Precisian Medical Instruments: Corporate Profile and Vactor™ Technical Overview

1. Corporate Identity and Strategic Vision

Precisian Medical Instruments (PMI) is a disruptive force in the medical technology sector, engineered to resolve the systemic failures of legacy airway management in high-stakes environments. Our competitive advantage is rooted in "dirt-floor authority"—the strategic intersection where combat-proven experience meets high-level surgical expertise. By identifying critical capability gaps in the "Ruck" model of care—where current tools are either too cumbersome for individual carry or too mechanically weak for clinical efficacy—PMI has established a new operational standard for point-of-injury intervention.

The leadership team provides a unique multi-disciplinary moat. CEO Morgan Keane brings 22 years of experience as a Navy SEAL, including 15 years within one of the nation's premier Special Missions Unit. Co-founder and product inventor Abby Abouhaib provides the front-line perspective of a Special Operations Medic, while Dr. Brian Knipp, a Vascular Surgeon, provides surgical oversight to ensure clinical rigor. This core is supported by Morgan Miller, who provides the "method to the process" and leads Gen 2 regulatory research, and Lindsey Keane, whose background in finance and data management ensures that our Quality Management System (QMS) and accounting structures are hardened for scalability and audit readiness.

PMI's "No Fail Mission" was forged in a 2023 pediatric trauma response where co-founder Abby Abouhaib found himself helpless when both primary powered suction and manual backups failed to clear a flooded airway. PMI exists to ensure that no medic is ever forced to watch a life slip away due to equipment bulk or mechanical failure. This mission has culminated in the Vactor™, a technical solution engineered to bridge the gap between the hospital trauma bay and the point of injury.

2. The Vactor™: Form, Ergonomics, and Design Philosophy

In the "Ruck-Truck-House" care model, a tactical capability gap exists in the "Ruck" phase. While vehicles (Truck) and facilities (House) utilize powered suction, the individual medic (Ruck) has been historically relegated to manual pumps or no suction at all. The Vactor™ is strategically engineered to fill this void, providing hospital-grade power in a "Pocket-Ready" form factor.

The device is a 0.4–0.5 lb cylinder (188mm length, 40mm diameter) designed for seamless integration into a standard M4 magazine pouch. The Vactor™ is defined by three core Design Principles:

- **Adaptable**: Designed to integrate into diverse medic preferences and complex clinical workflows
- **Quick**: Optimized for high-intensity, time-sensitive deployment.
- **Secure**: Featuring a cylindrical, anti-snag form factor for controlled handling and rapid retrieval from tactical kits.
- **Platform:** Future capability development is as simple as a new head for a new purpose i.e. wound vac, infusion, transfusion, compression, etc.

Ergonomic refinements include a **tethered button cap architecture** that prevents the loss of protective components in high-stress field environments. The User Interface (UI/UX) utilizes tactile flow adjustment buttons for "blind" navigation with gloved hands and a "Stealth Mode" LED architecture. In Stealth Mode, LEDs are dimmed and programmed with a three-second timeout to maintain light discipline and operator security. This marriage of physical form and intuitive control ensures that the Vactor™ remains an asset, never a liability.

3. Functional Performance and Engineering Architecture

The "Medic's Dilemma" forces providers to choose between 11-pound powered units left in a vehicle or manual alternatives that lack the vacuum pressure to move viscous fluids. The Vactor™ resolves this trade-off by utilizing a **$90 custom US-manufactured motor** to deliver NIH required power within an ultra-portable frame.

Performance is benchmarked against ISO 10079-4 standards using a **TSI 5200 flow meter**. Through a proprietary **eccentric cam modification**, the Vactor™ achieves vacuum levels consistent with clinical requirements:

Device Setting	Vacuum Level	Fluid Flow rate	Test Duration	ISO 10079-4 Category
High (100% PWM)	18.3 kPa (137 mmHg)	1.9 L/min	10s	Low vacuum/low flow
Medium (75% PWM)	16.9 kPa (127 mmHg)	1.3 L/min	10s	Low vacuum/low flow
Low (50% PWM)	15.9 kPa (120 mmHg)	1.0 L/min	10s	Low vacuum/low flow

A critical engineering innovation is the "Quick-Swap" pump head system. Clogs from thick debris are the primary cause of trauma device failure; the Vactor™ allows the operator to snap off a compromised head and twist on a sanitary replacement in under three seconds. Internal flow is further optimized via **6mm internal diameter tubing**, providing the ideal balance of vacuum pressure and flow rate.

To de-risk capital and compress the timeline to market, PMI is utilizing a **"Bridge Tooling"** (soft tooling) strategy. This allows for the production of the first 12–15 units by mid-May for **MIL-STD 810H, FDA, ISO and CE** validation without the immediate overhead of hard tooling. The "Spin 2" PCB hardware stack (comprising MCU/Control, UI/UX, Button, and Motor boards) demonstrates advanced engineering maturity, transitioning the Vactor™ from a design file to a field-ready asset.

4. Market Analysis: Military and Civilian Deployment

The Total Addressable Market (TAM) for airway management is valued at $4.5 billion. Geopolitical shifts, specifically the rise of drone warfare (accounting for 70–80% of casualties in recent conflicts), have caused a surge in severe maxillofacial and upper-body blast injuries. These injuries and the expectation of extended field care for trauma victims in conflict areas make portable, powered suction a mandatory fulfillment item rather than a luxury tool.

- **Military/Federal**: The strategic goal is to transition the Vactor™ from a tool to a mandated equipment list item. With PMI's access, placement, and history within the Special Operations Command (SOCOM) and the Joint Special Operations Command (JSOC) and its subordinates **Combat Applications Group, Naval Special Warfare Development Group, 24th Special Tactics Squadron, 160th SOAR** as early adopters and concurrently working with **Dr. Jen Gurney** at the Joint Trauma System (JTS), PMI is moving to embed the Vactor into **Clinical Practice Guidelines (CPGs)**. This triggers a fulfillment mandate across the DoD. Current engagement includes the Irregular Warfare Technical Support Directorate (IWTSD), elements of the **State Department, Justice Department, Customs and Border Patrol**, and the **Federal Bureau of Investigation's Hostage Rescue Team**, which serves as a gateway to 56 DOJ SWAT teams.
- **Civilian/EMS**: High demand exists within SWAT teams, Flight Medicine, Wildland Fire support (REMS) and multiple independent EMS departments across the nation. These sectors mirror the weight and space constraints of the battlefield.
- **NATO/FVEY:** Initial interest and demand from NATO partners is increasing as this capability enters the purview of foreign SOF and EMS. Norway, Sweden, Denmark, Poland, Germany, Netherlands to name a few.

Unlike legacy "big box" units like the Laerdal LSU or SSCORT, which are "bag-ready" at best, the Vactor™ offers a "hands-free" powered alternative that stays on the medic's person, secured by the operational moat of domestic production.

5. Manufacturing Strategy and Regulatory Roadmap

PMI is committed to a 100% US-based and TAA compliant manufacturing strategy. This ensures strict compliance with Federal Acquisition Regulations (FAR) and DFARS, creating a competitive moat for DoD acquisitions and mitigating supply chain volatility.

The regulatory roadmap and QMS is managed through **Formwork (Open Regulatory)**, directed by Lindsey Keane and supported by FDA Consultant Jerry Sudduth of Imangel Consulting. PMI is moving toward an FDA 510(k) Class II submission, supported by objective evidence from **MIL-STD 810H survivability and exposure testing** (including Method 512 for IP67 Immersion) with lab partner **Intertek**.

The Vactor™ stands as the definitive future of austere airway management.

6. Contact

Morgan Keane | CEO | morganjkeane@precisianmedical.com

Morgan Miller | COO | morgan.miller@precisianmedical.com