Omni-Axis: Overbed Table Improvement

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Atlas Works™

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Team 17

Background

Overbed tables are a ubiquitous feature of hospital rooms around the world. Predominantly used for dining, grooming and storing personal items, they serve a critical role in facilitating inpatient activities. However, patients and staff express dissatisfaction with the amount of effort required to adjust the table, storage versatility, and poor compatibility with hospital beds.

Problem statement: Hospital inpatients need a more maneuverable, ergonomic and storage-optimized alternative to improve patient independence and reduce burden on hospital staff.


Figure 1. The Michael Graves with Stryker Overbed Table

Mission Statement

AtlasWorks seeks to improve **independence**, **safety** and **satisfaction** for both **adult inpatients** and **caregivers** through streamlined and innovative hospital furniture technologies.
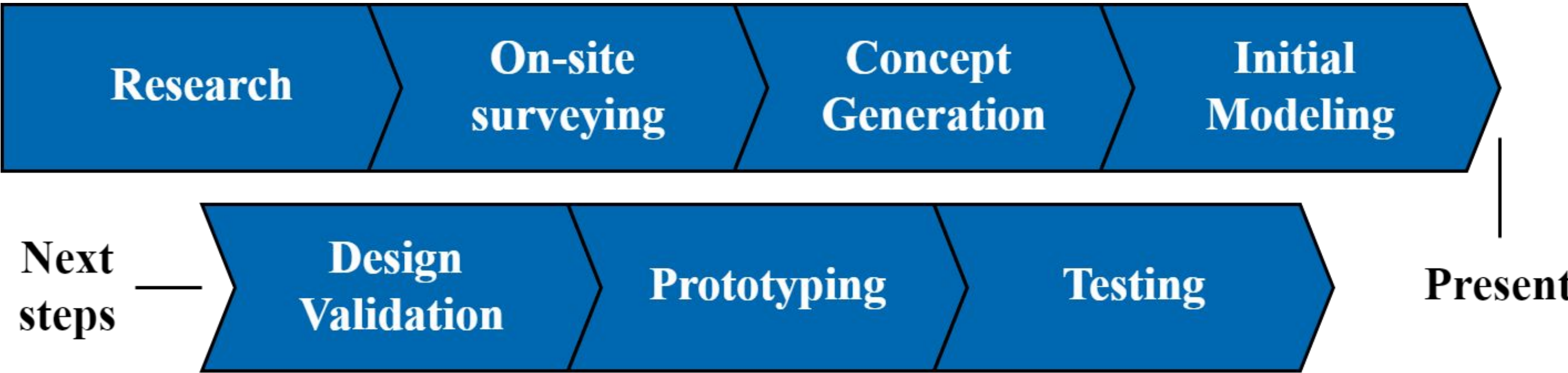
Clinical Survey

Figure 2. Results of a survey conducted by our team at the Mayo Clinic Hospital in Phoenix of a cohort of doctors, nurses and occupational therapists (n=26). Questions were posed as Likert statements, and consisted of satisfaction assessment of (1) ease of height adjustment, (2) ease of rolling/maneuvering, (3) frequency of patients asking for assistance, (4) reachability and (5) table durability.
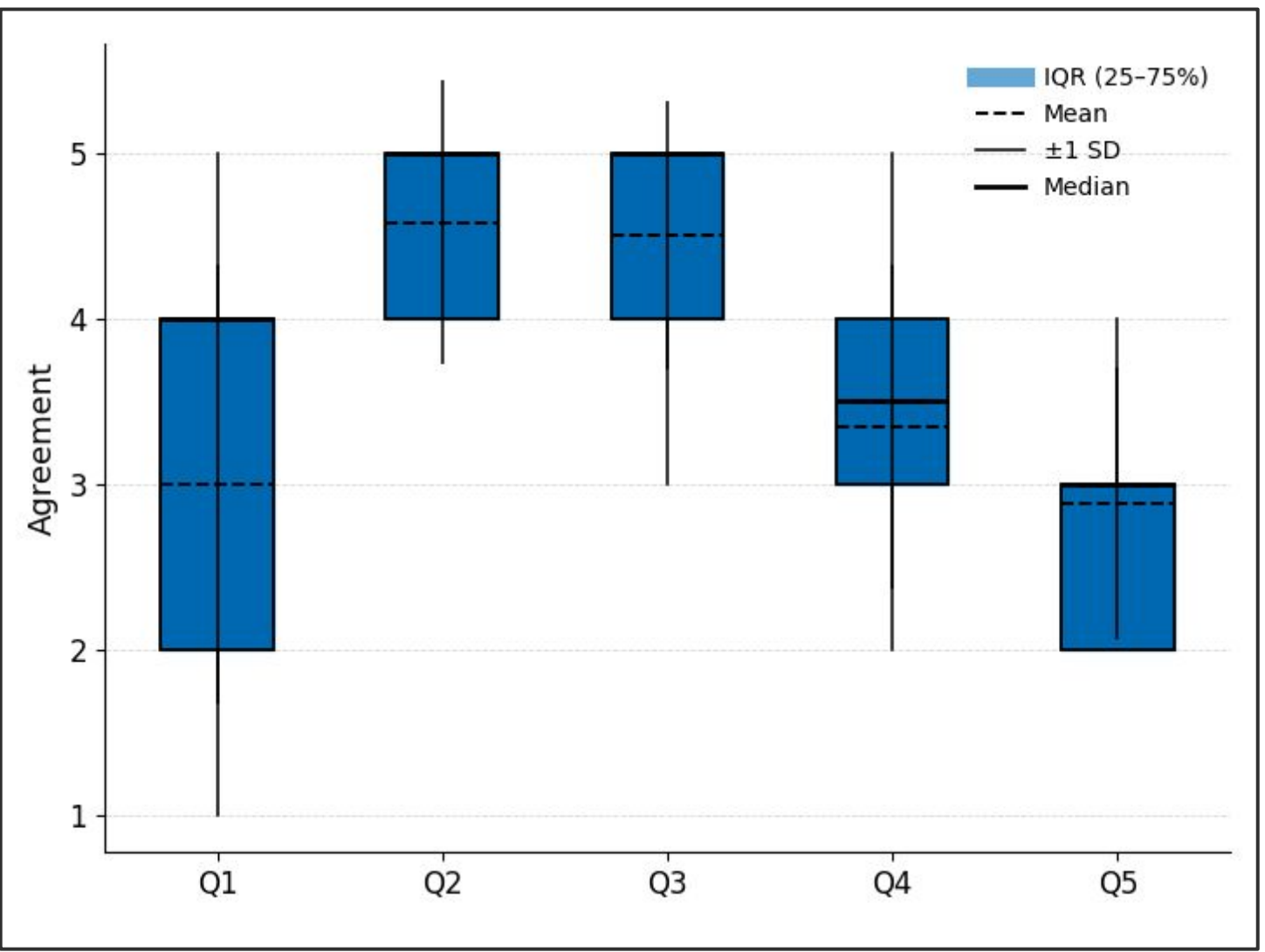
96.1% strongly disagreed that the table was easy to roll and maneuver
88.5% strongly agreed that patients frequently ask for help adjusting the table height.

Project Timeline

Research → On-site surveying → Concept Generation → Initial Modeling

Next steps — Design Validation → Prototyping → Testing → Present

Customer Needs/Metrics

Needs/Metrics	Target Value
Vertical adjustability range	27-46 in.
Arm reach	≥ 24 in.
Folded table profile	< 8 in.
Required push/pull force	≤ 10 N
Weight capacity	50 lbs.
Table surface (length x width)	30 x 15 in. minimum
Storage feature availability	Yes
Life cycle	$\geq 7{,}300$ cycles / 20 years
Estimated unit cost	$\leq \$200$

Product Architecture

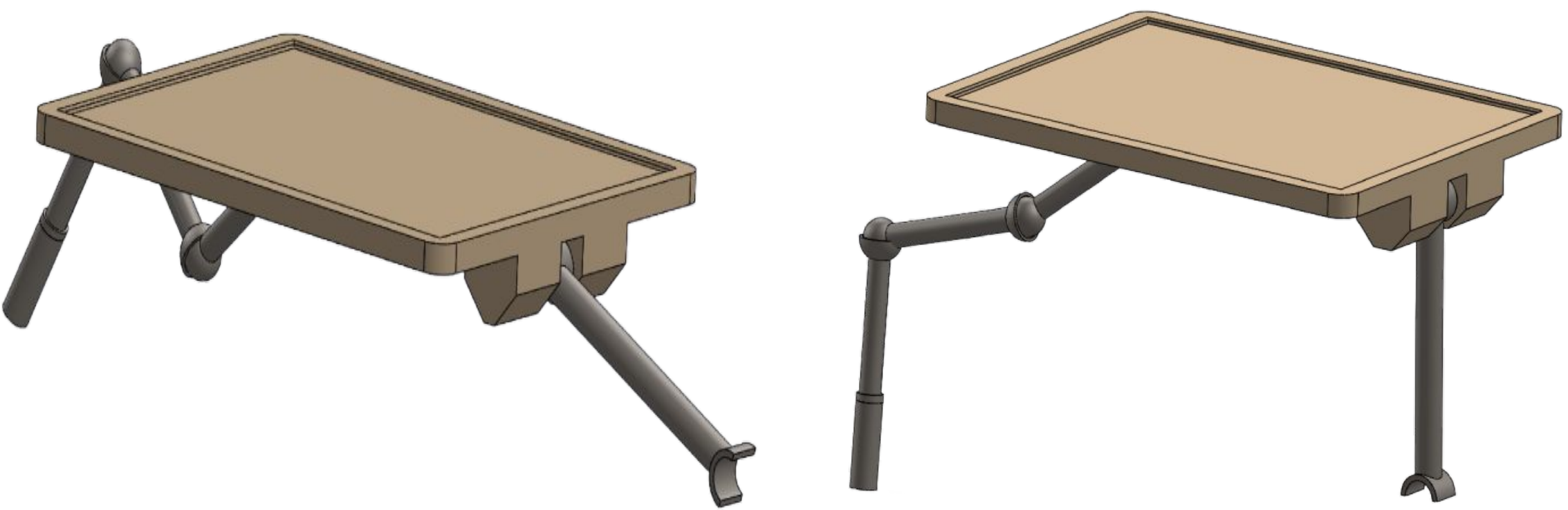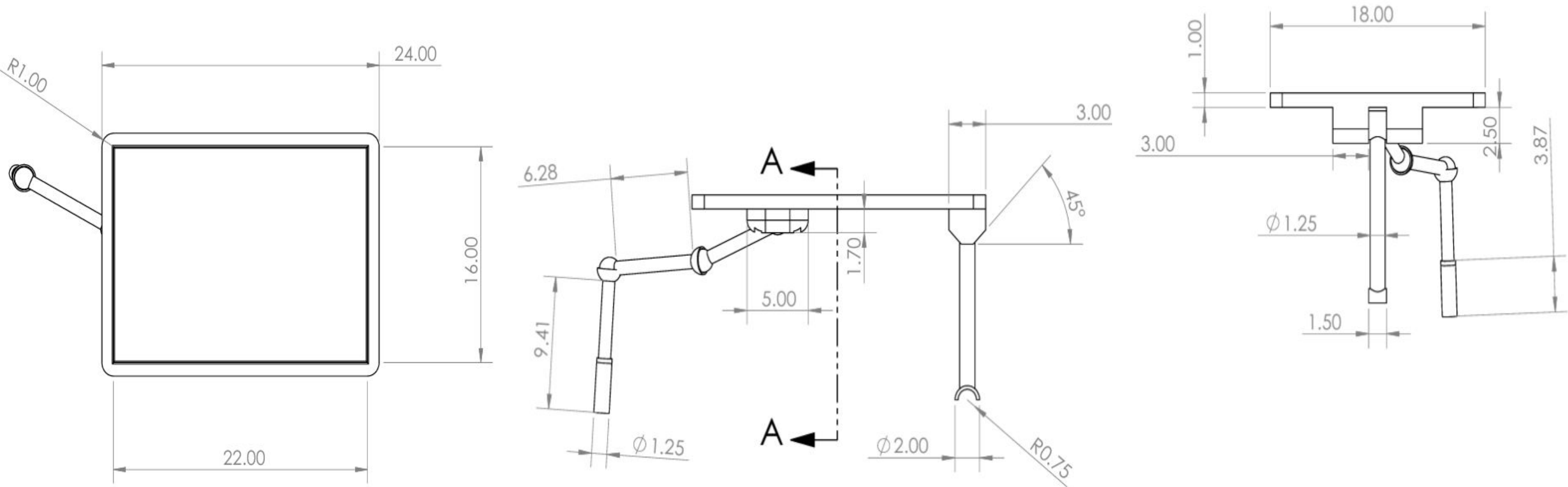| Translational Equilibrium	$\sum \vec{F} = 0$	Rotational Equilibrium	$\sum \vec{\tau} = 0$
Cantilever bending deflection	$\delta = \dfrac{FL^3}{3EI}$	Bending stress	$\sigma = \dfrac{FLc}{I}$
Torsional twist	$\theta = \dfrac{TL}{GJ}$	Euler buckling	$P_{cr} = \dfrac{\pi^2 EI}{(KL)^2}$

Figure 3. Proof-of-concept technical models of the Articulated Overbed Attachment concept., created and visualized on SOLIDWORKS.

Product Comparison

Target Metrics	Hill Rom Dual Top	Drive Tilt-Top	Stryker - Michael Graves	Stryker Tru-Fit	AtlasWorks Omni Table
Foldable	✅	❌	❌	❌	✅
Estimated Unit Cost (>$200)	❌	✅	❌	❌	✅
Storage Feature Availability	❌	❌	❌	✅	✅
Table Surface Minimum	✅	❌	✅	✅	✅
Vertical Adjustability Range	❌	❌	❌	❌	✅
Spill Containment Edge	❌	❌	✅	✅	✅
Table Top Tilt Feature	❌	✅	❌	❌	✅

Path to Market

Device type: Class I Exempt (low risk device)
Regulatory Pathway: No required premarket submission - must register all facilities with FDA and follow applicable QSR and cGMP requirements.

Status & Future Directions

Project Gantt Chart Outlines future directions and schedule for continued product development

Next steps:
- Refine Technical Models
- Begin prototyping
- Performance testing

Acknowledgements