validated the prototype's performance, durability, and alignment with design specifications.

