innovation works
CASE STUDY

Sensing and IoT Lead to Smarter Care: Pioneering the Autonomous Pharmacy



Modern healthcare is moving beyond traditional hospital walls, extending care delivery into patient-centered clinics and ambulatory facilities. Yet, as medications move closer to patients, real-time oversight of drug inventory is inadequate, creating inefficiencies, inflated costs, and mounting stress and strain on care teams. Legacy tools have failed to keep pace, leaving health systems without the digital insights to manage one of their largest and least understood assets.

After decades advancing healthcare technologies from robotic systems to molecular imaging platforms, **Douglas Descalzi** saw a clear opportunity in the market to reinvent pharmacy logistics. In 2023, he founded **Thiopoly**, ideating a novel solution that leverages passive sensing and real-time intelligence to automate inventory tracking and bring seamless efficiency to the drug supply chain.

Thiopoly's flagship platform, Thio, redefines medication management with quiet precision and intuitive design. Through a simple but elegant app, staff gain immediate visibility and control, transforming daily workflows into seamless digital experiences. Modeled as a true plug-and-play system, Thio is built on a secure cellular internet-of-things (IoT) network that connects directly to the cloud—which means a light IT lift, no capital investment burden, and limitless scalability. Every inventory interaction is automatically logged, creating a continuous digital record that powers predictive intelligence and sets the stage for a new era of autonomous pharmacy management.

By fusing advanced sensing, cloud connectivity, and seamless usability, Thiopoly is creating a transparent, interoperable, and always-on digital pharmacy ecosystem. The platform is modernizing how healthcare manages medication in the digital era—bringing intelligence, speed, and simplicity to the front lines of care.

Challenge

Thiopoly is transforming medication management with intelligent automation, replacing tedious manual counts and audits with seamless, data-driven workflows. In 2024, the company launched its year-long Digital Visibility in Pharmacy pilot program, partnering with leading US health systems to test how sensing, IoT, and cloud technologies can deliver real-time intelligence across the pharmaceutical supply chain.

Executing the pilot required hundreds of devices, as well as cloud and mobile applications for end-to-end testing across multiple clinical sites. Scaling production to meet that demand—and ensuring each prototype performed reliably—posed a pivotal challenge. To succeed, Thiopoly needed hands-on prototyping support, dedicated workspace, precision machining, and a streamlined manufacturing workflow that could rapidly translate concepts to clinical deployment.

Project Details

Company:
Thiopoly

Year Founded:
2023

Founder:
Douglas Descalzi

Programs Participated In (Year):
Innovation Works Seed Fund (2024)
Robotics Factory Scale Program (2024)



Solution

Thiopoly's path from concept to commercialization was fueled by teamwork, persistence, and the strength of its regional creative network. With early seed funding from Innovation Works and hands-on support through the Robotics Factory Scale Residency, the company gained not only capital but access to expertise, workspace, and the technical infrastructure essential for advancing from prototype to pilot. Descalzi and team worked alongside Robotics Factory engineers to machine custom parts, assemble pilot units, and build a demonstration rack that brought their technology to life for health system partners. The residency provided critical prototyping tools like 3D printers, fabrication equipment, and collaborative lab space that accelerated development and de-risked early manufacturing.



During their year-long trial across five health systems, Thiopoly deployed more than 120 devices at 16 locations, tracking 65 drugs and capturing over 20,000 real-world inventory transactions. The results speak for themselves. The pilot demonstrated high accuracy, strong ROI potential, and measurable improvements in safety, compliance, and workflow efficiency, validating the company's sensing and communication technologies at scale.

By early 2025, Thiopoly had closed its seed round, hired CTO **Will Spies**, and successfully completed its institutional pilots. Throughout this process, Innovation Works and the Robotics Factory offered mentorship, flexible lab and office access, and guidance on scaling strategies and business operations. Now entering commercialization, the company is integrating all learnings into its sixth-generation data-driven solution, while continuing to collaborate with trial partners as it prepares for the next phase of growth. Demonstrating his continued commitment to the Robotics Factory's mission of advancing innovation in the region, Descalzi signed on to mentor emerging entrepreneurs through their Accelerate program.



Innovation Works and Robotic Factory collaboration has been an incredible catalyst for reaching our first milestones."

--Douglas Descalzi
Founder, Thiopoly

Thiopoly's success stems not only from its visionary technology but from a vibrant regional network of partners and advisors. Pilots with trusted local health systems validated their novel approach, while regional design firms Bally Design and Daedalus helped refine hardware and prototypes from concept to working units. Founder Doug Descalzi and CTO Will Spies harnessed these strategic partnerships to bootstrap the platform to trial-ready status. Now operating out of their Lawrenceville HQ, Thiopoly prototypes, tests, and fine-tunes every nuance of the platform, turning meticulous iteration into a launchpad for a smarter, more transparent, and connected pharmacy future.

Innovation Works and the Robotics Factory

Innovation Works is one of the most active early-stage investors in the country and the most active in Pennsylvania. Since its inception of the seed fund in 1999, Innovation Works has invested in over 780 companies that have gone on to raise $3.4 billion in follow-on funding. Innovation Works is part of the Ben Franklin Technology Partners network, which has catalyzed economic growth over the last 30 years by providing access to capital and networks that help foster innovation and technology-based economic development in Pennsylvania. The Robotics Factory is an array of robotics programs led by Innovation Works and the Pittsburgh Robotics Network. Learn more at **innovationworks.org** and **roboticsfactory.org**.