

1. Problem Definition

Dental offices have trouble tracking composite material uses:

- Large number of SKU's
- Small size makes tracking tedious
- Inventory distributed in operating room

Consequences of lack of tracking:

- Use alternatives with non-matching shades and characteristics
- Carry large inventories



Figure 1: Composite Material - Compule

2. Project Scope

- Develop the specifications for the physical data collection system.
- Develop database and tools to support inventory tracking and data analysis.
- Develop simulation model to determine the impact of system implementation and order policies.

3. Smart Drawer Concept

- Track material using photo-resistor modules
- Each slot assigned to an SKU
- Automatically detect consumption, inventory levels
- Send data to server in real-time
- Provide reports, tracking tools, reorder levels

10. Acknowledgements

- Bluelight Analytics Inc.
- Dalhousie University
- Industrial Engineering Department Faculty and Staff

4. Smart Drawer Design

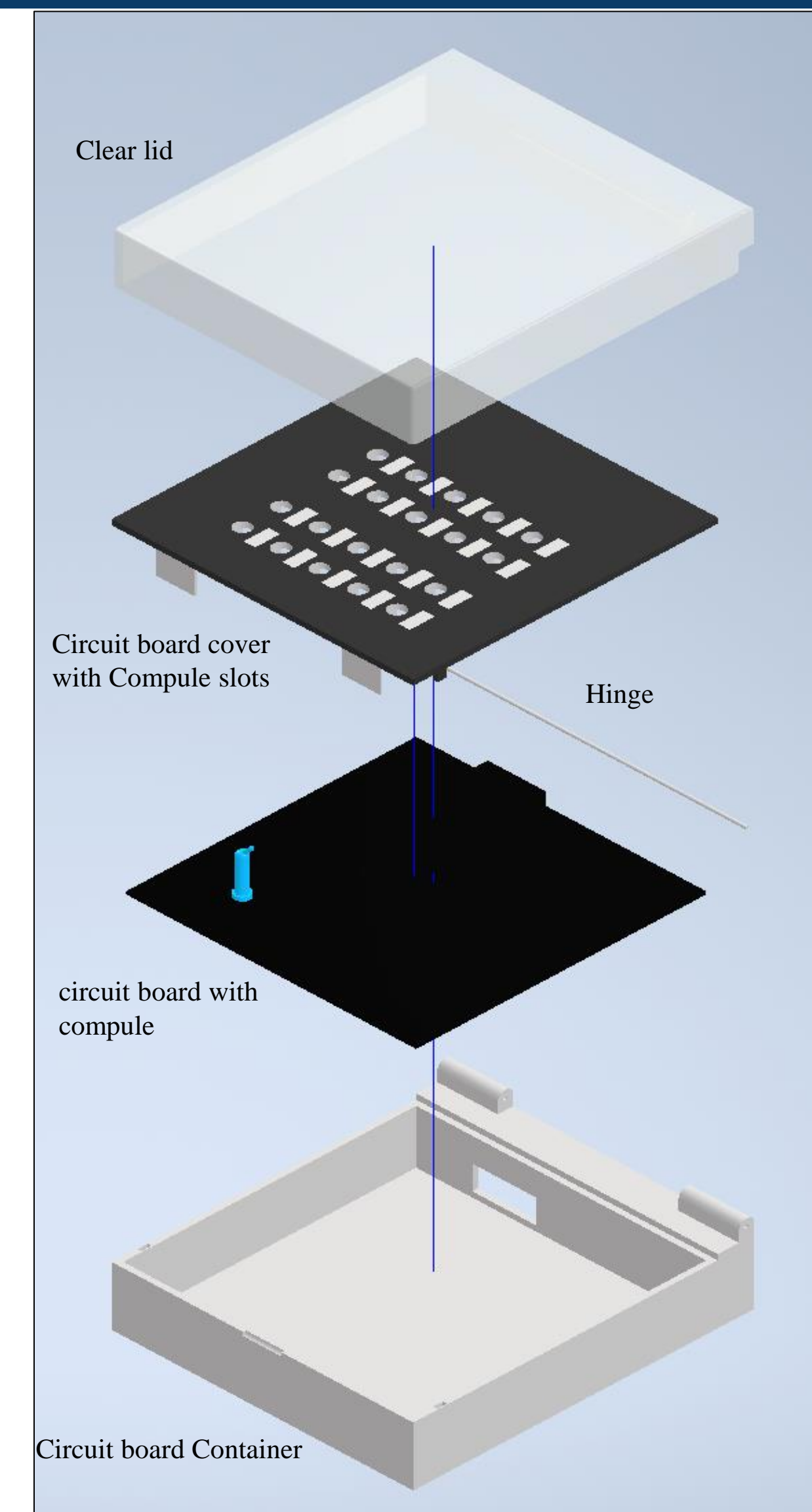


Figure 2: Overall Assembly

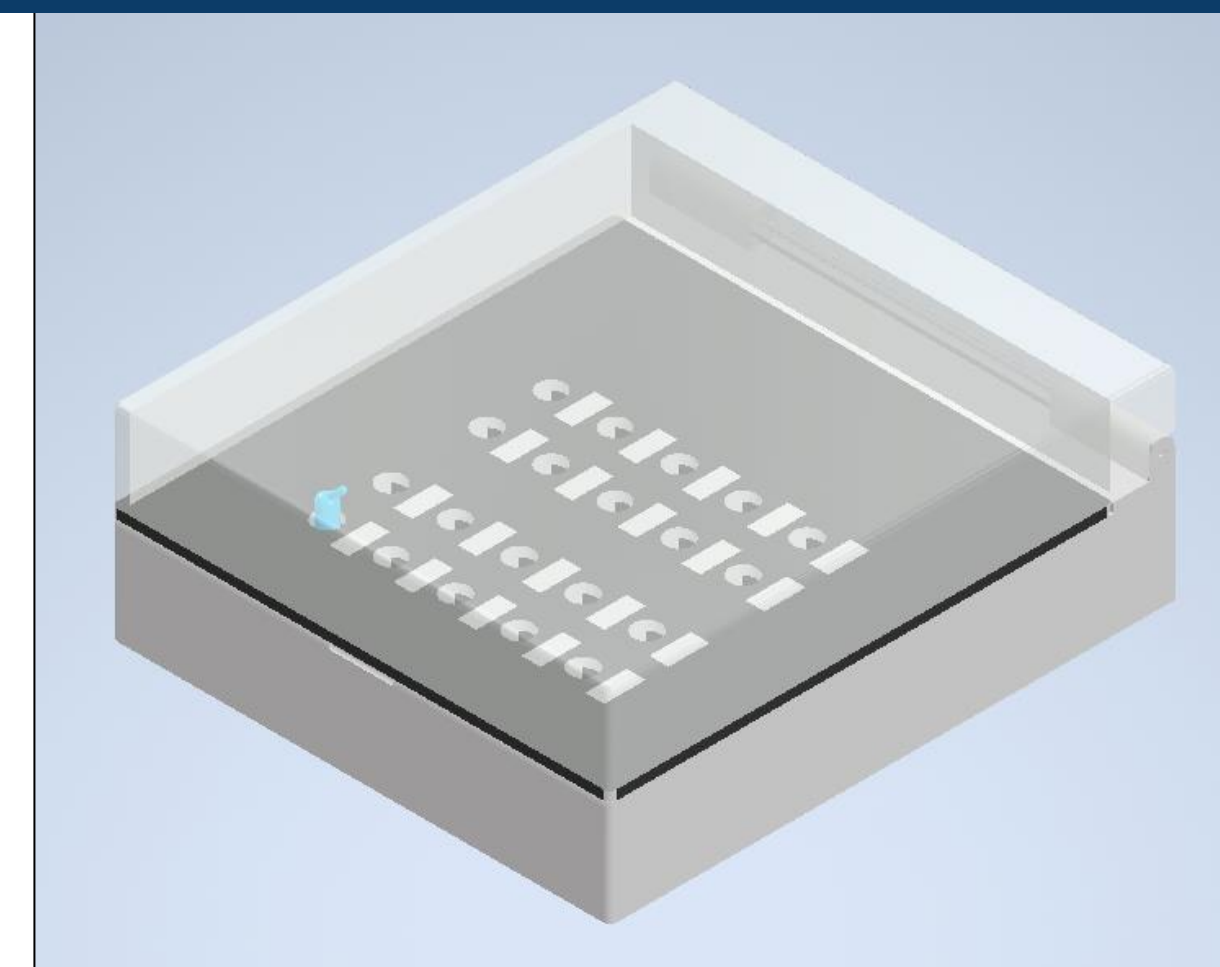


Figure 3: Fully Assembled Compule Container

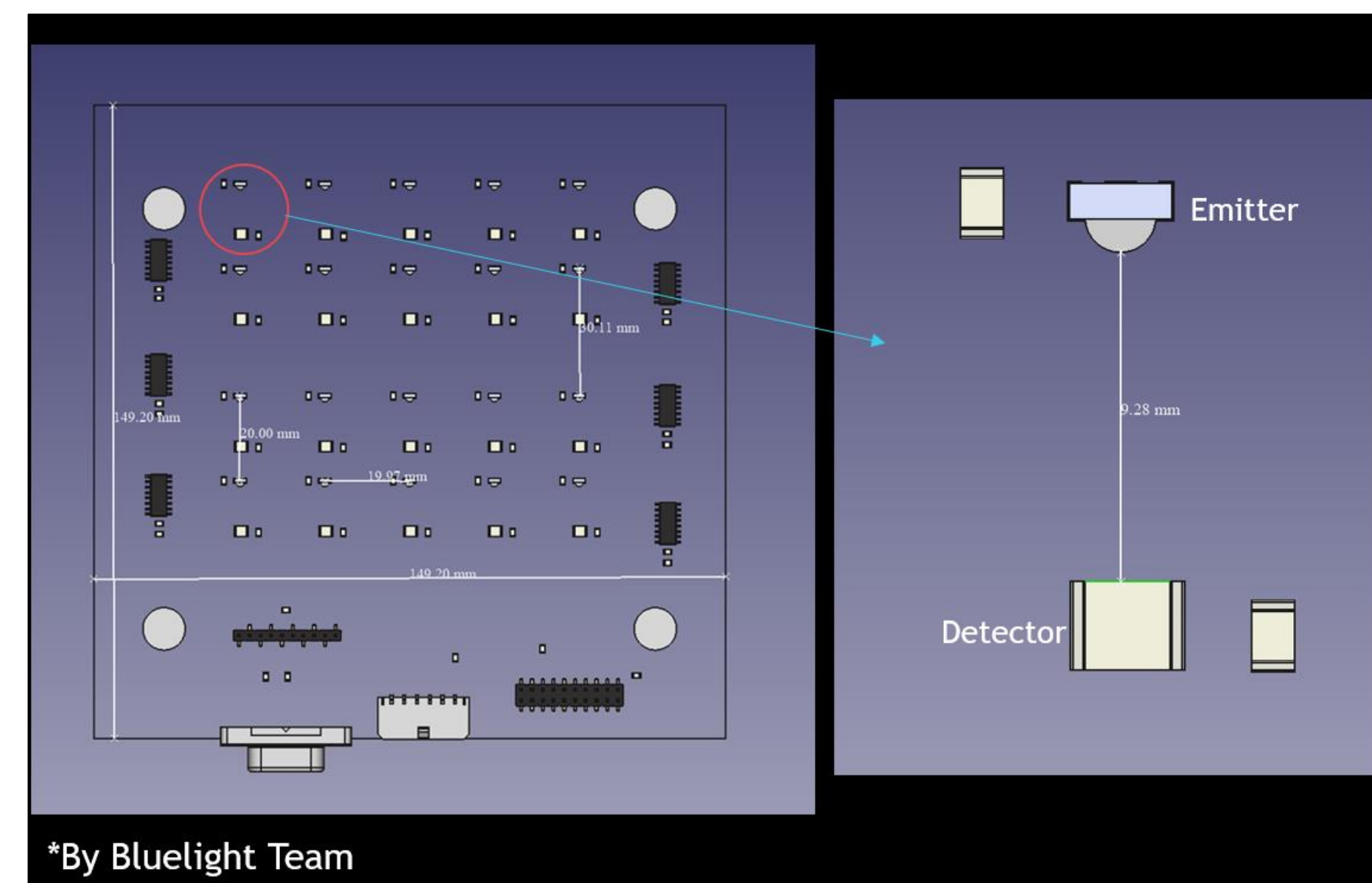
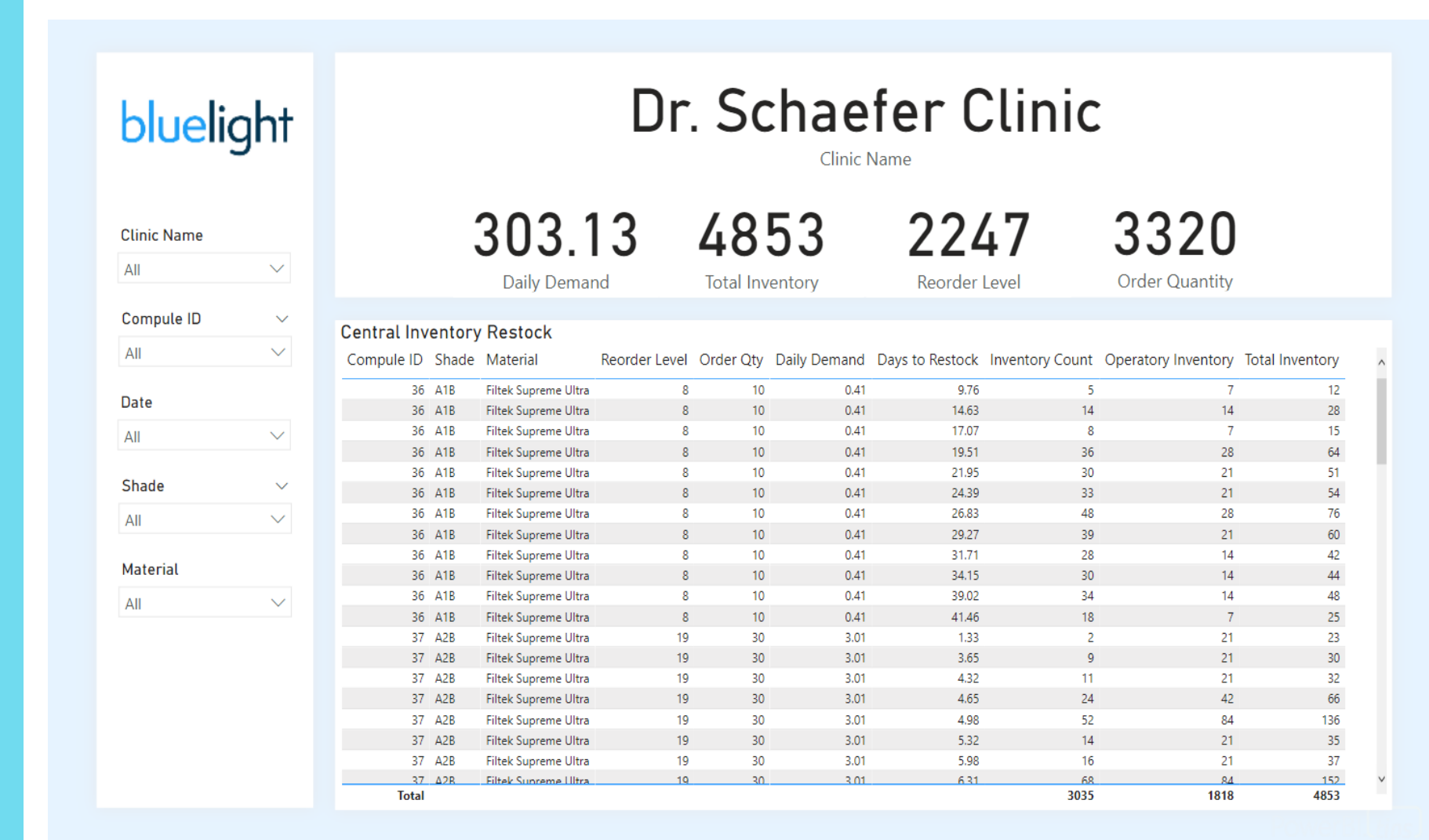


Figure 4: Circuit Board with Sensors (20 capacities)

5. Data Analytics and Reporting

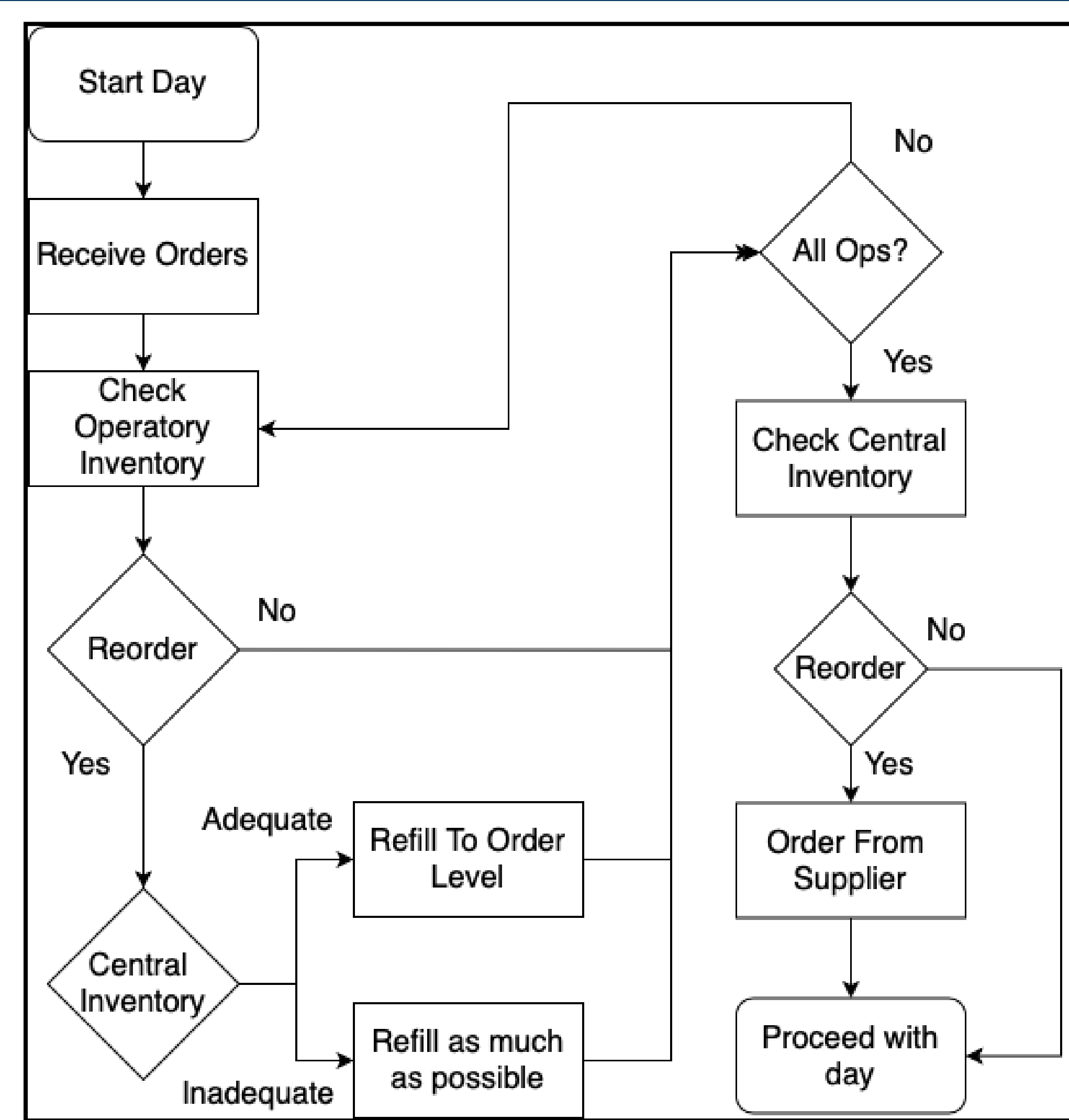


Reports to give overview of inventory level and consumption of different products over time.



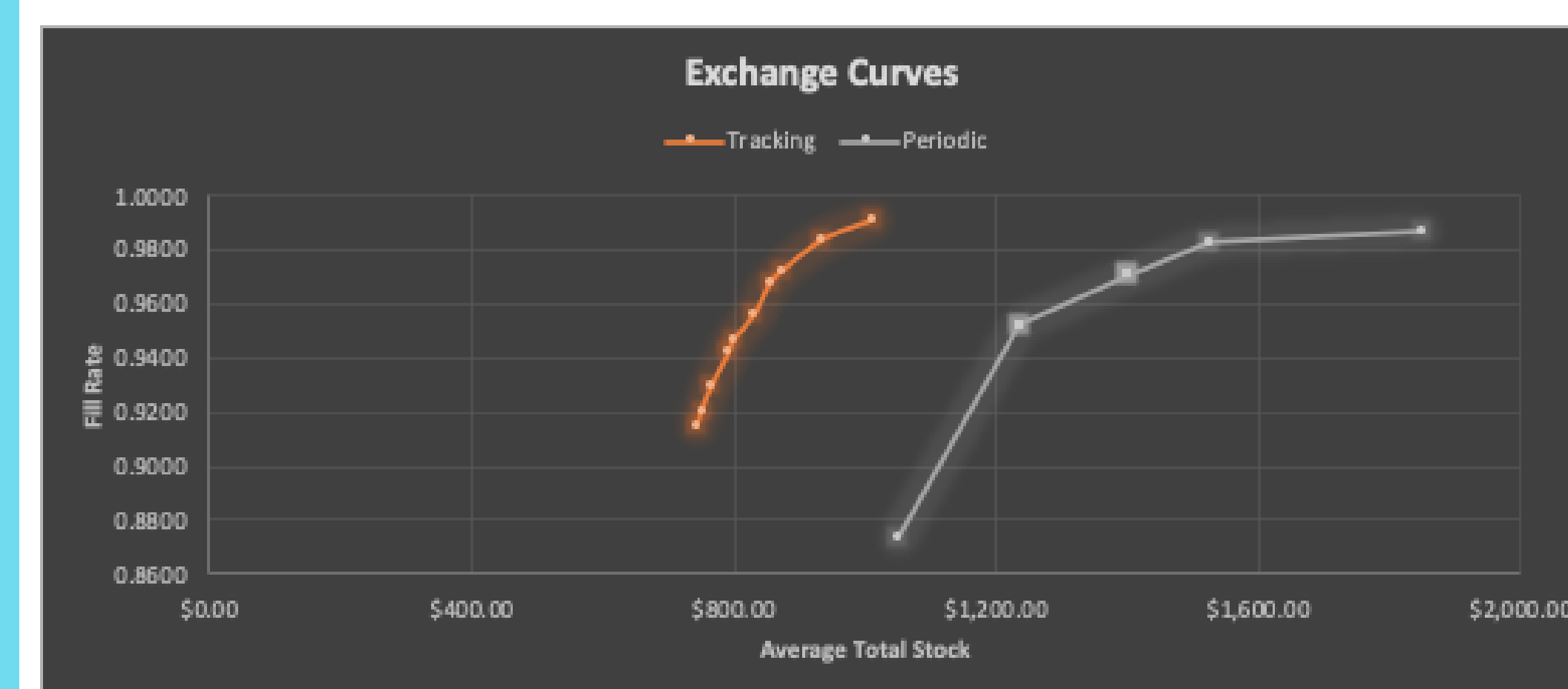
Reports to give current inventory level, reorder level, and estimated time to reorder for different SKUs.

6. Simulation Model



- The flowchart illustrates the simulation of the tracking system in the dental office.
- Daily demands generated according to a Poisson distribution to mimic real time data

7. Simulation Results



		Current System	Tracking System
Fill Rate	Ave.	0.9707	0.9726
	CI	0.0019	0.0013
Inventory	Ave.	\$1,402.14	\$872.56
	CI	\$10.44	\$2.70
Safety Stock	Ave.	\$950.97	\$372.56
	CI	\$10.44	\$2.70
Reduction in Stock			62%
Reduction in Safety Stock			39%

Simulation shows a 40% reduction in stock levels required to meet fill rate targets.

8. Outcomes

- Automatic, real-time tracking of Inventory at the compule level in all locations.
- Tools to calculate consumption rates
- Reorder policy to order from suppliers
- Models to determine optimal reorder policies based on consumption rates (Exchange Curves)

9. Other Recommended Uses

- Use forecasting models on demand data generated to inform reorder policies
- Evaluate demand for new products to determine whether they should be stocked