

NYX: Continuous, Affordable Vital Sign Monitoring for Every Bed

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Concept

On a typical hospital ward, vital signs are often checked only every 4 to 6 hours. In between rounds, a patient can drift from stable to critical without anyone noticing until the next check. Many in-hospital emergencies are preceded by abnormal vital signs that were present but not acted on in time, which leads to late rapid-response calls, avoidable ICU transfers, longer stays, and preventable mortality.

NYX closes that gap by making continuous monitoring practical on any ward bed. It is a reusable, medical-grade headband paired with a secure clinical dashboard that provides continuous trends, real-time alerts, and clinician-ready summaries, without the infrastructure and maintenance burden that keeps continuous monitoring treated like an ICU luxury.

1. The Problem NYX Solves

Problem 1: Missed monitoring. Intermittent checks create long blind spots. Many patients are assessed only every 4 to 6 hours, and staffing limits make continuous observation unrealistic, with nurse to patient ratios reaching roughly 1 to 19 at night and more than 1 to 25 during the day. When early warning signs are missed, conditions like sepsis and respiratory compromise can progress before intervention, worsening outcomes and increasing cost. Problem 2: Global gap and pricing. Traditional bedside monitors are priced for intensive care, costing roughly \$3,500 to \$8,000 per bed, with advanced configurations reaching five figures, so coverage is limited to the highest-risk patients. Consumer wearables are not validated for inpatient monitoring and are not integrated into clinical alerting or documentation, leaving most general

wards without scalable, affordable continuous surveillance. Problem 3: Maintenance burden. Many sites cannot keep monitors calibrated and in service due to limited parts, tools, and biomedical technicians, and calibration drift reduces trust. In low-resource settings, roughly 30 to 50 percent of donated monitoring equipment becomes unusable within a year, forcing wards back to intermittent spot checks.

2. Customer Segments

NYX serves three customer segments with the same need: reliable continuous monitoring at low total cost of ownership. In U.S. hospitals, NYX targets general wards where staffing and budget constraints limit surveillance, so patients rely on intermittent spot checks. NYX pairs reusable headband kits with a nurse-facing dashboard to provide unit-wide visibility and actionable alerts without ICU-grade infrastructure everywhere. NYX also fits settings where affordability and maintainability determine whether monitoring is possible. For NGOs, Ministries of Health, and LMIC hospitals, NYX is reusable, modular, and supports one-tap calibration without specialized tools, enabling near-cost hardware with sustainable recurring software and service revenue. For senior care, long-term care, and clinics, NYX supports long-wear monitoring to reduce avoidable transfers by detecting early deterioration and routing alerts to the right staff with simple workflows that can scale across facilities.

3. The NYX Solution

Solution 1: Continuous monitoring. NYX is a reusable headband that continuously measures heart rate, respiration, temperature, and motion. It uses multiple sensors to stay accurate during normal movement, including PVDF film strips for chest movement, an accelerometer for motion

and posture, MEMS microphones for breathing sounds, and thermal sensors for temperature, with optional radar support. This redundant design supports clinical reliability and a credible path toward FDA Class II 510(k) clearance.

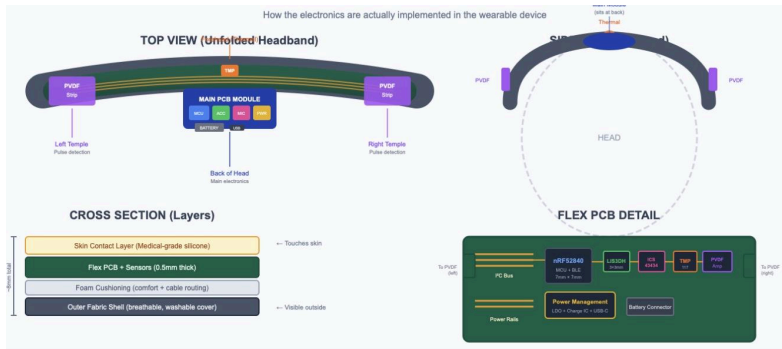


Figure 1. Headband Design Layout

Solution 2: Affordable care. NYX is designed to reduce total cost by avoiding consumables and heavy servicing, addressing monitoring costs that can reach \$15,000 to \$25,000 per bed annually. It transmits encrypted data via Bluetooth to a secure clinical dashboard for nurse-station monitoring. In internal testing across 1,000 recorded sessions, 89 percent of measurements were within plus or minus 3 beats per minute for heart rate and plus or minus 1.5 breaths per minute for respiratory rate compared to a reference monitor.

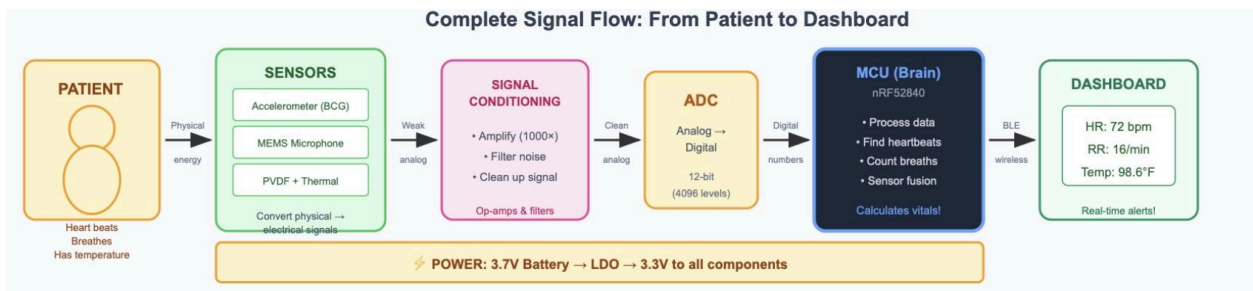


Figure 2. Data Flow Diagram from Patient to Dashboard

Solution 3: Reliability. NYX includes a one-tap calibration check in the dashboard so staff can verify sensor performance without external tools. A protective, water-resistant casing and modular parts enable low-cost replacement and reduced downtime. Predictive alerts help flag drift early so devices stay accurate and in service longer.

4. Why NYX Is Different and Better

NYX is designed for non ICU realities, where staffing, budget, and workflow make continuous surveillance difficult. It closes the monitoring gap by replacing intermittent spot checks with continuous trends and actionable alerts for heart rate, respiration, temperature, and motion using a redundant sensor suite built to stay reliable through normal patient movement. NYX is affordable and reusable, avoiding consumables and heavy servicing, and it is maintenance light through one tap calibration in the dashboard plus modular, low cost part replacement. Its clinical value is software first: a secure nurse-facing dashboard delivers real time patient lists, trend graphs, role based alert routing, daily clinician summaries, and EMR compatible export, so staff get decision ready insights instead of noisy raw streams. Compared with ICU bedside monitors, NYX delivers ward scale coverage at a fraction of the total cost, and compared with consumer wearables, it is built for clinical workflows, validation, and integrated alerting rather than fitness tracking.

5. Underlying Economics and Revenue Streams

| Revenue Stream | NGOs | US Hospitals | U.S. senior-care /clinics | Profit Margin |
|-----------------------|---------|--------------|---------------------------|---------------|
| Product Kits | \$80-85 | \$115 | \$80-85 | 31% |
| Software Subscription | \$100 | \$300-500 | \$90 | 66% |
| Bulk Product Kits | \$100 | \$120 | \$90 | 28% |

Table 1. Pricing Chart

NYX earns revenue through three streams: direct Product Kit sales, Bulk Product Kit rollouts, and recurring Software Subscriptions attached to each installed site. Subscription revenue is designed to stay high-margin and predictable, helping cover production and distribution costs as deployments scale, resulting in an estimated blended margin of ~33% in Year 1. Costs are engineered to enable tiered pricing. Core manufacturing is modeled near \$42 per unit; when packaging, logistics, compliance, and embedded reliability work are included. Hardware can be priced near cost for NGO and LMIC programs, while higher-income hospital pricing and subscriptions provide margin. They are priced per facility and tiered by bed count because alert volume, onboarding effort, and support needs rise as sites scale.

6. Team, Traction, and Milestones

NYX is led by a cross functional team across biomedical design, hardware, product, and business, with guidance from advisor Narayan Rajan, who runs insurance at Persistent, assisting with marketing plans. Vedant Kalipatnapu leads biomedical design (iGEM) , Vedant Mehta leads hardware (Stanford lab experience) , Shaunak Buche leads product design (United Nations Intern) , and Vishwa Rajan leads business development (JEC global events).

We have completed the design of our initial prototype and have ordered components and boards to begin assembly and bench testing. We are working with Augusta University and Emory University on clinical validation planning and workflow alignment, and we are engaging Georgia Tech innovation resources to strengthen engineering validation and dashboard development. We are currently building the NYX clinical dashboard with all previously mentioned features. Planned milestones include clinical validation in 2026, regulatory preparation toward a Class II 510(k) submission in late 2026, and early institutional and NGO-supported pilots in 2027.